CROWN
LAMINATES & BEYOND

# Environmental Product Declaration

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

## High Pressure Laminates

| | |
|---|---|
| **EPD registration number:** | S-P-09226 |
| **Publication date:** | 2023-08-02 |
| **Validity date:** | 2028-08-01 |
| **Geographical scope:** | Global |

## 1. Introduction

Crown Decor Private Limited a Royale Touche Laminate group company is a niche Luxury Laminate brand from India and was launched in 1978 with the idea that a laminate has unlimited potential in surface décor. They made people look at laminates as a resilient and flexible product. They gave laminates a complete makeover with unparalleled endless designs and textures. The product has a rich luxurious feel that adds aesthetic value to interiors that makes architect, end users and interior designer's life easy.

With over 45 years of experience in the manufacturing industry the group has seven production lines of high pressure laminates producing over 18 million sq mtr annually in 4 different sizes and in thickness ranging from 0.6 mm to 20 mm which are made of 100% phenolic resin. The laminates are manufactured at a qualified facility equipped with imported machinery from Spain, Italy and Germany. Products are created with imported design papers made from highly stable and resistant pigments which guarantees freshness years after years of its use. All the products bear Greenguard, Greenbuilding, Green Label FSC, CE, EN 438 and Fire Rating Certification. It's an Indian Power Brand classified product.

**Crown Decor** also produces Compact Laminates in interior and exterior grade. Interior grade laminates are used for Toilet Cubicles & Partitions, Lockers, Wall Panelling etc., Exterior Grade Laminates are used for Building Facade/Cladding, Balconies, Verandah, Fences, Outdoor Benches, Table Tops etc., Also in the production range are anti skid/ anti slippery surface laminates suitable for deck and outdoor flooring application. They have completed several projects pan India and overseas.

This EPD aims to provide a measurable and verifiable environmental impact of 1 $m^2$ for high pressure laminates manufactured at India. The raw materials, energy consumption and other utilities have been modelled. The main environmental results have been presented below for 1 $m^2$ of area equivalent of 6 mm laminates. The LCA study is in accordance with Product Category Rules for 'CONSTRUCTION PRODUCTS' Version 1.2.5, 2019:14 for preparation of Environmental Product Declaration (EPD) of construction products. The EPD is in accordance with ISO 14025 and EN 15804+A2. EPD of construction products may not be comparable if they do not comply with EN 15804+A2.

## 2. General Information

### 2.1 EPD, PCR, LCA Information

Table 1: EPD Information

| | | |
|---|---|---|
| **Programme** | The International EPD® System<br>www.environdec.com | |
| **Program operator** | EPD International AB Box 210 60,<br>SE-100 31 Stockholm, Sweden. | Indian Regional Hub<br>www.envirodecindia.com |
| **Declaration holder**[1] | Ms Arpita Patel<br>Crown Décor Pvt Limited, 419/1 419/7, Radhe Industrial Estate, Tajpur Road, Chagodar, Sanand, Ahmedabad, Gujarat, India. Pin code: 382213<br>Email: arpita@crownlam.com<br>Website: www.crownlam.com | |
| **Product** | High Pressure Laminates (HPL) | |
| **CPC Code** | 314 | |
| **Reference standards** | ISO 14025:2006, ISO 14040/44, EN 15804:2012 +A2:2019 | |

Table 2: PCR Information

| | |
|---|---|
| Reference PCR | PCR CONSTRUCTION PRODUCTS' Version 1.2.5, 2019:14 |
| Date of Issue | 2022-11-01 |

Table 3: Verification Information

| | |
|---|---|
| Demonstration of verification | External, independent verification |
| Third party verifier | Mr. Prabodha Acharya<br>Independent verifier Mumbai, India<br>Email: prabodha.acharya@gmail.com |

Table 4: LCA Information

| | |
|---|---|
| Title | Environmental Product Declaration ofHigh Pressure Laminates |
| Preparer | Dr. Rajesh Kumar Singh<br>Sphera Solutions<br>707, Meadows, Sahar Plaza, Andheri Kurla Road, Andheri East, Mumbai - 400059, India.<br>Email: rsingh@sphera.com |
| Reference standards | ISO 14040/44 standard |

[1]EPD owner has the sole ownership, liability, and responsibility for the EPD

### 2.2 Reference Period of EPD Data

The reference period for the data used within this EPD is for the year April 2022-March 2023.

### 2.3 Geographical Scope of EPD Application

The geographical scope of this EPD is Global.

### 2.4 Additional Information about EPD

This EPD provides information concerning the production of High-Pressure Laminates (HPL) at CROWN DECOR. Product Category Rules (PCR) for the assessment of the environmental performance of High-Pressure Laminates is 'Construction products, 2019:14, version 1.2.5' and complying with the standard EN 15804. Product classification is UN CPC 314 Boards and panels 2013:02 Version 1.02. This PCR is applicable to the product "High Pressure Laminates". EPD of construction products may not be comparable if they do not comply with EN15804.

## 3. Product Description

### 3.1 Product Identification and Usage

HPL is a composite material composed of papers and resins. The product (multiple thicknesses: 0.8 mm to 20 mm) is made by the saturation of multiple layers of paper with phenolic resin and melamine resin by the use of thermal energy and electricity. CROWN DECOR manufactures HPL in Ahmedabad India.The production volume and area weight of various laminates along with respective thicknesses are presented below in Table 3-1. The production volume is maximum for 6 mm laminates thus it is selected as the representative product in this EPD.

Table 3-1 Production volume and area weight of various laminates

| Sr no | Thicknesses (mm) | Area weight (kg/m²) | Production Volume (m²/annum) | Production (%) |
|---|---|---|---|---|
| 1 | 0.8 | 1.238 | 3,21,959.85 | 17.8 |
| 2 | 0.9 | 1.25 | 81,403 | 4.5 |
| 3 | 1 | 1.3 | 21,452 | 1.19 |
| 4 | 1.2 | 1.35 | 4,598 | 0.25 |
| 5 | 1.3 | 1.4 | 1,98,726 | 10.99 |
| 6 | 1.7 | 1.6 | 3,965 | 0.22 |
| 7 | 1.8 | 1.65 | 28,112 | 1.55 |
| 8 | 2 | 3 | 2,467 | 0.14 |
| 9 | 3 | 4.5 | 37,172 | 2.05 |
| 10 | 4 | 6 | 13,453 | 0.74 |
| 11 | 5 | 7.5 | 30,336 | 1.68 |
| 12 | 6 | 9 | 6,16,568 | 34.09 |
| 13 | 7 | 10.5 | 270 | 0.01 |
| 14 | 8 | 12 | 1,23,664 | 6.84 |
| 15 | 10 | 15 | 82,154 | 4.54 |
| 16 | 12 | 18 | 1,96,686 | 10.87 |
| 17 | 13 | 19.5 | 38,957 | 2.15 |
| 18 | 14 | 21 | 1,506 | 0.08 |
| 19 | 15 | 22.5 | 116 | 0.01 |
| 20 | 16 | 24 | 63 | 0 |
| 21 | 18 | 27 | 2,701 | 0.15 |
| 22 | 19 | 28.5 | 1,444 | 0.08 |
| 23 | 20 | 30 | 1,130.0 | 0.06 |

# 4. LCA

## 4.1 Information Sources and Data Quality

It is important that data quality is in accordance with the requirements of the declaration‘s goal and scope. This is essential to the reliability of the declaration and achievement of the intended application. The quality of the LCI data for modelling the life cycle stages have been assessed according to ISO 14044 (ISO, 2006b). Data quality is judged by its quality (measured, calculated or estimated), completeness (e.g. are there unreported emissions), consistency (degree of uniformity of the methodology applied on a study serving as a data source) and representativeness (geographical, time period, technology). To cover these requirements and to ensure reliable results, first-hand industry data in combination with consistent, upstream LCA information is used. The datasets have been used in LCA-models worldwide for several years in industrial and scientific applications for internal as well as critically reviewed studies. In the process of providing these datasets, they have been crosschecked with other databases and values from industry and science.

CROWN DECOR PRIVATE LIMITED provides accurate and representative data for HPL production. For all data requirements, primary data were used where possible, and finally upstream LCA data from LCA (FE) 10.6 professional database was used.

## 4.2 Methodological Details

### 4.2.1 Declared unit

The declared unit for the EPD is 1 $m^2$ of HPL.

## 4.3 Cut-off Criteria

No cut-off criteria are defined for this study. The system boundary was defined based on relevance to the goal of the study. For the processes within the system boundary, all available energy and material flow data have been included in the model.

## 4.4 Allocation

No allocation has been done. As no co-products are produced, the flow of materials and energy and the associated release of substances and energy into the environment is related exclusively to the product manufactured.

## 4.5 System Boundaries

The system boundary for HPL represents a Cradle-to-Gate with options, which covers production and End of life phase. The production phase includes the raw material extraction, upstream transportation, and manufacturing process of the final product. End of life phase includes incineration of the product.

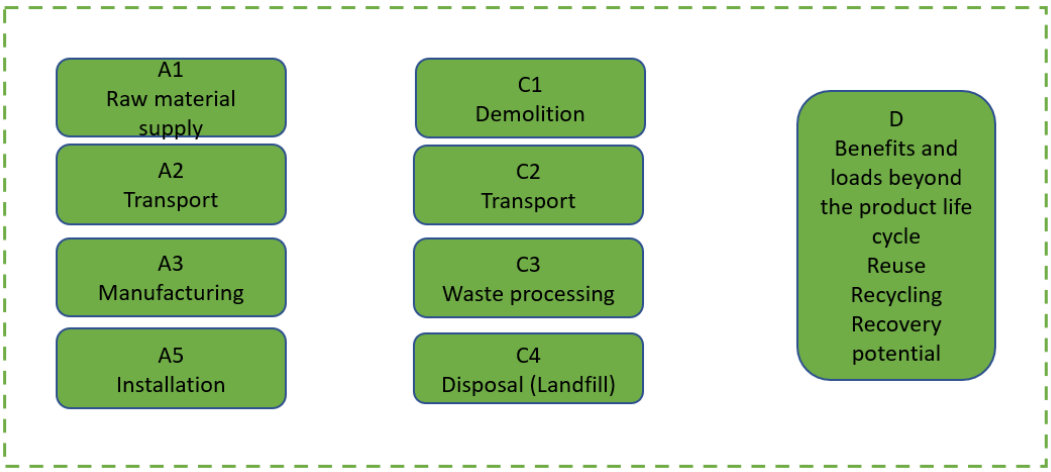



Figure 4 -1 System boundary included in the study

### 4.5.1 Geographic System Boundaries

The geographical coverage of the study covers manufacturing in India. Country specific boundaries wherever possible have been adapted and others dataset were chosen from EU and GLO if no regional datasets were available.

### 4.5.2 Temporal System Boundaries

The data collection is related to one year of operation, and the year of the data is indicated in the questionnaire for each data point. The data is collected from year April 2022- March 2023 and is believed to be representative of production of HPL product in India.

### 4.5.3 Technology coverage

The exact technological configuration was used for the HPL product for representing the accurate environmental impacts. It was assumed that secondary data from databases that were used for this assessment, were temporally and technologically comparable to that of primary data and within the temporal coverage already addressed.

## 4.6 Software and database

The LCA model was created using the LCA (FE) 10.6 Software system for life cycle engineering, developed by Sphera Solutions. The LCA (FE) database provides the life cycle inventory data for several of the raw and process materials obtained from the upstream system. Detailed database documentation for LCA (FE) datasets can be accessed at https://sphera.com/product-sustainability-gabi-data-search/ .

## 4.7 Comparability

According to the standards, EPDs do not compare the environmental performance of products in the sector. Any comparison of the declared environmental performance of products lies outside the scope of these standards and is suggested to be feasible only if all compared declarations follow equal standard provisions.

"EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025."

## 4.8 Results

Modules of the life cycle included as per PCR is given in Table 4-1.

Table 4-1 Modules of Production life cycle included (X= Declared Module; MND = Module not declared)

| Production | | | Installation | | Use Stage | | | | | | | End of Life | | | | Next Product System |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply (extrac-tion, processing, recycled mate-rial) | Transport to manufacturer | Manufacturing | Transport to site | Treatment of packaging products | Use / application | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Demolition | Transport to EoL | Incineration | Disposal | Credits from incineration |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | MND | X | MND | MND | MND | MND | MND | MND | MND | X | X | X | X | X |

### 4.8.1 LCIA and LCI Result

The LCIA results for 1 $m^2$ of HPL (6 mm) are given in Table 4-2 to Table 4-6

4-2Environmental impacts for 1 $m^2$ of HPL (6 mm)

| Environmental impact indicators | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Climate Change - total | kg $CO_2$ eq. | 2.10E+01 | 2.01E-01 | 0.00E+00 | 8.66E-02 | 9.54E+00 | 0.00E+00 | -3.97E+00 |
| Climate Change, fossil | kg $CO_2$ eq. | 3.04E+01 | 1.05E-01 | 0.00E+00 | 8.70E-02 | 2.89E-01 | 0.00E+00 | -3.95E+00 |
| Climate Change, biogenic | kg $CO_2$ eq. | -9.42E+00 | 9.61E-02 | 0.00E+00 | 0.0117 | 9.25E+00 | 0.00E+00 | -2.25E-02 |
| Climate Change, land use and land use change | kg $CO_2$ eq. | 1.28E-02 | 6.31E-06 | 0.00E+00 | 7.98E-04 | 3.13E-05 | 0.00E+00 | -2.55E-04 |
| Ozone depletion | kg CFC -11 eq. | 2.26E-11 | -2.08E-14 | 0.00E+00 | 7.54E-15 | 1.49E-12 | 0.00E+00 | -3.09E-11 |
| Acidification | Mole of H+ eq. | 2.34E-01 | 3.34E-05 | 0.00E+00 | 1.12E-04 | 7.22E-03 | 0.00E+00 | -4.90E-03 |
| Eutrophication, freshwater | kg P eq. | 1.27E-04 | 2.09E-06 | 0.00E+00 | 3.14E-07 | 3.88E-07 | 0.00E+00 | -6.38E-06 |
| Eutrophication, marine | kg N eq. | 5.15E-02 | 2.55E-05 | 0.00E+00 | 3.93E-05 | 3.43E-03 | 0.00E+00 | -1.43E-03 |
| Eutrophication, terrestrial | Mole of N eq. | 5.02E-01 | 1.40E-04 | 0.00E+00 | 4.72E-04 | 3.97E-02 | 0.00E+00 | -1.53E-02 |
| Photochemical ozone formation, human health | kg NMVOC eq. | 1.01E+00 | 6.18E-05 | 0.00E+00 | 9.70E-05 | 8.83E-03 | 0.00E+00 | -3.98E-03 |
| Resource use, mineral and metals | kg Sb eq. | 1.11E-06 | -9.86E-11 | 0.00E+00 | 5.56E-09 | 1.41E-08 | 0.00E+00 | -2.83E-07 |
| Resource use, fossils | MJ | 4.41E+02 | 6.37E-02 | 0.00E+00 | 1.17E+00 | 4.44E+00 | 0.00E+00 | -7.21E+01 |
| Water use | $m^3$ world equiv. | 1.94E+00 | 8.88E-03 | 0.00E+00 | 9.93E-04 | 1.52E+00 | 0.00E+00 | -3.75E-01 |

4-3 Resource use Indicators for 1 $m^2$ of HPL (6 mm)

| Resource use indicators | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Use of renewable primary energy (PERE) | MJ | 1.06E+02 | 1.48E+00 | 0.00E+00 | 8.29E-02 | 1.13E+02 | 0.00E+00 | -2.11E+01 |
| Primary energy resources used as raw materials (PERM) | MJ | 1.13E+02 | -1.50E+00 | 0.00E+00 | 0.00E+00 | -1.12E+02 | 0.00E+00 | 0.00E+00 |
| Total use of renewable primary energy resources (PERT) | MJ | 2.19E+02 | -1.56E-02 | 0.00E+00 | 8.29E-02 | 9.31E-01 | 0.00E+00 | -2.11E+01 |
| Use of non-renewable primary energy (PENRE) | MJ | 4.40E+02 | 1.68E+00 | 0.00E+00 | 1.17E+00 | 4.44E+00 | 0.00E+00 | -7.21E+01 |
| Non-renewable primary energy resources used as raw materials (PENRM) | MJ | 1.62E+00 | -1.62E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Total use of non-renewable primary energy resources (PENRT) | MJ | 4.41E+02 | 6.37E-02 | 0.00E+00 | 1.17E+00 | 4.44E+00 | 0.00E+00 | -7.21E+01 |
| Input of secondary material (SM) | kg | 2.08E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of renewable secondary fuels (RSF) | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of non renewable secondary fuels (NRSF) | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of net fresh water (FW) | $m^3$ | 6.95E-02 | 2.01E-04 | 0.00E+00 | 9.13E-05 | 3.59E-02 | 0.00E+00 | -1.71E-02 |

4-4 Waste Categories and other Indicators for 1 m² of HPL (6 mm)

| Output flows and waste categories | Units | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Hazardous waste disposed (HWD) | kg | 1.48E-06 | 1.07E-11 | 0.00E+00 | 4.34E-12 | 2.94E-10 | 0.00E+00 | -3.78E-09 |
| Non-hazardous waste disposed (NHWD) | kg | 4.26E-01 | 8.95E-02 | 0.00E+00 | 1.69E-04 | 1.11E-01 | 0.00E+00 | -3.57E-02 |
| Radioactive waste disposed (RWD) | kg | 3.32E-03 | -6.32E-06 | 0.00E+00 | 1.52E-06 | 2.10E-04 | 0.00E+00 | -5.60E-03 |
| Components for re-use (CRU) | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for Recycling (MFR) | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material for Energy Recovery (MER) | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported electrical energy (EEE) | MJ | 1.68E+00 | 1.75E-01 | 0.00E+00 | 0.00E+00 | 1.68E+01 | 0.00E+00 | 0.00E+00 |
| Exported thermal energy (EET) | MJ | 2.99E+00 | 3.12E-01 | 0.00E+00 | 0.00E+00 | 2.99E+01 | 0.00E+00 | 0.00E+00 |

4-5 Biogenic Carbon content of 1 m²of HPL (6 mm)

| Biogenic carbon content | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Biogenic carbon content in product [kg] | kg | 2.83E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Biogenic carbon content in packaging [kg] | kg | 3.80E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

4-6 Additional Parameters for 1 $m^2$of HPL (6 mm)

| Optional indicators | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| **Particulate matter** | Disease incidences | 5.12E-06 | 3.70E-10 | 0.00E+00 | 7.44E-10 | 2.16E-08 | 0.00E+00 | -4.16E-08 |
| **Ionising radiation, human health** | kBq U235 eq. | 5.35E-01 | -1.11E-03 | 0.00E+00 | 2.19E-04 | 3.34E-02 | 0.00E+00 | -9.32E-01 |
| **Ecotoxicity, freshwater** | CTUe | 2.71E+02 | 1.16E-01 | 0.00E+00 | 8.17E-01 | 1.65E+00 | 0.00E+00 | -1.59E+01 |
| **Human toxicity, cancer** | CTUh | 1.32E-05 | 4.84E-12 | 0.00E+00 | 1.66E-11 | 1.06E-10 | 0.00E+00 | -8.00E-10 |
| **Human toxicity, non-cancer** | CTUh | 4.12E-07 | 5.24E-10 | 0.00E+00 | 8.83E-10 | 3.65E-09 | 0.00E+00 | -2.48E-08 |
| **Land Use** | Pt | 1.36E+03 | -4.09E-03 | 0.00E+00 | 4.89E-01 | 1.11E+00 | 0.00E+00 | -1.39E+01 |

#### 4.8.2 Climate Change Total (GWP) Conversion Factors for other thicknesses

The Climate Change Total (GWP)Factors per kg of the product are presented below for the respective thicknesses.

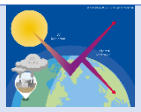
4-7Climate change total (GWP) Factors for other thicknesses

| Thickness (mm) | GWP-Total Factors (per kg) |
|---|---|
| **0.8** | 0.977 |
| **0.9** | 0.986 |
| **1** | 1.007 |
| **1.2** | 0.978 |
| **1.3** | 0.974 |
| **1.7** | 1.086 |
| **1.8** | 1.085 |
| **2** | 1.028 |
| **3** | 1.017 |
| **4** | 1.012 |
| **5** | 1.009 |
| **7** | 1.005 |
| **8** | 1.004 |
| **10** | 1.002 |
| **12** | 1.001 |
| **13** | 1.000 |
| **14** | 1.000 |
| **15** | 1.000 |
| **16** | 1.000 |
| **18** | 0.999 |
| **19** | 0.999 |
| **20** | 0.999 |

## 4.9 Interpretation

The interpretation of the results of 1 $m^2$ of 6 mm HPL are presented in Table 4-8.

4-8 Interpretation of most significant contributors to life cycle parameters (1 $m^2$ of HPL Products)

| Parameter | | Most significant contributor |
|---|---|---|
| **Acidification Potential (AP)** | | The Cradle to gate (A1-A3) Acidification Potential (AP) is 0.233 Mole of H+ eq. The contribution by the manufacturing stage is 78% while the raw material stage (A1) contribution is 17%, while the raw material transportation stage (A2) contributes to 5% |
| **Eutrophication Potential (EP)** | | The Cradle to Gate Eutrophication potential (EP) is 1.27E-04kg P eq. The contribution by the raw material stage is 99% while the manufacturing stage (A3) contributes 1%. |
| **Climate change Total (GWP 100 years)** |  | The Cradle to gate Climate change total (GWP) is 21.03kg C02 eq. The contribution from the manufacturing stage (A3) is 92% followed by raw material stage (A1) which contributes 3% |
| **Photochemical Ozone Creation Potential (POCP)** | | The Cradle to Gate Photochemical ozone creation potential (POCP) is 1.01 kg NMVOC eq. The major contribution is from manufacturing stage (A3) which is around 99% |
| **Abiotic depletion potential (ADP) - Fossil** | | The total resource use fossil is 441.26 MJ. The major contribution is from raw material stage (A1) which is around 55% and from the manufacturing stage it is around 43% |

Concluding, the study provides fair understanding of environmental impacts during the various life cycle stages of HPL product production. It also identifies the hot spots in the value chain where improvement activities can be prioritised and accordingly investment can be planned. The scope covers the ecological information to be divided into raw material production (A1), transportation (A2) and Manufacturing (A3) along with the end of life (C1-C4).

## 5. LCA Terminology

| | |
|---|---|
| Cradle to Gate | Scope of study extends from mining of natural resources to the completed product ready for shipping from the manufacturing dispatch "gate", known as Modules A1-A3. |
| Cradle to Grave | Scope of study extends from mining of natural resources to manufacture, use and disposal of products at End of Life, including all Modules A-D. |
| End of life | Post-use phase life cycle stages involving collection and processing of materials (e.g., scrap) and recycling or disposal, known as Modules C and D. |

## 6. Other Environmental Information

The constituent materials used within our products are responsibly sourced and we apply the principles of Sustainable Development and of Environmental Stewardship as a standard business practice in our operations. Protecting the environment by preserving non-renewable natural resources, increasing energy efficiency, reducing the environmental emissions, limiting the impact of materials transportation to and from our operations is part of our way in doing business.

Products do not contain any substances that can be included in "Candidate List of Substances of Very High Concern for Authorization" and raw materials used are not part of the EU REACH regulation.

## 7. References


- LCA (FE) 10.6_2022: Dokumentation der LCA (FE)-Datensätze der Datenbank zur Ganzheitlichen Bilanzierung. LBP, Universität Stuttgart und Sphera Solutions Pvt Ltd GmbH
- LCA (FE) 10_2021: Software und Datenbank zur Ganzheitlichen Bilanzierung. LBP, Universität Stuttgart und Sphera Solutions Pvt Ltd GmbH
- ISO 14020:2000 Environmental labels and declarations - General principles
- ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- ISO 14040:2006 Environmental management- Life cycle assessment - Principles and framework
- ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines
- PCR 2019:14, Product Category Rules (PCR) for 'CONSTRUCTION PRODUCT' Version 1.2.5