

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



If EPD is registered through a regional or national licensee, replace the logotype above with the combined Licensee logotype and/or CLC.

**Samrat Laminates** (Decorative Laminates, Digital Laminates, Unicore decorative laminates)  
from

**Samrat Plywood Limited**



Programme:	The International EPD System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
Type of EPD:	EPD of a similar product based on representative sample from the manufacturer
EPD registration number:	EPD-IES-0024224
Publication date:	2025-09-26
Validity date:	2030-09-25
<i>An EPD may be updated or republished if conditions change. To find the latest version of the EPD and to confirm its validity, see <a href="http://www.environdec.com">www.environdec.com</a></i>	



## GENERAL INFORMATION

Programme Information	
<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>E-mail:</b>	<a href="mailto:support@environdec.com">support@environdec.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 2.0.0
<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>Individual EPD verification without a pre-verified LCA/EPD tool</b>
<input type="checkbox"/> <b>Individual EPD verification with a pre-verified LCA/EPD tool</b>
Third-party verifier: Approved by: International EPD System <i>Eurocert Inspection Services Pvt Ltd</i> Accredited by: The International EPD® System
<input type="checkbox"/> <b>EPD process certification* without a pre-verified LCA/EPD tool</b>
<input type="checkbox"/> <b>EPD process certification* with a pre-verified LCA/EPD tool</b>
<input type="checkbox"/> <b>Fully pre-verified EPD tool</b>
*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 [www.envrondec.com](http://www.envrondec.com).

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 characterisation 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: Village- Birplassi, Nalagarh, Solan, Himachal Pradesh

Contact: Puneet Singhal, 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**

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: Decorative Laminates, Digital Laminates, Unicore decorative laminates

Product identification: Samrat Laminates

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



UN CPC code: 3141

Product description: Samrat Plywood offers an extensive and evolving range of premium laminates, continually introducing new designs to meet market trends. Manufactured using absorbent kraft paper derived from virgin pulp and high-quality decorative paper, our laminates are impregnated with phenolic and melamine resins and cured under heat and high pressure for superior durability. To ensure an exceptional surface finish, we utilize Italian mould plates.

Our laminate collection is available in a variety of sizes and thicknesses, ranging from 0.5 mm to 20 mm, catering to diverse application needs. Samrat High Pressure Laminates are trusted across more than 18 countries, with over 700,000 panels—equivalent to 2.5 million square meters—installed by 2022. Our exterior-grade panels are manufactured to FR (Fire Retardant) standards and are endorsed by over 2,000 architects worldwide, reflecting the global trust in Samrat quality.

Our product range includes varieties that are highly resistant to moisture, abrasion, scratches, heat, impact, and stains. Select variants also offer enhanced wear and tear resistance.

Our Exterior Cladding HPL (ECH) laminates are specifically engineered for superior UV resistance, weather resistance, ease of cleaning, fire retardancy, and cost-effectiveness. They are designed with advanced mechanical and physical properties, including resistance to scratching, absorption, cigarette burns, heat, and offer antistatic properties up to electrical dissipation levels. In terms of chemical performance, our ECH laminates exhibit exceptional resistance to staining, chemical attacks, organic solvents, steam, and boiling water. We are proud to offer a Service Life of a minimum of 20 years for our ECH category products, ensuring long-term durability and performance.

All products undergo rigorous, standardized testing protocols, including evaluations for *moisture content, water resistance (covering delamination and glue shear strength), ply adhesion, specific gravity, appearance, boiling water resistance, high-temperature resistance, and water absorption.*

Select laminate varieties, depending on their specific applications, are further subjected to specialized testing, including *thickness tolerance (EN 438-2.5), length and width (EN 438-2.6), straightness of edges (EN 438-2.7), squareness (EN 438-2.8), flatness (measured on a full-size sheet) (EN 438-2.9), radiant heat resistance, and wear resistance cycles.*

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

Name and location of production site(s): The group operates an office in Chandigarh and oversees two manufacturing units: a plywood facility in Yamunanagar, Haryana, and a High-Pressure Laminate (HPL) unit in Nalagarh, Himachal Pradesh. The company has a robust production capacity of **1,150 cubic meters** of plywood and over 1 lakh sheets of decorative laminates each month.

## 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 8×4 inches with a thickness of 6 mm, has a weight of 23 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
Craft Paper	Kg	0.848
Phenol	Kg	0.217
Formaldehyde	Kg	0.298

Malemine	Kg	0.019
Design Paper	Kg	0.022
Tissue Paper	Kg	0.002

**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	Weight (kg)	Weight, %	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Kraft Paper	0.848	56.798	0	0.424
Phenol	0.217	14.564	0	0
Formaldehyde	0.298	19.952	0	0
Melamine	0.019	1.258	0	0
Design Paper	0.022	1.456	0	0.011
Tissue Paper	0.002 (kg)	0.146	0	0.01
Packaging materials	Weight, kg		Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Packaging film	5.87E-05		3.93E-03	0
Wood pellet	2.37E-06		1.59E-04	1.185E-06

Paper sack	1.69E-04		1.13E-02	8.45E-05
Iron Straps	3.93E-06		2.63E-04	0
<b>Fuels &amp; resources for manufacturing</b>				
Electricity (Grid)	1.31E-03 (kWh)			
Diesel	2.03E-03 (kg)			
Pet Coke	2.03E-03 (kg)			
Water	8.57E-03 (ltr)			

**Table 2:** Raw materials used for 1 kg of High-pressure laminates manufacturing

## LCA INFORMATION

**Declared unit:** The laminate under evaluation is manufactured from composite paper comprising both virgin and recycled fibres, bonded with a chemical resin. For the purpose of this assessment, a declared unit of **1 kilogram of laminate** has been selected.

This mass-based declared unit has been chosen to ensure consistency, transparency, and accuracy in the environmental impact assessment. Given that the density of laminate 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 kraft paper-based laminate 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 Nalagarh, Solan, Himachal Pradesh, 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 Laminates are produced at our manufacturing facility in Nalagarh, Solan, Himachal Pradesh, India, with raw materials sourced from various regions across the country. The finished products are then exported to both domestic and international markets

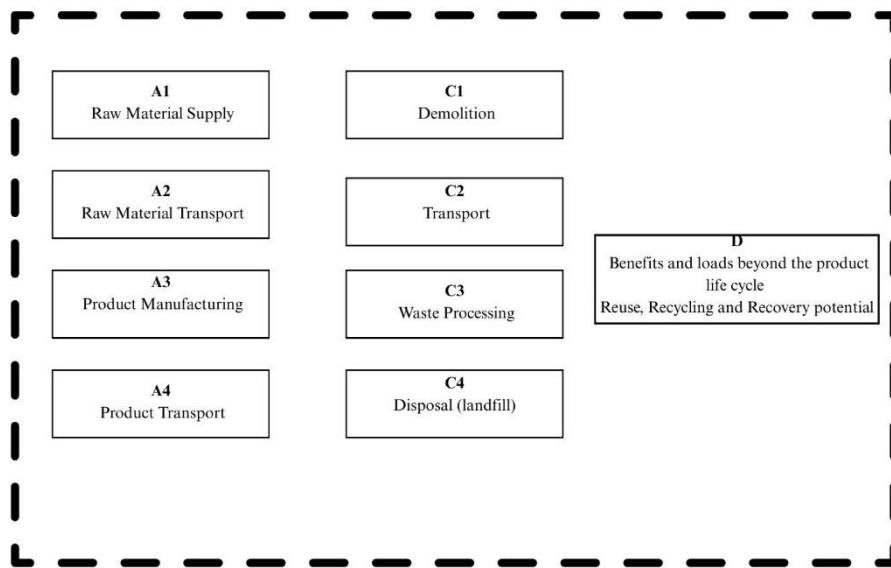
**Database(s) and LCA software used:** The generic data has been modeled utilizing SimaPro software (version 9.6.0.1) and the EcoInvent database (version 3.10). Allocation procedures—whether physical, economic, or energy-based—have been applied in full compliance with the requirements of EN 15804. The 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).



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

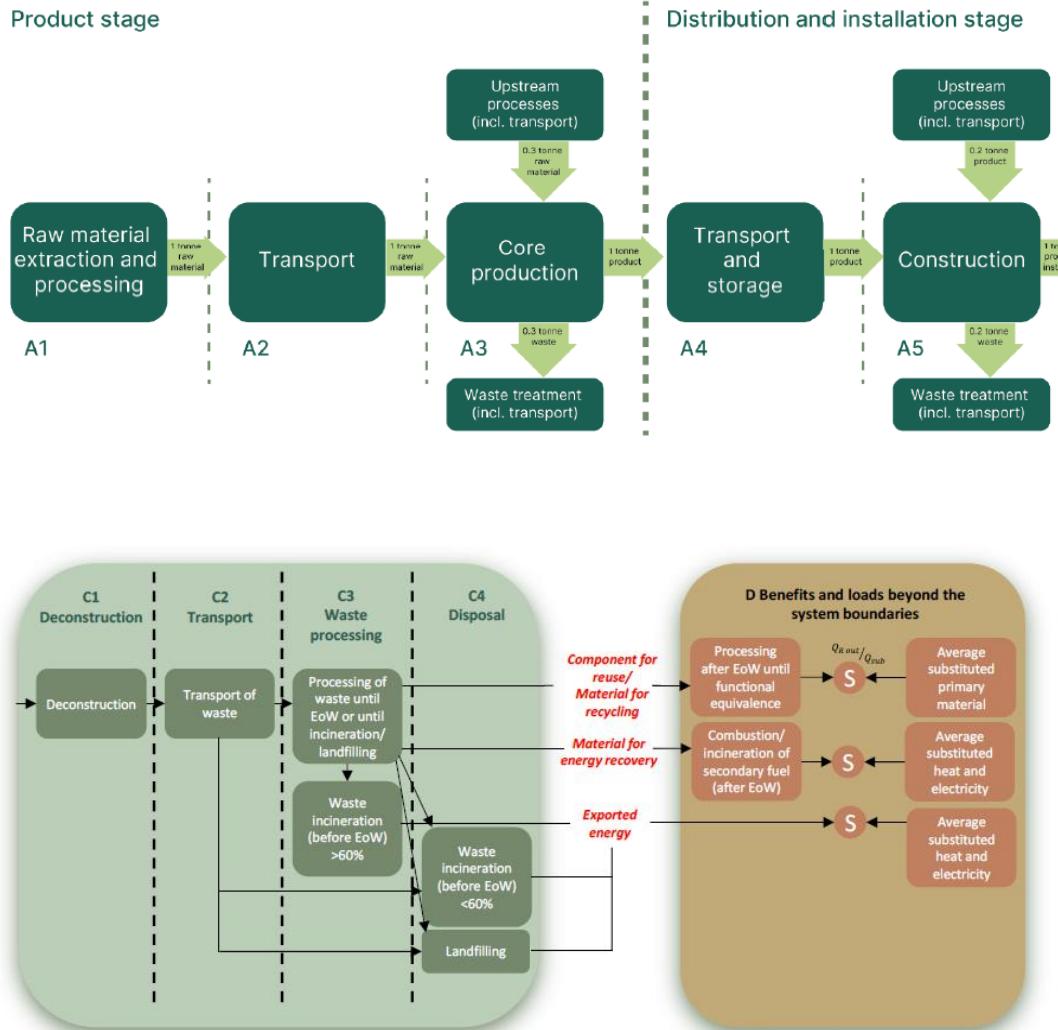
#### Activities outside the scope of the LCA

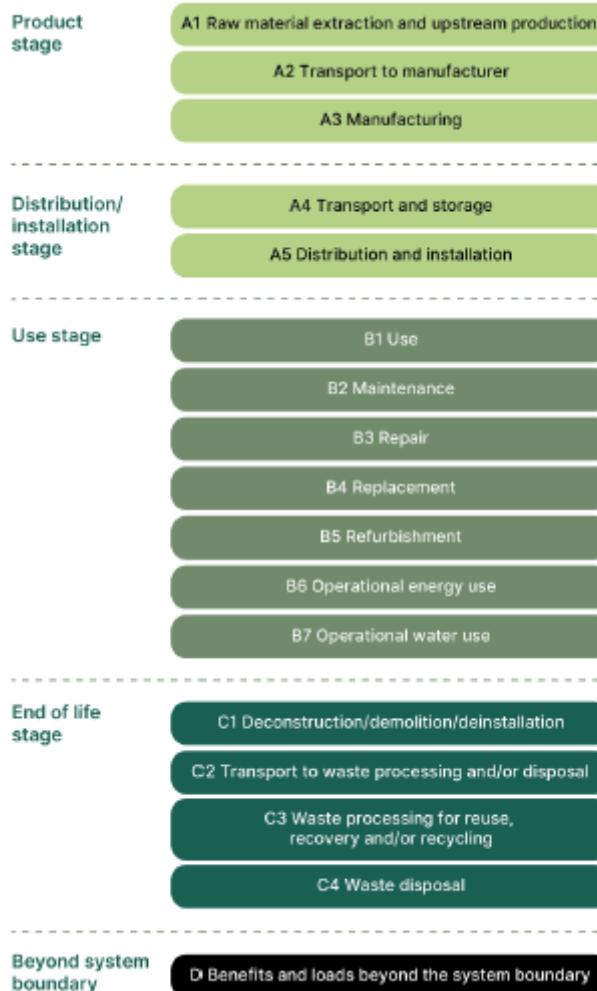
Activity	Reason for exclusion
Maintenance and operation of equipment	It is expected that these impacts will be very small when allocated across the full production
Installation of the equipment	Installed equipment for cutting, cooling and drying chambers
Human labor and employee transport	These aspects 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

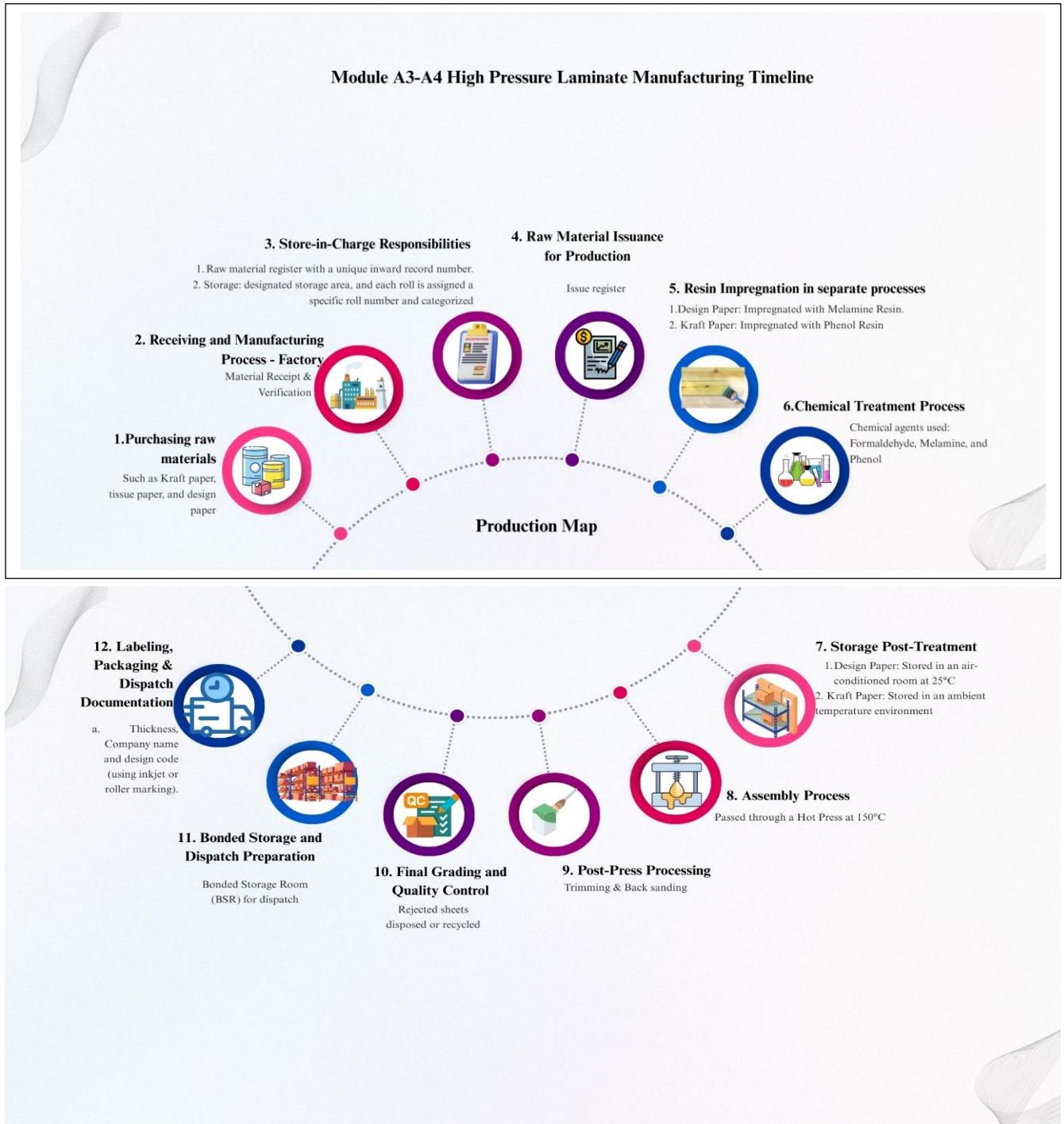
#### Assumptions

1. In alignment with PCR 2019:14 Construction Products (v 2.0), 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), 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:**

**Module A1:** This module focuses on the extraction and processing of all raw materials prior to the laminate manufacturing process. Specifically, it addresses the supply of raw materials for the production of melamine, phenolic and formaldehyde resin, as well as the supply of kraft and decorative paper used in laminate production.

**Module A2: Transport to manufacturer**

This module addresses the transportation of raw materials to the manufacturing facility, primarily via truck. It incorporates key data, including the approximate distance traveled to source the raw materials and the number of trips made during the reporting period.

**Module A3:** The third module encompasses the entire laminate manufacturing process, including energy consumption, emissions produced during production, and the treatment of waste generated (such as waste resins, paper, and laminate). It also covers the necessary processing steps to cut and adjust the laminate size according to specific project requirements.

The plant specific manufacturing process is as follows. The Commercial Manager initiates the purchase order with all essential specifications, including material category, description, quantity, and price. Upon arrival, the raw material is verified and logged into the raw material register with a unique inward record number. The paper is unloaded in a designated area, assigned a specific roll number, and categorized accordingly. The rolls are issued and recorded in the issue register. The issued paper then undergoes resin impregnation, with the design paper being impregnated with melamine resin and kraft paper with phenol resin in separate processes. Chemical agents such as formaldehyde, melamine, and phenol are used for impregnation.

After treatment, the design paper is stored in an air-conditioned room at 25°C, while the kraft paper is kept at ambient temperature. These materials are then assembled and passed through a hot press at 150°C to bond the composite material, depending on the thickness of the final product. Post-pressing, the laminate sheets are moved to the finishing area for trimming and backsanding. The manufactured products are subjected to grading and quality control, with any rejected sheets either disposed of or sent for recycling. The approved laminates are then stored in a bonded storage room, labelled with thickness, company name, and design code using inkjet or roller marking in compliance with Indian Standards Institute requirements. Finally, the product is packaged, and dispatch documentation is prepared.

**Module A4** includes the actual monthly dispatch records for consignments sent to domestic buyers and the nearest export port, outlining the mode of transportation and the average distance covered. This data is integrated within the system boundary, providing a clear representation of practical transportation metrics.

The assessment focuses on the end-of-life stage (Modules C1–D) and follows the **EN 15804 +A2** methodology. We used **SimaPro** with the **Ecoinvent** and **Environmental Footprint v3.1** databases to evaluate all relevant environmental performance indicators.

For this analysis, **Module C1** is excluded. As laminates are typically non-structural and can be disassembled with minimal effort, its removal has a negligible environmental impact. In line with **EN 15804**, negligible modules may be omitted when justified; therefore, no deconstruction materials or energy were considered under the cut-off rule.

To complete the model End-of-Life alternatives, a few cautious assumptions were applied:

- Percentage contributions for Modules C1–D were informed by EPDs for comparable products.
- For **Module C2**, a **50 km** transport distance is assumed for laminate.
- For **Module C3**, for **1 kg** of laminate, we assume **70% incineration, 21% landfill, and 9% allocated to recycling (Module D)**.

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. 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).

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 Craft Paper, Phenol, Formaldehyde, Melamine, Design Paper, Tissue Paper and Pet Coke consumption, regional electricity usage, transport distances, and distribution routes, based on 2024 production data from Samrat Laminates 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 Laminates 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 (ISO, 2006b).

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

### **Additional Information**

The results disclosed in this Environmental Product Declaration (EPD) for the laminate product group are based on a representative product: a laminate sheet measuring 2500 mm X 1200 mm X 6 mm, selected due to its highest sales volume within the group. 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.

### **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 characterisation method used for Normalisation 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	GL O	GL O	GL O	GLO
Share of primary data						-	-	-	-	-	-	-	-	-	-	-	-
Variation – products						-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites						-	-	-	-	-	-	-	-	-	-	-	-

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

\*Raw Material consists of use of craft paper, phenol, formaldehyde, melamine, design paper, tissue paper, pet coke, diesel,

#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 declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> eq.	1.70E+00	7.29E-02	0.00E+00	4.90E-01	1.00E+00	6.20E-02	6.80E-01
GWP-fossil	kg CO <sub>2</sub> eq.	2.98E+00	7.28E-02	0.00E+00	4.90E-01	1.10E-02	7.60E-03	-3.40E-01
GWP-biogenic	kg CO <sub>2</sub> eq.	-1.28E+00	2.12E-06	0.00E+00	1.60E-04	1.00E+00	5.40E-02	1.00E+00
GWP-luluc	kg CO <sub>2</sub> eq.	3.53E-03	2.96E-05	0.00E+00	2.30E-04	3.00E-06	4.60E-06	0.00E+00
ODP	kg CFC 11 eq.	4.84E-08	1.08E-09	0.00E+00	2.70E-10	1.30E-11	5.80E-12	-5.00E-12
AP	mol H <sup>+</sup> eq.	1.32E-02	1.67E-04	0.00E+00	1.20E-03	1.10E-04	5.30E-05	-3.50E-03
EP-freshwater	kg P eq.	1.89E-03	5.76E-06	0.00E+00	5.40E-05	4.90E-06	6.00E-06	-2.70E-06
EP-marine	kg N eq.	3.50E-03	3.87E-05	0.00E+00	2.70E-04	6.00E-05	2.50E-04	-3.70E-04
EP-terrestrial	mol N eq.	3.34E-02	4.19E-04	0.00E+00	2.90E-03	5.80E-04	2.20E-04	-4.00E-03
POCP	kg NMVO C eq.	1.31E-02	2.34E-04	0.00E+00	1.60E-03	1.40E-04	9.20E-05	-1.40E-03
ADP-minerals&metals*	kg Sb eq.	1.54E-05	2.38E-07	0.00E+00	1.70E-06	1.90E-08	1.40E-08	0.00E+00
ADP-fossil*	MJ	5.13E+01	1.02E+00	0.00E+00	8.80E-01	2.20E-02	1.30E-02	-5.50E+00
WDP*	m <sup>3</sup>	9.90E-01	4.66E-03	0.00E+00	3.20E-02	4.50E-03	-1.10E-01	-1.50E-02

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
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*\* 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).*

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PM	Disease incidence	1.75E-07	6.33E-08	0.00E+00	3.60E-08	1.30E-09	1.20E-09	-2.00E-08
IRP	kBq U-235 eq	1.17E-01	9.92E-03	0.00E+00	5.60E-03	1.10E-04	1.40E-04	0.00E+00
HTC	CTUh	2.74E-08	3.83E-10	0.00E+00	8.10E-11	2.00E-11	1.90E-12	-3.40E-10
HTNC	CTUh	2.15E-08	6.41E-10	0.00E+00	4.30E-09	1.40E-09	1.40E-10	-2.30E-09
HTCI	CTUh	2.71E-10	5.32E-12	0.00E+00	3.60E-11	1.60E-11	8.60E-13	-2.10E-11
HTCO	CTUh	2.72E-08	3.77E-10	0.00E+00	4.50E-11	4.20E-12	1.10E-12	-3.20E-10
HTNCI	CTUh	1.95E-08	6.03E-10	0.00E+00	4.00E-09	1.40E-09	7.10E-11	-2.20E-09

HTNCO	CTUh	2.03E-09	3.86E-11	0.00E+00	2.50E-10	2.50E-12	7.10E-11	-8.20E-11
Acronyms	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, HTNCl= Human toxicity, non-cancer – inorganics, HTNCO= Human toxicity, non-cancer - organics							

### Resource use indicators

Results per declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	5.79E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	7.73E-01	0.00E+00	0.00E+00	0.00E+00	9.52E+00	0.00E+00	0.00E+00
PERT	MJ	6.57E+00	0.00E+00	0.00E+00	0.00E+00	9.52E+00	0.00E+00	0.00E+00
PENRE	MJ	2.82E+01	1.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	1.88E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.00E+01	1.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	1.16E-02	0.00E+00	0.00E+00	3.21E-02	4.51E+00	-1.12E-01	-1.50E-02
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 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 resources; 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 declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	2.22E-04	0.00E+00	0.00E+00	5.00E-02	2.50E-03	1.25E-04	-6.25E-06
Non-hazardous waste disposed	kg	4.04E-01	0.00E+00	0.00E+00	9.50E-01	9.03E-01	8.57E-01	-8.15E-01
Radioactive waste disposed	kg	0.00E+00						

## Output flow indicators

Results per declared unit								
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						
Materials for energy recovery	kg	0.00E+00						
Exported energy, electricity	MJ	0.00E+00						
Exported energy, thermal	MJ	0.00E+00						

## Discussion

We have conducted a comprehensive Life Cycle Inventory (LCI) assessment based on the EN 15804 + A2 methodology. The following impact categories were considered in the Life Cycle Impact Assessment (LCIA):

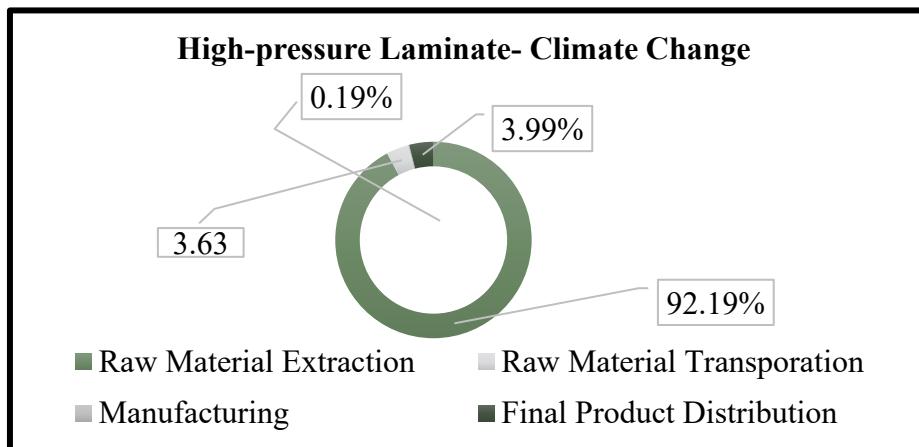
- Acidification (mol H<sup>+</sup> eq.)

- Climate change (kg CO<sub>2</sub> eq.)
  - Biogenic (kg CO<sub>2</sub> eq.)
  - Fossil (kg CO<sub>2</sub> eq.)
  - Land use and land use change (kg CO<sub>2</sub> eq.)
- Ecotoxicity, freshwater:
  - Part 1 (CTUe)
  - Part 2 (CTUe)
  - Inorganics (CTUe)
  - Organics – p.1 (CTUe)
  - Organics – p.2 (CTUe)
- Particulate matter (disease incidence)
- Eutrophication:
  - Marine (kg N eq.)
  - Freshwater (kg N eq.)
  - Terrestrial (kg P eq.)
- Human toxicity:
  - Cancer (CTUh)
  - Cancer – Inorganics (CTUh)
  - Cancer – Organics (CTUh)
  - Non-cancer (CTUh)
  - Non-cancer – Inorganics (CTUh)
  - Non-cancer – Organics (CTUh)
- Ionizing radiation (kBq U-235 eq.)
- Land use (Pt)
- Ozone depletion (kg CFC11 eq.)
- Photochemical ozone formation (kg NMVOC eq.)
- Resource use:
  - Fossils (MJ)
  - Minerals and metals (kg Sb eq.)
- Water use (m<sup>3</sup> depriv.)

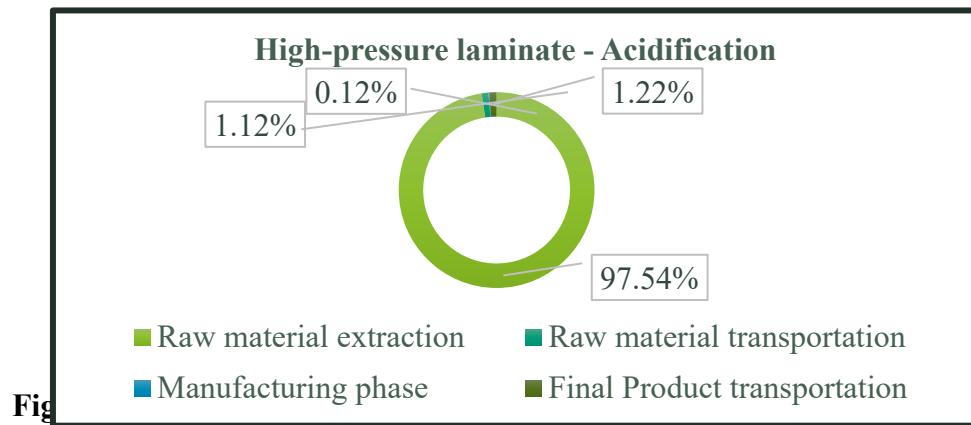
This rigorous assessment ensures a comprehensive understanding of the environmental impacts across various categories. However, the environmental performance results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The manufacturing process currently depends on a single energy source, electricity from the Indian grid, with a climate impact of 1.3 kg CO<sub>2</sub> eq./kWh. At this stage, the plant does not utilize any renewable energy sources for production, but efforts are underway to source its energy needs from renewable alternatives available in the region. For the waste generated indicator, we have excluded the C1-C4 and D modules due to the significant uncertainty associated with these at the given geographical scale.

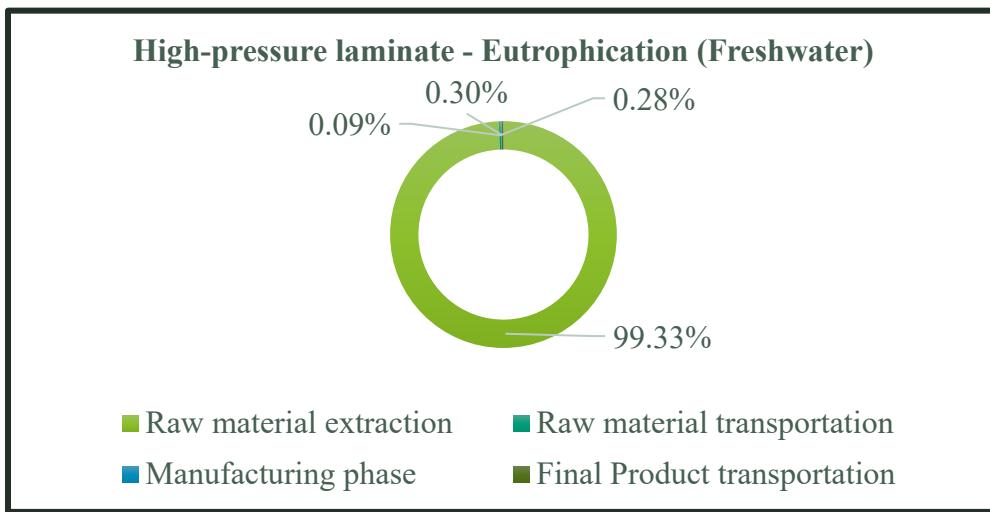
We analyzed the Cradle to Gate with distribution system boundary, as this system category offers the greatest control and influence by the EPD owner to enhance manufacturing efficiency.



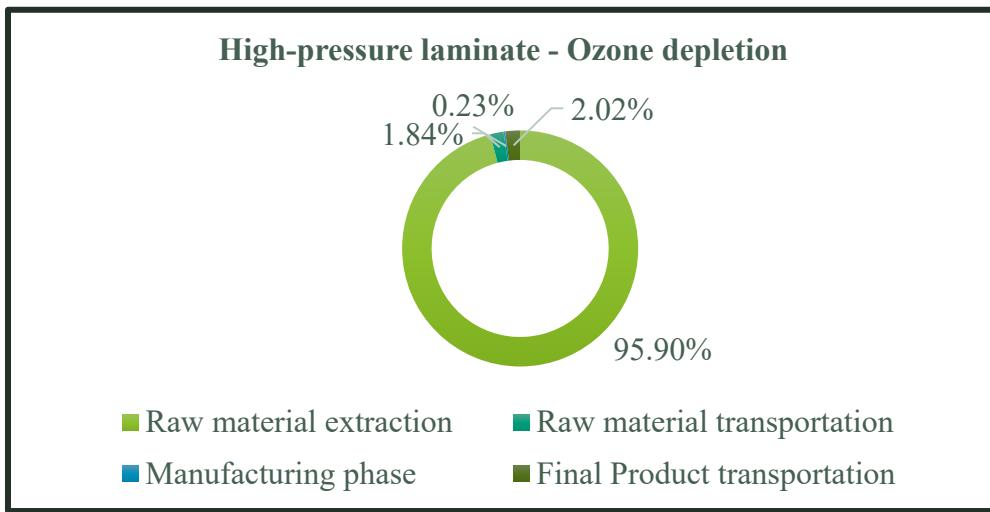
**Figure 3:** Phase wise percentage distribution of Climate Change



**Fig**



**Figure 5:** Phase wise percentage distribution of Eutrophication



**Figure 6:** Phase wise percentage distribution of Ozone Depletion

## Conclusion

Samrat Laminate completed a thorough Life Cycle Assessment (LCA) with a cradle-to-gate system boundary, which included the distribution phase. The analysis determined that producing 1 kg of laminate at their facility results in a climate change impact of 1.770 kg CO<sub>2</sub> equivalent. A detailed breakdown of the impact sources reveals that raw material transportation accounts for 0.19%, the manufacturing process contributes 3.63%, and product distribution represents 3.99%. Notably, raw material extraction emerges as the most significant stage, offering the highest potential for emissions reduction at 92.19%.

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

## **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 raw materials are sourced exclusively from responsibly managed resources.

We maintain partnerships solely with suppliers who consistently meet our exacting environmental standards. 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 their raw materials through verifiable traceability certifications.

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

### **REFERENCES**

- a) ISO (2006b), ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework
- 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.
- 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

