

Environmental  
Product  
Declaration

In accordance with ISO 14025:2006 and EN  
15804:2012+A2:2019/AC:2021. for:

**EPD**  
INTERNATIONAL EPD SYSTEM



### Plywood

from

**Samrat Plywood Limited**



Programme:	The International EPD System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
Licensee:	International EPD System India
Type of EPD:	EPD of multiple products, based on a representative product
EPD registration number:	EPD-IES-0022924
Version date:	2025-10-03
Validity date:	2030-10-02

*An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see [www.environdec.com](http://www.environdec.com)*



## GENERAL INFORMATION

Programme Information		
<b>Programme:</b>	The International EPD® System	EPD India
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden	EPD India, a licensee of the International EPD® System 422, Midas, Sahar Plaza Mumbai, India- 400059
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a> ,	<a href="http://www.environdecindia.com">www.environdecindia.com</a>
<b>E-mail:</b>	<a href="mailto:support@environdec.com">support@environdec.com</a> ,	<a href="mailto:info@environdecindia.com">info@environdecindia.com</a>

Product Category Rules (PCR)
<b>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</b>
<b>Product Category Rules (PCR):</b> Construction products, 2019:14, version 2.0.1
<b>PCR review was conducted by:</b> <i>The Technical Committee of the International EPD® System. A full list of members available on <a href="http://www.environdec.com">www.environdec.com</a></i>
<b>c-PCR, if applicable:</b> Not applicable

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
<input checked="" type="checkbox"/> <b>EPD Verification by accredited certification body</b>
 <b>Third-party verifier:</b> Eurocert S.A. 89 Chlois St. & Likoviriseos, 14452, Greece Email: <a href="mailto:info@eurocert.gr">info@eurocert.gr</a> <a href="http://www.eurocert.gr">www.eurocert.gr</a>
Eurocert S.A is an approved certification body accountable for the third-party verification. The certification body is accredited by: Hellenic Accreditation System (E.S.Y.D.), Accreditation number 21-8
*EPD process certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on <a href="http://www.envrondec.com">www.envrondec.com</a> .

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes       No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterization factors); and be valid at the time of comparison.

For further information about comparability, see EN 15804 and ISO 14025.



## **INFORMATION ABOUT EPD OWNER**

Owner of the EPD: Samrat Plywood Limited

Address: E 36, Industrial Estate, Yamuna Nagar, Haryana-135001

Contact: Puneet Singhal, [puneetsinghal@samratply.in](mailto:puneetsinghal@samratply.in)

Address and contact information of the LCA practitioner commissioned by the EPD owner, if applicable: **Nirantara Ecoventures Private Limited, [ganesh@nirantara.solutions](mailto:ganesh@nirantara.solutions)**

Description of the organisation: Samrat Plywood Limited is a distinguished Indian company specializing in the production and distribution of premium plywood and wood-based products. Renowned for its commitment to quality, innovation, and customer satisfaction, the company offers a diverse range of solutions, including plywood, laminates, VHDHMR, and high-pressure laminates (HPL), serving industries such as furniture, interior design, and construction.

With a reputation for delivering durable and aesthetically pleasing products, Samrat Plywood has become a trusted name in the wood products industry. The company's high-quality plywood is extensively used in furniture manufacturing, construction, and interior decoration, while its decorative laminate products are widely recognized for their excellence in surface finishing for furniture and interior design projects.

Since its establishment in 1988, Samrat Plywood has emerged as one of the top five leaders in the Plywood and Mica Industry, marking its journey of continuous growth and success. Samrat Plywood has successfully expanded its footprint across 21 states in India and exports its products to 25 countries globally. The flagship decorative High Pressure Laminate brand, Samrat, is available in over 50 countries, including Thailand, Indonesia, Taiwan, Canada, Bahrain, Hong Kong, Malaysia, Singapore, UAE, and Lebanon

Product-related or management system-related certifications: Samrat Plywood has achieved several esteemed certifications, including **California Air Resources Board (CARB), Forest Stewardship Council (FSC), Green Rating for Integrated Habitat Assessment (GRIHA), and Green Product Certification (GREEN PRO)**. Additionally, the company holds certifications for **International Organization for Standardization (ISO)** such as **ISO 45001, ISO 14001, ISO 9001**, **Indian Standards Institute (ISI)** such as **BIS IS 710, BIS IS 2202, BIS IS 303, BIS IS 1659, and BIS IS 5509**, **European Standard for plywood (EN 636)**, as well as the **lowest formaldehyde emission level (E0) ( using BS EN 717-1 Method)**, alongside **Anti-Viral and Anti-Microbial certifications**, demonstrating its unwavering commitment to quality and environmental sustainability.

## PRODUCT INFORMATION

Product name: Plywood

Product identification: Phenol-Formaldehyde-Caustic based Plywood

Visual representation (e.g., an image) of the product



UN CPC code: 31410

Product description: Samrat Plywood utilizes premium timber, featuring high-quality top and bottom face layers. We employ advanced Pre-Press technology to prevent warping, a 4-stage pressing process to eliminate bending, and vacuum impregnation of chemicals for enhanced durability. Our plywood is 100% calibrated, fully termite-proof, and fire-resistant. Additionally, these products are guaranteed to be boiling water-proof for up to 300 hours. We also offer a lifetime warranty on select categories of our products.

Samrat Plywood offers a wide range of plywood varieties with varying densities, with the highest quality density being  $700 \text{ kg/m}^3$ . Available in sizes from  $2440 \times 1220 \text{ mm}$  to  $2500 \times 1250 \text{ mm}$ , Samrat plywood comes in thicknesses ranging from 4 mm to 40 mm. All products undergo rigorous and standardized testing, including *assessments for moisture content, delamination resistance after boiling, ply adhesion, modulus of elasticity, modulus of rupture, specific gravity, screw and nail holding strength, and water absorption.*

The Technical Datasheet and Safety Data Sheet are available on the following webpage:  
<https://www.samratply.in/E-Catalogs?type=resources>



Certain plywood varieties, based on their intended applications, are subjected to specialized tests, including *Glue Shear Strength (Dry State)*, *water resistance (3-hour immersion)*, *tensile strength*, *mycological tests*, *boiling water tests*, and more.

Additionally, Samrat Plywood provides fire-retardant doors designed to meet statutory requirements for high-rise buildings. These doors have been tested for *flammability* and *flame retardation*. Specifically, Samrat offers flush doors that undergo a range of laboratory tests, such as *dimensions and squareness impact tests*, *flexure tests*, *edge bending tests*, *shock resistance*, *slamming shutter tests*, *humidity variation tests*, *knife tests*, and other standard quality assessments.

Name and location of production site(s): The group operates an office in Chandigarh and oversees two manufacturing units: a plywood facility in Yamuna Nagar, Haryana.

### CONTENT DECLARATION

- The mass (weight) of one unit of a product, as purchased or per declared unit: The highest-selling and most representative product, measuring 1250 mm\*2500 mm with a thickness of 18 mm, has a weight of 11 kg per unit.
- Content of the product in the form of a list of materials and substances, and their mass:

Raw Material	Unit	Consumption/ kg
Face Veneer	m <sup>3</sup>	0.002162
Timber Wood	m <sup>3</sup>	0.00486
Phenol	Kg	0.0487
Formaldehyde	Kg	0.0877
Caustic	Kg	0.00292

**Table 1:** Material composition for 1 kg of the product

- Information on the environmental and hazardous/toxic properties of a substances contained in the product: The product is free from substances listed or eligible for inclusion in the Candidate List of Substances of Very High Concern (SVHC) for Authorization
- The LCA identified a higher concentration of formaldehyde (over 0.1% of the product) in the raw material inputs. The EPD owner has committed to exploring suitable

alternatives or implementing measures to reduce the use of this hazardous substance in future manufacturing processes. Progress on this commitment will be reviewed and reported during the subsequent annual audit.

- Other information on substances with hazardous and toxic properties: Not Applicable
- The declared share of biogenic/recycled materials: < 5%

Product components	Raw Material Composition	Weight % per kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Face Veneer	2.16E-03 (m <sup>3</sup> )	13.611	0	0.1754
Timber Wood	4.86E-03 (m <sup>3</sup> )	81.805	0	1.054
Phenol	4.87E-02 (Kg)	1.537	0	0
Formaldehyde	8.77E-02 (kg)	2.772	0	0
Caustic	2.92E-03 (Kg)	0.275	0	0
Packaging materials	Weight, kg		Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Packaging film	2.92E-03		0.113	0
Wood pellet	4.27E-03		0.166	2.14E-03
Fuels & resources				
Electricity (Grid)	0.0325 kWh			
Electricity (renewable)	0.0438 kWh			
Diesel	0.00170 Kg			
Water	0.2083 Kg			
Steam	1.16 Kg			

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO<sub>2</sub>.

**Table 2:** Raw materials used for 1 kg of Plywood manufacturing



## LCA INFORMATION

Declared unit: The plywood under consideration is manufactured using face veneer with an average density of 650 kg/m<sup>3</sup> and core timber with an average density of 550 kg/m<sup>3</sup>, subject to seasonal variation. The average weight of the manufactured plywood is approximately 2 kg per m<sup>2</sup>. For the purpose of assessing regional variation, 1 kg has been selected as the declared unit.

This mass-based declared unit has been chosen to ensure consistency, transparency, and accuracy in the environmental impact assessment. Given that the density of plywood products can vary significantly due to differences in material composition and manufacturing processes, a mass-based approach offers a more robust and equitable basis for comparison. It accurately reflects the environmental burden per unit of material and facilitates meaningful benchmarking across similar wood-based panel products.

Reference service life: Not applicable for this EPD

Time representativeness: This Environmental Product Declaration (EPD) is developed using site-specific primary data collected from the Yamuna Nagar Plant, Haryana, covering the complete operational period from January 2024 to December 2024. The data has been verified to ensure accuracy, completeness, and representativeness of the production processes during the reference year.

Geographical scope: The plywood is produced at our manufacturing facility in Haryana, India, with raw materials sourced from various regions across the country. The finished products are then exported to both domestic and international markets.

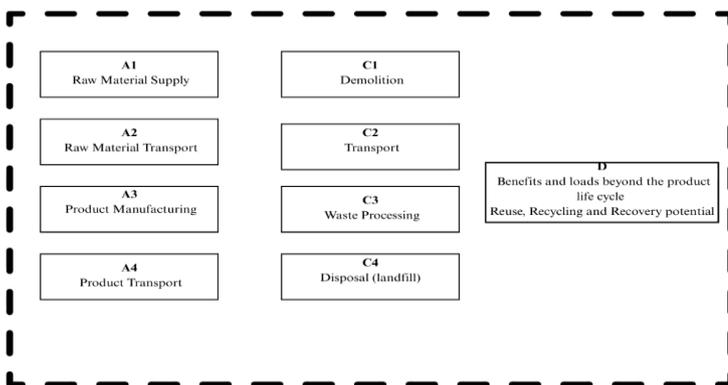
Database(s) and LCA software used: The generic data has been modeled utilizing SimaPro software (version 9.6.0.1) and the Ecoinvent database (version 3.10). Allocation procedures—whether physical, economic, or energy-based—have been applied in full compliance with the requirements of EN 15804. The declared product represents an average derived from the production volumes of the manufacturing facility. The dataset comprehensively includes information on raw materials, energy and water consumption, packaging materials, by-products, waste streams, and all relevant transportation processes.

Description of system boundaries:

Cradle to gate with options

**Type b) EPD:** Cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and additional modules). The additional modules may be one or more selected from A4–A5 and/or B1–B7

This Life Cycle Assessment (LCA) has been conducted using a Cradle-to-Gate with Distribution scope, complemented by the inclusion of Modules C1–C4 and D. The Cradle-to-Gate with Distribution modules have been given the highest priority, as the activities within these stages are either directly managed or substantially influenced by the EPD owner. Module B has been excluded from the current assessment due to the considerable uncertainty associated with its data. All other modules incorporated in this LCA are fully aligned with the requirements of PCR 2019:14 Construction Products (version 2.0.1).



**Figure 1:** System boundary included in the study

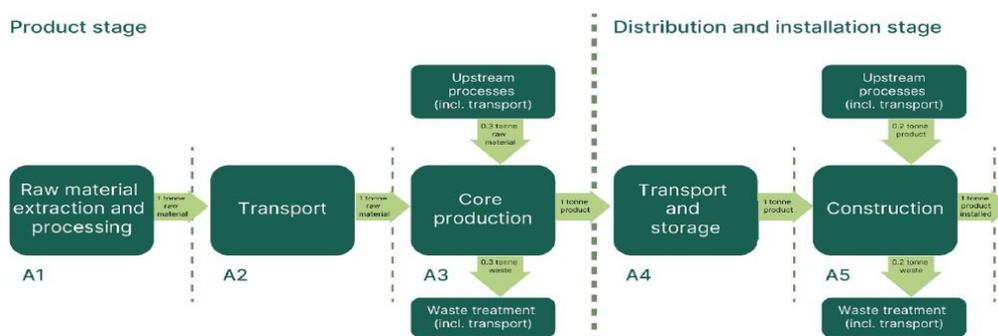
### Activities outside the scope of the LCA

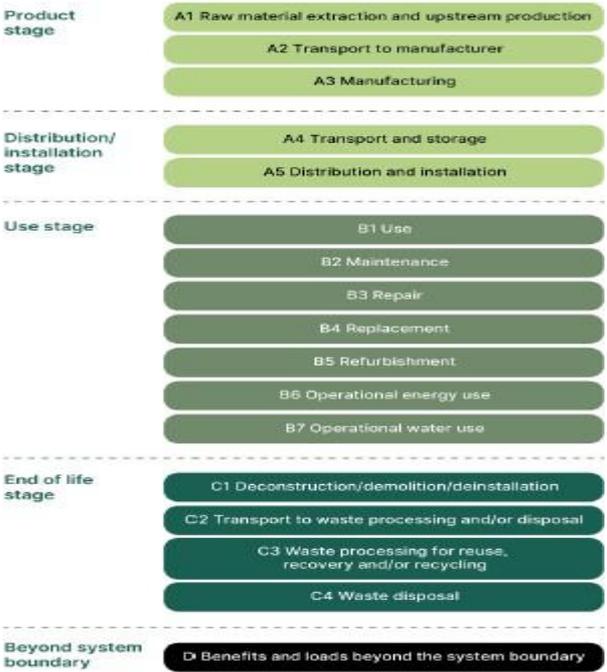
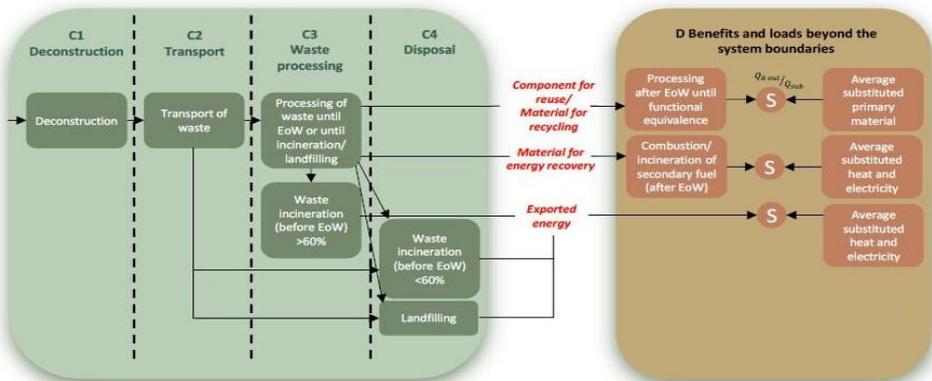
Activity	Reason for exclusion
Maintenance and operation of equipment	It is expected that these impacts will be very small when allocated across the full production
Installation of the equipment	Installed equipment for cutting, cooling and drying chambers
Human labor and employee transport	These aspects are not the central focus of the LCA and are not easily attributable to product impacts
Use phase of the product	No maintenance/consumption during use phase

**Table 3:** Activities outside the scope of the LCA

## Assumptions

1. In alignment with PCR 2019:14 Construction Products (v 2.0.1), the figure 1 system boundaries are established for manufacturing the product. The assessment excludes the manufacturing processes of capital goods, spare parts, and maintenance activities. Environmental impacts associated with infrastructure, construction, production equipment, and tools not directly consumed during production are not included in the Life Cycle Inventory (LCI). Historically, capital equipment and buildings contribute less than a few percent to most LCIs, a margin typically smaller than the inherent error within inventory data. Accordingly, for this project, the contribution of capital equipment is considered negligible.
2. The environmental impacts associated with infrastructure related to general management, office operations, and headquarters—both upstream and downstream—are not considered.
3. In accordance with PCR 2019:14 Construction Products (v 2.0.1), the following system boundaries are applied to employees. Impacts from personnel activities, including workplace operations, business travel, and commuting, are excluded from the LCI. Employee-related impacts are omitted on the basis that, if not employed in this function, individuals would be employed elsewhere, making allocation of personal life impacts impractical. Accordingly, employee impacts are excluded from this project’s assessment.
4. The processes linked to fuel production are inherently captured within the indicators provided by the Ecoinvent database utilized for the LCA.
5. The environmental impact of external transportation has been calculated using lorries from the Ecoinvent 3.10 database, compliant with EURO 6 standards. These vehicles were selected to represent the most realistic operational scenario





Process flow diagram for A3 and A4 Phase:



**Figure 2:** System diagram illustrating the manufacturing process from A3 and A4, highlighting the activities conducted during the A3 module

More information:

**Module description:**

Modules A1 and A2 pertain to the procurement of raw materials, factoring in the distance traveled, the transportation mode (truck), and the number of trips recorded during the reporting period. Face veneer and timber wood are procured from within a 7-kilometer radius of the manufacturing facility, whereas all other materials are transported to the site exclusively by road.

Module A3 covers all direct emissions from the manufacturing process, including peeling, drying, gluing, pre-pressing, hot pressing, trimming, sanding, steam treatment (using water heated by imported electricity and in-house renewable energy), and packaging.

Production begins with the receipt of timber logs at the facility. Steam, generated by burning diesel, residual woodchips, and electricity from the regional grid, serves as the primary heat source. The module also includes solid waste management and wastewater pre-treatment. Wood residues from plywood production are used as fuel. Plywood panels are manufactured in accordance with bonding class requirements. Electricity consumed is sourced from the regional electricity mix with a GWP-GHG value of 1.3 kg CO<sub>2</sub> eq./kWh. No wastewater is generated during the manufacturing process

Module A4 captures the monthly dispatch records of consignments to various domestic buyers and the nearest export port, detailing the mode of transportation and average distance covered. It is included within the system boundary, reflecting practical transportation data.

The assessment focuses on the end-of-life stage (Modules C1–D) and follows the EN 15804 +A2 methodology. Environmental indicators were modelled in SimaPro using the Ecoinvent and Environmental Footprint v3.1 databases.

For this analysis, Module C1 is excluded. As plywood is generally non-structural and easily disassembled, its removal has a negligible impact. In line with EN 15804, negligible modules may be omitted when justified; accordingly, no deconstruction materials or energy were considered under the applied cut-off rule.

Assumptions applied:

- Percentage contributions for Modules C1–D are informed by EPDs for similar products.
- **C2 (transport)**: an 80 km transport distance is assumed for plywood.
- **C3 (waste processing)**: for 1 kg of plywood, 100% calculated for use as secondary fuel

All the scenarios considered for the project report are representative scenarios that are in current use. The data for Modules C1–C4 and D in this LCA have been sourced from the global database Ecoinvent v3.10. The US region has been considered the farthest geographical boundary, in alignment with previously published EPDs.

The material share is assumed to be 100% used as secondary fuel, based on the assumptions provided by the client regarding the possible end-of-life fate of their product. Additionally, each scenario for the C3 module has been modeled separately for the 100% recycling and incineration scenarios.

Although certain uncertainties exist due to regional variability, disposal practices, and other unforeseen circumstances, these factors have been duly accounted for to ensure compliance with PCR 2019:14 Construction Products (version 2.0.1).

The LCI data for biogenic CO<sub>2</sub> provided by the LCA software were not balanced within each module, as the software and databases are not designed for that calculation. We also chose not to adjust uptake and release of biogenic CO<sub>2</sub> manually, to remain transparent and reflect the actual scenario within the EPD owner's control and influence.



Biogenic emissions carry inherent uncertainty—such as variation in raw material composition, production quality, plant location, and supplier inputs. Accordingly, using dedicated databases that account for biogenic carbon in both the product and its packaging, we applied the best-available values for **1 kg of the representative product (declared unit)**. Similarly, biogenic carbon at end-of-life and in **Module D (recycling)** was assessed for 1 kg of declared unit, based on the most probable scenarios and corresponding database values.

**Cut-off criteria:** - The cut-off rule permits the exclusion of material or energy flows deemed insignificant to the emission calculation of a unit process, provided they are clearly reported as data exclusions.

In this EPD, all raw materials and resources have been fully accounted for, achieving 100% coverage of elementary flows without applying cutoff criteria. Any omissions comply with the cut-off rule defined in EN 15804+A2.

All available product system data has been included in the LCA. Where specific data was unavailable, credible generic data from databases or literature was used. Data gaps were addressed through conservative assumptions and expert judgment to ensure full alignment with the defined criteria

### **Data Quality**

All manufacturing information is based on operational data and direct measurements, ensuring high data quality. Assumptions were made regarding the average transport distances for raw material supply and product distribution to various regions. Specific primary data were collected for plywood manufacturing, including timber wood, face veneer, PF-resin consumption, regional electricity usage, transport distances, and distribution routes, based on 2024 production data from Samrat Plywood's manufacturing facility.

Generic data were used for internal market transport and background processes, primarily sourced from the Ecoinvent v3.10 database, with adaptations made for country-specific electricity grids where relevant. Primary data are fully traceable to Samrat Plywood's internal departmental records, aligned with the objectives and scope of the LCA study. Secondary data supplement the analysis where needed, following the data quality requirements outlined in EN 15804 and ISO 14044.

To achieve the defined goal and scope of this life cycle assessment, comprehensive specific and generic data were collected. The data set includes producer-specific information, covering business, product, and process details wherever available, based on one-year average data from January 2024 to December 2024. The selected generic data incorporate the most probable



technological and geographical considerations to accurately reflect the physical reality of the product and production processes. Country-specific references were prioritized from the database where available; otherwise, region-specific references were utilized.

The methodology has been consistently applied across all components of the analysis, with no modifications to the system boundary or quality requirements at any stage of the study. As a result, the study is fully reproducible with access to the underlying data sources.

### **Allocation method**

This Life Cycle Assessment (LCA) applies an allocation approach aligned with co-production practices. Allocation has been performed to distribute the materials utilized in the production process. A mass-based allocation method has been employed, as multiple products are generated within a single unit process, requiring the division of input and output flows between the primary product under study and associated co-products. Furthermore, as the composition of the various plywood types considered in this LCA is uniform, there is no necessity to allocate specific raw materials or energy separately.

Accordingly, in line with EN 15804:2012+A2:2019, Section 6.4.3.2, mass allocation has been applied as the allocation method due to the minimal difference in revenue. Additionally, all inputs and outputs, including energy consumption during the manufacturing process, have been normalized against the total production quantities.

The types of waste generated and their end-of-life treatment during the manufacturing process are allocated on a mass basis, in line with the "*polluter pays*" principle applied to each waste type. For background processes, allocation is based on the default cut-off and classification approach, following the parameters set by the Ecoinvent® database.

In terms of end-of-life (EoL) allocation, this EPD and LCA adhere to the polluter-pays principle for foreground processes, ensuring that the product system responsible for generating waste assumes responsibility for its management up to the end-of-waste point. In this methodology, the environmental burdens and benefits associated with recycled or reused materials and recovered energy are attributed to the product system that consumes these resources, rather than the system providing them. These are quantified based on the recycled content of the material under study.

This EPD and LCA encompass a range of product sizes. However, since density, raw material composition, and manufacturing methods remain largely consistent across the range, the environmental impact per kilogram of product does not vary.



### **Variation product:**

The plywood production process involves variations in size and density, with the A1 module allocation determined based on the tonnage utilized, as tracking by wood type is not feasible. In Module A2, allocation is similarly based on tonnage, further refined by the density of the wood used. For Module A3, the plywood manufacturing process remains consistent across all size variations, with differences arising only in the number of layers required.

### **Additional Information on product variability / representativeness disclosure**

The results disclosed in this Environmental Product Declaration (EPD) for the plywood product group are based on a representative product: a plywood sheet measuring 1250 mm × 2500 mm × 18 mm, selected due to its highest sales volume within the group. Other products within the EPD category differ only in size and corresponding material quantities, while raw materials, manufacturing processes, and end-of-life scenarios remain identical. As the environmental impacts scale proportionally with mass, the declared results are considered representative for the full product range.

Since the only distinction among product variants is dimensional, the results are consistent across all variants when normalized to a per-kilogram basis, with no significant variation. To convert the declared results to a per-cubic-meter basis, users should divide the declared values by, and apply the resulting factor to the respective volume of each plywood variant within the product group.

### **Additional Information about EPD**

The EPD owner holds sole ownership, liability, and full responsibility for the EPD. For two EPDs to be considered comparable, the following conditions must be met:

- They must be developed under the same PCR (including the same version) or under fully aligned PCRs or versions.
- They must cover products with identical functions, technical performance, and use (e.g., identical declared or functional units).
- They must have equivalent system boundaries and consistent data descriptions.
- They must apply equivalent data quality requirements, data collection methods, and allocation procedures.
- They must use identical cut-off rules and impact assessment methodologies (including the same version of characterization factors).
- They must present equivalent content declarations.
- They must both be valid at the time of comparison.



EPDs registered under different programs or not compliant with EN 15804: A2, even if within the same product category, may not be comparable. For detailed information on EPD comparability, refer to EN 15804: A2 and ISO 14025

The modelling of downstream stages and Module D has been carried out using insights from published literature, with references provided in the project report. Certain assumptions have not been publicly disclosed in order to respect the confidentiality of the EPD owner's export data.

The characterization method used for Normalization and weighting factor is EF 3.1 of EN 15804+A2 (adapted)

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery- Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	IND	IND	IND	IND	-	-	-	-	-	-	-	-	GL O	G L O	GL O	GL O	GLO
Share of primary data	54%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0			-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Table 4:** Declared modules, geographical scope, specific data share (in GWP-GHG results), and data variation (in GWP-GHG results)

#Disclaimer: The environmental performance results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks

#Disclaimer: The results of the end-of-life stage (module C) should be considered when using the results of the production stage (modules A1-A3).

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing of raw material	Database	Ecoinvent v3.10	2024	Primary data & Secondary data	3%
Generation of electricity used in manufacturing of product	Database	Ecoinvent v3.10	2024	Primary data & Secondary data	3%
Transport of raw material to manufacturing site	Invoices	EPD Owner	2024	Primary data & Secondary data	5%
Production of final Product	Internal registers	EPD Owner	2024	Primary data & Secondary data	30%
Manufacturing of packaging material	Database	Ecoinvent v3.10	2024	Primary data & Secondary data	3%
Other processes including steam generation, waste treatment from product manufacturing,	Databases	Ecoinvent v3.10	2024	Secondary data	10%
Total share of primary data, of GWP-GHG results for A1-A3					54%

\*Raw Material consists of use of Wood logs, Wood veneers, Phenolic resin, Caustic  
The reported share of primary data is associated with uncertainty, as an EPD used as data source lack information on the share of primary data.

#Disclaimer: The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that do not capture all relevant aspects of data quality. The indicator is not comparable across product categories.

#Disclaimer: The reported share of primary data is associated with uncertainty, as an EPD [or: several EPDs] used as data source lack information on the share of primary data.

## ENVIRONMENTAL PERFORMANCE

### LCA results of the product(s) - main environmental performance results

#### Mandatory impact category indicators according to EN 15804

Results per 1 kg of Plywood								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP- total	kg CO2 eq.	- 1.02E+0 0	8.51E-01	0.00E+00	1.58E+01	5.32E+00	0.00E+00	0.00E+00
GWP- fossil	kg CO2 eq.	4.12E+00	8.50E-01	0.00E+00	1.58E+01	1.82E-01	0.00E+00	0.00E+00
GWP- biogenic	kg CO2 eq.	- 5.14E+0 0	2.48E-05	0.00E+00	5.24E-03	5.14E+00	0.00E+00	0.00E+00
GWP- luluc	kg CO2 eq.	4.89E-03	3.45E-04	0.00E+00	7.25E-03	3.20E-04	0.00E+00	0.00E+00
ODP	kg CFC 11 eq.	3.01E-08	1.26E-08	0.00E+00	2.14E-07	1.14E-09	0.00E+00	0.00E+00
AP	mol H+ eq.	2.26E-02	1.95E-03	0.00E+00	3.80E-02	7.97E-03	0.00E+00	0.00E+00
EP- freshwater	kg P eq.	1.26E-03	6.72E-05	0.00E+00	1.73E-03	8.66E-05	0.00E+00	0.00E+00
EP- marine	kg N eq.	3.95E-03	4.52E-04	0.00E+00	8.72E-03	3.71E-03	0.00E+00	0.00E+00
EP- terrestrial	mol N eq.	4.15E-02	4.89E-03	0.00E+00	9.41E-02	4.15E-02	0.00E+00	0.00E+00
POCP	kg NMVO C eq.	2.23E-02	2.73E-03	0.00E+00	5.13E-02	1.00E-02	0.00E+00	0.00E+00
ADP- minerals & metals*	kg Sb eq.	6.98E-06	2.78E-06	0.00E+00	5.29E-05	1.04E-06	0.00E+00	0.00E+00
ADP- fossil*	MJ	4.58E+01	1.20E+01	0.00E+00	2.19E+02	2.02E+00	0.00E+00	0.00E+00
WDP*	m <sup>3</sup>	4.20E-01	5.44E-02	0.00E+00	1.03E+00	2.53E-02	0.00E+00	0.00E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted							

*\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

*\* Disclaimer: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.”*

*\* Disclaimer: The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).*

### Additional mandatory and voluntary impact category indicators

Results per 1 kg of Plywood								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PM	Disease incidence	5.26E-07	6.33E-08	0.00E+00	1.15E-06	8.16E-08	0.00E+00	0.00E+00
IRP	kBq U- 235 eq	8.65E-02	9.92E-03	0.00E+00	1.79E-01	2.00E-02	0.00E+00	0.00E+00
HTC	CTUh	2.00E-08	4.47E-09	0.00E+00	2.60E-09	4.50E-10	0.00E+00	0.00E+00
HTNC	CTUh	3.02E-08	7.49E-09	0.00E+00	1.37E-07	1.69E-08	0.00E+00	0.00E+00
HTCI	CTUh	3.04E-10	6.21E-11	0.00E+00	1.16E-09	9.51E-11	0.00E+00	0.00E+00
HTCO	CTUh	1.98E-08	4.41E-09	0.00E+00	1.45E-09	3.55E-10	0.00E+00	0.00E+00
HTNCI	CTUh	2.80E-08	7.04E-09	0.00E+00	1.29E-07	1.68E-08	0.00E+00	0.00E+00
HTNCO	CTUh	2.12E-09	4.51E-10	0.00E+00	8.13E-09	1.29E-10	0.00E+00	0.00E+00
ETF	CTUe	2.62E+01	3.21E+00	0.00E+00	4.04E+01	1.40E+00	0.00E+00	0.00E+00
ETFI	CTUe	1.85E+01	2.10E+00	0.00E+00	3.93E+01	1.39E+00	0.00E+00	0.00E+00
ETFO	CTUe	7.75E+00	1.11E+00	0.00E+00	1.08E+00	1.41E-02	0.00E+00	0.00E+00
LU	Pt	1.53E+03	7.23E+00	0.00E+00	1.31E+02	4.77E-01	0.00E+00	0.00E+00
Acronyms	PM= Particulate matter, IRP= Ionizing radiation, HTC=Human toxicity, cancer, HTNC= Human toxicity, non-cancer, HTCI= Human toxicity, cancer – inorganics, HTCO= Human toxicity, cancer – organics, HTNCI=Human toxicity, non-cancer – inorganics, HTNCO= Human toxicity, non-cancer – organics, ETF= Ecotoxicity, freshwater, ETFI= Ecotoxicity, freshwater – inorganics, ETFO= Ecotoxicity, freshwater – organics, LU=Land Use							

### Resource use indicators

Results per 1 kg of Plywood								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	4.17E+00	2.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.18E+00	0.00E+00	0.00E+00	2.18E+01	4.15E+00	0.00E+00	0.00E+00
PERT	MJ	6.35E+00	2.00E-03	0.00E+00	2.18E+01	4.15E+00	0.00E+00	0.00E+00
PENRE	MJ	2.80E+01	3.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	3.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.12E+01	3.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	kg	0.00E+00						
RSF	MJ	0.00E+00						
NRSF	MJ	0.00E+00						
FW	m <sup>3</sup>	2.15E-02	4.00E-05	0.00E+00	5.12E-02	1.90E-03	0.00E+00	0.00E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

### Waste indicators

Results per 1 kg of Plywood								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.83E-04	0.00E+00	0.00E+00	8.002E-02	2.50E-03	0.00E+00	0.00E+00
Non- hazardous waste disposed	kg	9.73E-01	0.00E+00	0.00E+00	1.52E+00	9.03E-01	0.00E+00	0.00E+00
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

### Output flow indicators

Results per 1 kg of Plywood								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re- use	kg	0.00E+00						
Material for Recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-01	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00						
Exported energy, electricity	MJ	0.00E+00						
Exported energy, thermal	MJ	0.00E+00						

### Alternative end-of-waste scenario per 1 kg of Plywood

The results for Module C are based on the C3: 100% secondary fuel scenario. The table below presents the results for each module under separate 100% end-of-life scenarios—where the material is assumed to be reused, recycled, or incinerated in Module C3, landfilled in Module C4, each independently. The assumptions for Modules C1 and C2 remain unchanged and are consistent with those used in the main Module C modelling for every case.

Impact category	Unit	100 % Recycle (Module C3)	100% Secondary Fuel (Module C3)	100% Incineration (Module C3)	100% Landfilling (Module C4)
AP	mol H+ eq	7.84E-05	3.10E-03	1.56E-03	0.00E+00
GWP- Total	kg CO2 eq	1.80E-01	2.07E+00	1.60E+00	0.00E+00
GWP- biogenic	kg CO2 eq	1.73E-01	2.00E+00	1.56E+00	0.00E+00
GWP- fossil	kg CO2 eq	6.99E-03	7.09E-02	3.17E-02	0.00E+00
GWP- luluc	kg CO2 eq	4.31E-06	1.25E-04	0.00E+00	0.00E+00
ETF	CTUe	3.64E-02	5.46E-01	4.31E-01	0.00E+00
ETFI	CTUe	3.58E-02	5.41E-01	1.45E-01	0.00E+00
ETFO	CTUe	5.97E-04	5.49E-03	2.85E-01	0.00E+00
PM	disease inc.	1.09E-09	3.17E-08	1.07E-09	0.00E+00
EP- marine	kg N eq	6.65E-05	1.44E-03	7.82E-04	0.00E+00
EP- freshwater	kg P eq	2.31E-06	3.37E-05	5.41E-06	0.00E+00
EP- terrestrial	mol N eq	3.79E-04	1.61E-02	8.56E-03	0.00E+00
HTC	CTUh	6.01E-12	1.75E-10	9.93E-10	0.00E+00
HTCI	CTUh	3.06E-12	3.70E-11	2.27E-10	0.00E+00
HTCO	CTUh	2.95E-12	1.38E-10	7.66E-10	0.00E+00

HTNC	CTUh	3.19E-10	6.59E-09	2.70E-08	0.00E+00
HTNCI	CTUh	3.03E-10	6.54E-09	2.66E-08	0.00E+00
HTNCO	CTUh	1.56E-11	5.02E-11	4.13E-10	0.00E+00
IRP	kBq U- 235 eq	1.86E-04	7.76E-03	0.00E+00	0.00E+00
LU	Pt	9.76E-02	1.86E-01	0.00E+00	0.00E+00
ODP	kg CFC11 eq	1.02E-10	4.43E-10	0.00E+00	0.00E+00
POCP	kg NMVOC eq	1.04E-04	3.89E-03	4.22E-03	0.00E+00
ADP- fossil	MJ	9.62E-02	7.85E-01	0.00E+00	0.00E+00
ADP- minerals & metals	kg Sb eq	2.05E-08	4.03E-07	0.00E+00	0.00E+00
WDP	m3 depriv.	-1.43E-02	9.86E-03	0.00E+00	0.00E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption, PM= Particulate matter, IRP= Ionising radiation, HTC=Human toxicity, cancer, HTNC= Human toxicity, non-cancer, HTCI= Human toxicity, cancer –inorganics, HTCO= Human toxicity, cancer – organics, HTNCI= Human toxicity, non-cancer – inorganics, HTNCO= Human toxicity, non-cancer – organics, ETF= Ecotoxicity, freshwater, ETFI= Ecotoxicity, freshwater – inorganics, ETFO= Ecotoxicity, freshwater – organics, LU=Land Use				

### Additional LCA results (other environmental performance results) of the product(s)

The plywood product with dimensions 1250 mm × 2500 mm and a thickness of 18 mm has been selected as the representative sample, as it accounts for the highest production volume. The LCA results for one declared unit are then modelled for products with the same composition and the same length and breadth, but with different thicknesses. The thickness range considered is 4 mm to 40 mm.

LCA result of one kg of plywood product (A-C)	Unit	Min	% Difference between Representative and Minimum	Representative	Max (Worst Case)	% Difference between Representative and Worst case
AP	mol H+ eq	6.97E-02	-1.1%	7.05E-02	7.13E-02	1.20%
GWP-Total	kg CO2 eq	2.07E+01	-1.3%	2.10E+01	2.12E+01	1.00%
GWP-biogenic	kg CO2 eq	5.23E-03	-0.6%	5.26E-03	5.29E-03	0.60%
GWP-fossil	kg CO2 eq	2.07E+01	-1.4%	2.10E+01	2.12E+01	1.10%
GWP-luluc	kg CO2 eq	1.27E-02	-0.7%	1.28E-02	1.29E-02	0.80%
ETF	CTUe	7.05E+01	-1.0%	7.12E+01	7.18E+01	0.90%
PM	disease inc.	1.79E-06	-1.8%	1.82E-06	1.85E-06	1.90%
EP-marine	kg N eq	1.66E-02	-1.0%	1.68E-02	1.70E-02	1.00%
EP-freshwater	kg P eq	3.12E-03	-0.8%	3.14E-03	3.16E-03	0.70%
EP-terrestrial	mol N eq	1.80E-01	-1.1%	1.82E-01	1.84E-01	1.00%
HTC	CTUh	2.74E-08	-0.5%	2.75E-08	2.76E-08	0.50%
HTNC	CTUh	1.91E-07	-0.6%	1.92E-07	1.93E-07	0.60%
IRP	kBq U-235 eq	2.91E-01	-1.5%	2.95E-01	2.99E-01	1.40%
LU	Pt	1.66E+03	-0.5%	1.67E+03	1.68E+03	0.50%
ODP	kg CFC11 eq	2.55E-07	-1.2%	2.58E-07	2.61E-07	1.30%
POCP	kg NMVOC eq	8.49E-02	-1.6%	8.63E-02	8.77E-02	1.60%
ADP-fossil	MJ	2.74E+02	-1.7%	2.79E+02	2.84E+02	1.80%
ADP- minerals & metals	kg Sb eq	6.33E-05	-0.7%	6.37E-05	6.41E-05	0.70%
WDP	m3 depriv.	1.51E+00	-1.0%	1.53E+00	1.55E+00	1.20%
Acronyms	WP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine= Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP- minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption, PM= Particulate matter, IRP=Ionising radiation, HTC=Human toxicity, cancer, HTNC= Human toxicity, non-cancer, ETF= Ecotoxicity, freshwater, LU=Land Use					



## Discussion

We have conducted a comprehensive Life Cycle Inventory (LCI) assessment based on the EN 15804 + A2 methodology.

This rigorous assessment ensures a comprehensive understanding of the environmental impacts across various categories. However, the environmental performance results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The manufacturing process relies on two energy sources. The first is electricity from the Indian grid, with a climate impact of 1.3 kg CO<sub>2</sub> eq./kWh. The second is energy from a solar plant, with a significantly lower climate impact of 0.0186 kg CO<sub>2</sub> eq./kWh. Additionally, the process incorporates various indicators, including the use of both renewable and non-renewable energy, and ensures compliance with mandatory indicators to prevent double counting of impacts. Currently, the output flow indicators do not apply to the existing manufacturing process.

We analyzed the Cradle to Gate with distribution system boundary, as this system category offers the greatest control and influence by the EPD owner to enhance manufacturing efficiency.

## Conclusion

Samrat Plywood conducted a comprehensive Life Cycle Assessment (LCA) using a cradle-to-gate with distribution system boundary. The analysis revealed that the climate change impact associated with producing 1 kg of plywood at its facility is -0.16736 kg CO<sub>2</sub> equivalent. This negative value highlights the significant carbon sequestration benefits of wood, as approximately 51.24% of emissions are offset during raw material extraction—primarily due to the carbon absorption by trees during their growth phase. Harvested wood retains this carbon, and when used in long-life applications such as construction or furniture, it effectively stores carbon and delays its return to the atmosphere. Other contributors to the total impact include raw material transportation (0.15%), the manufacturing process (36.03%), and product distribution (12.58%). Among all stages, raw material extraction stands out as the phase with the highest potential for emissions mitigation.

The environmental footprint of Samrat Plywood’s manufacturing process was assessed through a Life Cycle Assessment (LCA), with a focused cradle-to-gate with distribution approach.

For example, the A1–A3 biogenic carbon values are primarily derived from primary data and processes directly influenced by the EPD owner. This provides a more practical and realistic basis for analyzing improvement opportunities and understanding the product’s environmental footprint within the owner’s control.

The EOL scenarios—where the EPD owner has limited influence—are currently modelled based on assumptions for 1 kg of product, its raw-material composition, and global database values. As the EOL scope becomes clearer in the future, the biogenic carbon modelling will be refined to rely less on assumptions and more on reliable data, ensuring alignment with the mass-balance approach.

This methodology effectively highlights impact categories linked to activities under the organization’s direct control or influence. The analysis is grounded in high-quality primary data collected on-site, minimizing uncertainty and enhancing reliability. By adopting this approach, Samrat Plywood can accurately identify the environmental risks and opportunities inherent in its current operations. Moving forward, the company will act on these insights to implement targeted improvements and reduce its environmental footprint across its value chain.

## ENVIRONMENTAL INFORMATION

### **BIOGENIC CARBON BALANCE**

Biogenic carbon has been balanced to achieve a net zero impact across the life cycle by aligning the uptake and emissions of biogenic carbon dioxide. Uptake is associated with wood logs used as raw material and external fuel in plywood production, while emissions occur from combustion of external wood fuel, internal production waste, and incineration at end-of-life (C3). Minor deviations from net zero between stages A1 and C3 are due to small biogenic CO<sub>2</sub> emissions in database data. However, for the wood raw material and fuel used in A3, biogenic

carbon uptake and emissions are fully balanced across the life cycle.

**EXTRACTION AND ORIGIN OF RAW MATERIALS:**

The wood is sourced primarily from regional forest areas located within approximately 10 kilometers of the production site. Short transportation distances are maintained to minimize logistical costs and optimize the procurement of raw materials.

**VOLATILE EMISSIONS FROM OUR PLYWOOD MANUFACTURING**

Plywood panels are not directly associated with the emission of volatile pollutants into indoor air, as they are designed to be overlaid and are not intended for direct exposure. Samrat Plywood Limited (SPL) further reinforces its commitment to indoor air quality by offering 'Zero Emission Ply,' manufactured through a specialized four-stage pressing process. Additionally, SPL complies with E0 emission standards, with certification and test reports available upon request.

**LIFE CYCLE INVENTORY**

To develop the life cycle inventory, specific primary data for the reference year was gathered from reliable sources, including delivery notes for supplied materials, invoices, and product data sheets.



### **Additional environmental information**

Samrat Plywood Limited (SPL) upholds a robust and proactive sustainability profile, demonstrating a steadfast commitment to continuously enhancing our environmental performance. We systematically integrate regional and international best practices within our operations and extend our influence across our supply chain, wherever direct control or substantial impact is possible. We remain dedicated to fostering continuous improvement throughout all facets of our business activities.

The traceability of our products is of paramount importance. Through rigorous risk assessments, third-party certifications, and ongoing monitoring measures, SPL ensures that all wood raw materials are sourced exclusively from responsibly managed forests, where reforestation constitutes a fundamental aspect of forest management practices.

We maintain partnerships solely with suppliers who consistently meet our exacting environmental standards, particularly in relation to chemical content in construction boards. Furthermore, our products are registered within recognized environmental assessment databases, facilitating transparency and enabling customers to select products with proven environmental integrity.

A significant proportion of our suppliers are based in India, a country characterized by tropical and subtropical ecosystems with high biodiversity value. We engage exclusively with reputable, conscientious producers who can substantiate the origin of wood materials through verifiable traceability certifications.

In alignment with our commitment to sustainable forestry, SPL holds certification from the Forest Stewardship Council (FSC), affirming that our timber procurement practices are both ethical and environmentally responsible.

Moreover, SPL is proactively addressing the environmental impacts associated with product transportation. We are investing in operational efficiency enhancements, cultivating environmental awareness among our employees and supply chain partners, and systematically identifying and mitigating environmental inefficiencies. We are also expanding our focus to evaluate and address social and environmental risks and opportunities beyond the immediate scope of our operations.

### **Additional social and economic information**

At SPL, we are deeply committed to ensuring safe and equitable working conditions for everyone associated with our operations, including our suppliers. We expect our suppliers to uphold the same core values we champion, such as promoting gender equality and fair



treatment. As part of our due diligence, all suppliers are required to sign our Code of Conduct prior to entering into any form of collaboration. Additionally, we conduct regular on-site visits to verify that our standards are consistently maintained.

### **Differences versus previous versions**

No previous version for this EPD.

### **VERSION HISTORY**

Original version of the EPD

### **ABBREVIATIONS**

<b>Abbreviations</b>	
<b>CARB</b>	California Air Resources Board
<b>EoL</b>	end-of-life
<b>FSC</b>	Forest Stewardship Council
<b>GRIHA</b>	Green Rating for Integrated Habitat Assessment
<b>HPL</b>	High-Pressure Laminate
<b>ISI</b>	Indian Standards Institute
<b>LCI</b>	Life Cycle Inventory
<b>SPL</b>	Samrat Plywood Limited
<b>SVHC</b>	Substances of Very High Concern

## REFERENCES

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- b) ISO (2006c), ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines.
- c) SimaPro version 9.6.0.1.
- d) Ecoinvent database version 3.10
- e) EPD International (2025) General Programme Instructions (GPI) for the International EPD® System, version 5.0.1
- f) EPD International (2025) Product Category Rules: construction products. PCR 2019:14, version 2.0.1
- g) European Committee for Standardization (2021), EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works - Environmental Product Declarations - Corerules for the product category of construction products
- h) Ecoinvent, 2023. LCA database published by the ecoinvent association originally known as the ecoinvent Centre, the Swiss Centre for Life Cycle Inventories. Since June 2013 ecoinvent is a not-for-profit association founded by institutes of the ETH Domain and the Swiss Federal Offices. The version 3.9.1 was used
- i) ISO (2006a). ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- j) UNECE/FAO Report on Wood Panel LCA (2010+)
- k) Ecoinvent 3.8 Open Summaries
- l) openLCA Nexus datasets
- m) Environmental Product Declarations for:
- n) UPM WISA Plywood
- o) Indian Plywood Industries Federation (IPIRTI studies)

