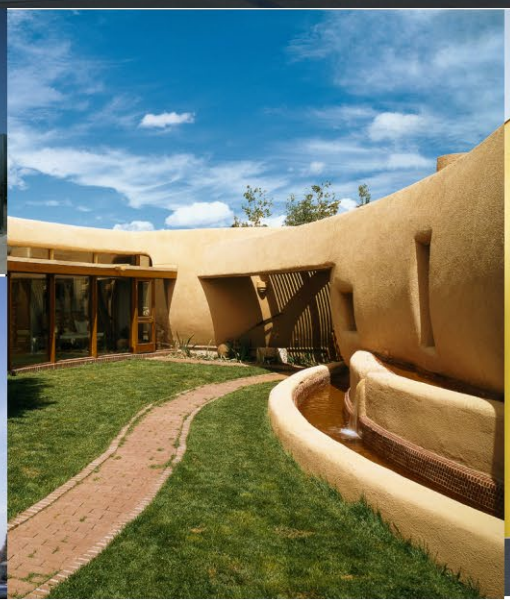
Building with conscience.

## EPD for StoColor Wood Stain

**StoColor Wood Stain** is an acrylic-based stain for use as a topcoat over StoCast Wood and StoSignature Wood. It provides superior UV protection for long lasting colors and is available in gloss or matte sheen. With 25 standard colors and the possibility for custom colors, designers will enjoy the creative freedom to follow their inspiration. Use it on vertical above grade walls in StoVentec®, StoTherm®, StoPowerwall®, StoQuik®Silver,StoPanel®, and StoLIte® wall systems, and on prepared concrete, concrete masonry, or stucco wall surfaces.



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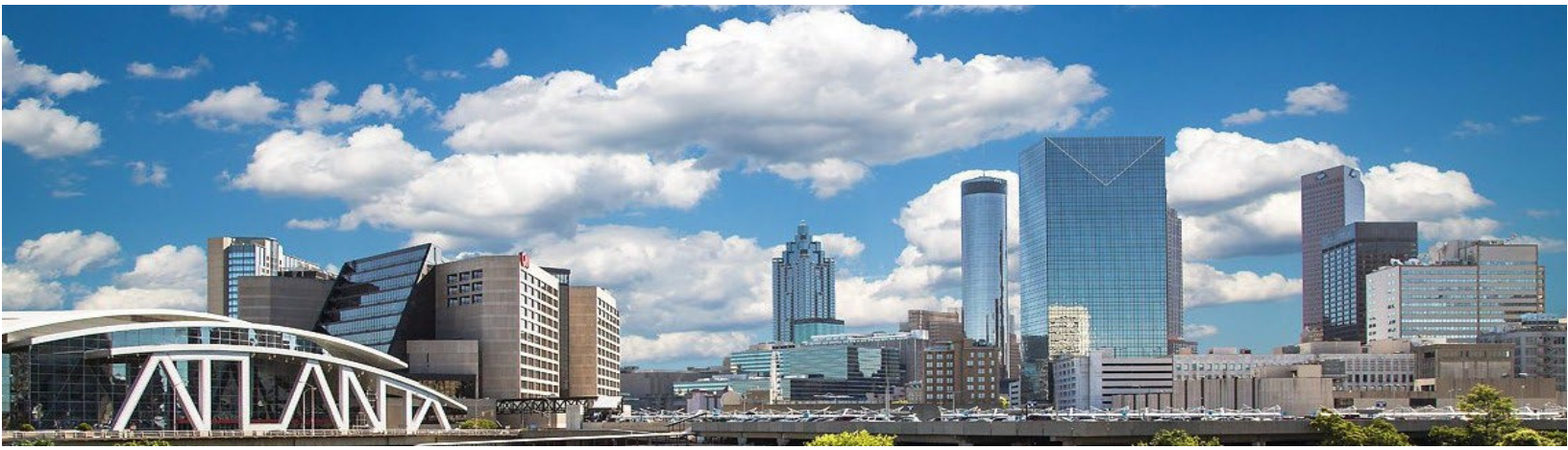

| | |
|---|---|
| PCR Identification | PCR for Architectural Coatings: NAICS 325510 on the basis of ISO 21930: 2017, NSF International, 2017. Valid through June 30, 2024 |
| PCR Review was conducted by | Thomas P. Gloria, Ph.D.<br>Bill Stough<br>Michael Overcash, Ph.D. |
| Product Category | Vertical Wood Stain |
| Manufacturer's name | Sto Corp.<br>3800 Camp Creek Parkway SW, Building 1400, Suite 120<br>Atlanta, GA 30331<br>www.stocorp.com \| (800) 221-2397 |
| EPD program operator | Epsten Group, a Salas O'Brien Company<br>101 Marietta St NW Suite 2600<br>Atlanta, GA 30303<br>www.epstengroup.com |
| Declaration Number | 01-015 |
| Date of Certification | October 8th, 2024 |
| Period of Validity | 5 years from date of certification |
| Functional Unit | One square meter of covered and protected substrate for 60 years |
| Market-base life / Design life used in assessment | 10 Years / 5 Years |
| System based life used in assessment | 40 Years |
| Test method employed for determination of design life | Product default warranty |
| Amount of colorant needed | See Table 3 |
| Overall Data Quality Assessment Score | Good |
| Site(s) in which the results of the LCA are representative | STO manufacturing sites in Atlanta, GA; Glendale, AZ; and Rutland, VT |
| Information on where explanatory material can be obtained | See references at the end of this document. |
| LCA Software and Version Number | LCA for Experts (formerly GaBi) 10.7 |
| LCI Database and Version Number | MLC (formerly GaBi) Database Version 2023.2 |
| This declaration was independently verified in accordance with ISO 21930:2017, ISO 14025: 2006 and the reference PCR: PCR for Architectural Coatings: NAICS 325510<br>☐ Internal ☒ External | Megan Blizzard<br>Megan.Blizzard@salasobrien.com |
| This life cycle assessment was conducted in accordance with ISO21930:2017, ISO 14044 and the reference PCR by: | WAP Sustainability Consulting, LLC |
| This life cycle assessment was independently verified in accordance with ISO 21930:2017, ISO 14044 and the reference PCR by: | Angela Fisher, Aspire Sustainability<br>angela@aspiresustainability.com |

## Comparability

In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the building level per ISO 21930 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

## Company

We believe in '**Building with conscience**'.

That means ensuring that all building products are not only safe, effective and easy to install, but also environmentally responsible and sustainable. We know you're always looking for the smartest and newest technology to create energy efficient buildings with superior aesthetics.

That's exactly what our products help you achieve. Products like our wall systems, coatings and finishes are consistent favorites among design professionals, contractors and property owners alike. Whatever your needs or vision may be, we offer products for every type of building project; whether it's new construction, restoration or panelization, commercial or residential work.

An architect or specifier focuses on aesthetics and feasibility, a contractor needs products that are easy to work with, and a building owner requires high value and low costs on properties. Sto understands these unique needs, and delivers the smart, innovative materials and solutions that make this all possible. That's why Sto remains the innovative leader in integrated exterior wall systems.

When you combine that commitment to product support and innovation with value-added offerings like consultative design and color services through Sto Studio or training in proper application techniques through the Sto Institute, you get an integrated exterior wall system solution unmatched in the industry.

## Manufacturing Sites Covered in this EPD

Atlanta Plant

Glendale Plant

Rutland Plant

## Product Identification

StoColor Wood Stains are offered in two sheen options that allow more freedom in building exterior designing and finishing. Table 1 lists the products declared in this EPD.

Table 1: List of StoColor Wood Stains

| Product Name | Product Number | Sheen Type |
|---|---|---|
| StoColor Wood Stain | 81713 | Gloss |
| | 81714 | Matte |

## Product Description

StoColor Wood Stain is an acrylic-based stain for use as a topcoat over StoCast Wood and StoSignature Wood. It provides superior UV protection for long lasting colors and is available in gloss or matte sheen. With 15 standard colors and the possibility for custom colors, designers will enjoy the creative freedom to follow their inspiration. Use it on vertical above grade walls in StoVentec®, StoTherm®, StoPowerwall®, StoQuik®Silver,StoPanel®, and StoLite® wall systems, and on prepared concrete, concrete masonry, or stucco wall surfaces. The products are offered in two sheen options: matte finish and glossy finish. The study is conducted to cover both options.


## Performance Features

| | | |
|---|---|---|
| Acrylic-based | Wide Variety of Colors & Sheens | Easy to Install |
| Vapor Permeable | Easy to clean | |

## Material Composition

The material compositions of Stolit® Lotusan® are listed below:

Table 2: Material composition for StoColor Wood Stain

| Material | **StoColor Wood Stains** |
|---|---|
| Water | 45% |
| Latex | 35% |
| Surfactant | 8% |
| Additive* | 8% |
| Polyether Polyol | 3% |
| Polyurethane | <1% |

*Additives include light stabilizer, plasticizer, biocide, etc.
The product does not contain hazardous substances per the EPA's Resource Conservation and Recovery Act.

## Components related to Life Cycle Assessment

The functional unit for the LCA study was covering and protecting 1 square meter ($m^2$) of substrate for a period of 60 years—the assumed lifetime of a building. The reference flow required for the functional unit is calculated based on the product lifespan scenarios prescribed in the PCR. The market-based lifetime is 10 years, and the design lifetime is determined either based on quality determined by ASTM tests or on the product warrant. The EPD provides an additional lifetime scenario where the declared products are installed as a component of the wall system. This service life is estimated at 40 years based on combined data from performance studies on Sto's wall systems, past life cycle assessments of Sto's wall systems, and EPDs published by Sto in Europe (Frauenhofer IBP, 2015; BTY Group, 2001; Sto SE & Co. KGaA and Sto Scandinavia AB, 2020). The reference flow required for one functional unit is provided in Table 3 for each lifetime.

Table 3: Reference flow by lifetime used

| | Functional Unit | Reference Flow [kg] | Tint needed [kg] | Reference Flow [kg] | Tint needed [kg] | Reference Flow [kg] | Tint needed [kg] |
|---|---|---|---|---|---|---|---|
| Lifespan | | Design Lifetime [3 years] | | Market-based Lifetime [3 years] | | System-based Lifetime [40 years] | |
| StoColor Wood Stain | 1 | 3.37 | N/A | 3.37 | 1.30 | 3.65 | 0.325 |

## Scope and Boundaries of the Life Cycle Assessment

The LCA was performed in accordance with ISO 14040 standards. The study is a cradle-to-grave LCA and includes the following life stages as prescribed in the PCR.

| Production | | | Construction | | Use | | | | | | | End of Life | | | | Benefits & Loads Beyond System Boundary |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Raw Material Supply | Transport | Manufacturing | Transport to Site | Assembly/Install | Use | Maintenance | Repair | Replacement | Refurbishment | Operational Energy Use | Operational Water Use | Deconstruction | Transport | Waste Processing | Disposal | Reuse, Recovery, Recycling Potential |
| X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | ND |

X = Module Included in LCA Report, ND = Module not Declared

Figure 1: Life stages for the cradle-to-grave LCA

## Cut-off Criteria

Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the functional unit.

## Data Quality

The overall data quality level was determined to be good. Primary data was collected from Sto's facilities in Atlanta, GA, Glendale, AZ and Rutland, VT for the 2021 reference year. When primary data did not exist, secondary data were obtained from the MLC Database Service. Overall, both primary and secondary data are considered good quality in terms of geographic, temporal and technological coverage.

## Estimates and Assumption

Assumptions were made to represent the cradle-to-grave environmental performance of Sto's products. These assumptions were made in accordance with the PCR and include the transportation distances, the disposal of packaging material and the product at its end of life and use phase assumptions.

## Allocation

General principles of allocation were based on ISO 14040/44. Where possible, allocation was avoided. When allocation was necessary it was done on a physical mass basis.

## Product Stage (A1-A3)

StoColor Wood Stain is produced at Sto's Atlanta, GA, Glendale, AZ and Rutland, VT facilities. This stage includes an aggregation of raw material extraction, supplier processing, delivery, manufacturing and packaging by Sto. StoColor Wood Stain is supplied in 5-gallon pails.

## Delivery and Installation Stage (A4-A5)

The design and construction process stage starts with the packaged product leaving the production site and ends with being delivered to the application site.

During this stage, the finished product is moved from a shipping dock for distribution. The end gate is the application site after the purchaser acquires the finished product and transports it to the application site.

The installation stage begins when the user prepares the product before applying it to a substrate and ends with any leftover coating and discarded packaging entering the end-of-life stage. Detailed application instructions are provided online. The application procedure includes mixing and applying. As recommended, an electric drill/mixer and a spray pump are assumed to be used for mixing and application. The equipment is not included in the study as these are multi-use tools and the impacts per declared unit is considered negligible, but electricity to power application tools has been included.

As prescribed in the PCR, 10% of the wet mass of StoColor Wood Stain is assumed to be unused and properly disposed of. Other than VOC emissions, no other direct emissions to soil and water.

Table 4: Transport to building site (A4)

| Property | StoColor Wood Stain |
|---|---|
| Vehicle Type | Heavy Heavy-duty Diesel Truck / 53,333 lb payload - 8b |
| Fuel Efficiency [L/100km] | 42 |
| Fuel Type | Diesel |
| Distance [km] | 9.93E+02 |
| Capacity Utilization [%] | 67% |
| Weight of Products Transported [kg] | 1.80E-01 |
| Product Density [kg/m$^3$] | 9.89E+02 |
| Capacity utilization volume factor | =1 |

Table 5: Installation scenario details (A5)

| Property | StoColor Wood Stain |
|---|---|
| Tint [kg] | 0 |
| Net Freshwater Consumption [m$^3$] | 0 |
| VOC emission [kg] | 7.75E-03 |
| Electricity Usage [kWh] | 4.09E-04 |
| Product wastage [%] | 10% |
| Waste materials at the construction site before waste processing, generated by product installation [kg] | 2.65E-02 |
| Packaging Waste to Landfill [kg] | 8.18E-03 |
| Packaging Waste to Incineration [kg] | 1.79E-03 |
| Packaging Waste to Recycling [kg] | 1.19E-03 |
| Distance to disposal facility [km] | 3.22E+01 |

## Use Stage (B1-B7)

This stage contains all of the energy, water, and materials related to the use of the product, including cleaning, maintenance, and replacements. StoColor Wood Stain does not require any energy or material for providing its functions. The reference service life of the product is 40 years. This service life scenario is valid only when the product is used as intended in Sto's proprietary engineerd wall system assemblies. The referenced PCR also prescribes two service life scenarios – design life and market-based life. The details are in Table 6.

Table 6: Replacement scenario details

| Product | StoColor Wood Stain |
|---|---|
| ESL [years] | 60 |
| Design Life [years]* | 3 |
| Replacement (Design Life) | 19 |
| Market-based Life [years]* | 3 |
| Replacement (Market-based Life) | 19 |
| System-based Life [years]* | 40 |
| Replacement (System-based Life) | 0.5 |
| * Design life and market-based lifetime are both reference service lifetime scenarios required by the architectural Coating PCR. The system-based lifetime scenario is included as additional information. | |

## End-of-Life Stage (C1-C4)

In this stage, the disposal of installation waste, packaging waste and product waste at its end of life is included. The disposal pathway of each waste stream is modeled based on the recommendation of PCR and US EPA's 2018 waste management fact sheet.

Table 7: End-of-life scenario details

| | RSL Scenario | Stolit Lotusan |
|---|---|---|
| Collected as mixed construction waste [kg] | Design Life | 3.06 |
| Waste to Landfill [kg] | | Same as above |
| Collected as mixed construction waste [kg] | Market-based lifetime | 3.06 |
| Waste to Landfill [kg] | | Same as above |
| Collected as mixed construction waste [kg] | System-based lifetime | 2.30E-01 |
| Waste to Landfill [kg] | | Same as above |
| Distance to Landfill [km] | - | 3.22E+01 |

## Life Cycle Assessment Results

As prescribed by the PCR, TRACI 2.1 impact characterization methodology and IPCC 5th assessment report are adopted to calculate the environment impacts. Table 4 provides the acronym key of the impact indicators declared in this EPD.

Table 8: LCIA impact category and LCI Indicator keys

| Abbreviation | Parameter | Unit |
|---|---|---|
| | **IPCC AR5** | |
| GWP | Global warming potential (100 years, includes biogenic CO2) | kg $CO_2$ eq |
| | **TRACI 2.1** | |
| AP | Acidification potential of soil and water | kg $SO_2$ eq |
| EP | Eutrophication potential | kg N eq |
| ODP | Depletion of stratospheric ozone layer | kg CFC 11 eq |
| SFP | Smog formation potential | kg $O_3$ eq |
| | CML 2001-Jan 2016 | |
| ADPF | Abiotic depletion potential for fossil resources | MJ, net calorific value |
| | Carbon Emissions and Uptake | |
| BCRP | Biogenic Carbon Removal from Product | [kg $CO_2$] |
| BCEP | Biogenic Carbon Emission from Product | [kg $CO_2$] |
| BCRK | Biogenic Carbon Removal from Packaging | [kg $CO_2$] |
| BCEK | Biogenic Carbon Emission from Packaging | [kg $CO_2$] |
| BCEW | Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes | [kg $CO_2$] |
| CCE | Calcination Carbon Emissions | [kg $CO_2$] |
| CCR | Carbonation Carbon Removals | [kg $CO_2$] |
| CWNR | Carbon Emissions from Combustion of Waste from Non- Renewable Sources used in Production Processes | [kg $CO_2$] |
| | **Resource Use Parameters** | |
| $RPR_E$ | Use of renewable primary energy excluding renewable primary energy resources used as raw materials | MJ, net calorific value (LHV) |
| $RPR_M$ | Use of renewable primary energy resources used as raw materials | MJ, net calorific value |
| $NRPR_E$ | Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | MJ, net calorific value |
| $NRPR_M$ | Use of non-renewable primary energy resources used as raw materials | MJ, net calorific value |
| SM | Use of secondary materials | kg |
| RSF | Use of renewable secondary fuels | MJ, net calorific value |
| NRSF | Use of non-renewable secondary fuels | MJ, net calorific value |
| RE | Recovered energy | MJ, net calorific value |
| FW | Net use of fresh water | $m^3$ |
| | **Waste Parameters** | |
| HWD | Disposed-of-hazardous waste | kg |
| NHWD | Disposed-of non-hazardous waste | kg |
| HLRW | High-level radioactive waste, conditioned, to final repository | kg |
| ILLRW | Intermediate- and low-level radioactive waste, conditioned, to final repository | kg |
| CRU | Components for reuse | kg |
| MR | Materials for recycling | kg |
| MER | Materials for energy recovery | kg |
| EEE | Exported electrical energy | MJ |
| EET | Exported thermal energy | MJ |

## StoColor Wood Stain - Gloss

The LCIA results presented below are for 1 $m^2$ of StoColor Wood Stain - Gloss for 60 years. Three lifetime scenarios are presented for module of replacement (B4).

| Impact Category | A1-A3 | A4 | A5 | B1 | B2 | B3 | Design Life B4 | Market-Based Life B4 | System Based B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IPCC AR5** | | | | | | | | | | | | | | | | |
| **GWP [kg $CO_2$ eq]** | 2.19E-01 | 1.31E-02 | 2.83E-02 | 0 | 0 | 0 | 4.95E+00 | 4.95E+00 | 1.30E-01 | 0 | 0 | 0 | 0 | 3.76E-04 | 0 | 3.31E-03 |
| **TRACI LCIA Impacts (North America)** | | | | | | | | | | | | | | | | |
| **AP [kg $SO_2$ eq]** | 4.70E-04 | 6.42E-05 | 5.79E-05 | 0 | 0 | 0 | 1.12E-02 | 1.12E-02 | 2.96E-04 | 0 | 0 | 0 | 0 | 1.12E-06 | 0 | 1.71E-05 |
| **EP [kg N eq]** | 3.66E-05 | 5.58E-06 | 8.60E-06 | 0 | 0 | 0 | 9.65E-04 | 9.65E-04 | 2.54E-05 | 0 | 0 | 0 | 0 | 1.14E-07 | 0 | 7.49E-07 |
| **ODP [kg CFC 11 eq]** | 9.34E-12 | 3.34E-17 | 9.34E-13 | 0 | 0 | 0 | 1.95E-10 | 1.95E-10 | 5.14E-12 | 0 | 0 | 0 | 0 | 9.64E-19 | 0 | 1.58E-16 |
| **SFP [kg $O_3$ eq]** | 7.71E-03 | 1.49E-03 | 2.53E-02 | 0 | 0 | 0 | 6.56E-01 | 6.56E-01 | 1.73E-02 | 0 | 0 | 0 | 0 | 2.55E-05 | 0 | 3.12E-04 |
| **CML 2001-Jan 2016** | | | | | | | | | | | | | | | | |
| **ADPF [MJ]** | 5.30E+00 | 1.81E-01 | 5.61E-01 | 0 | 0 | 0 | 1.15E+02 | 1.15E+02 | 3.02E+00 | 0 | 0 | 0 | 0 | 5.21E-03 | 0 | 4.99E-02 |
| **Carbon Emissions and Uptake** | | | | | | | | | | | | | | | | |
| **BCRP [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCEP [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCRK [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCEK [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCEW [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CCE [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CCR [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CWNR [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

The LCI results presented below are for 1 $m^2$ of StoColor Wood Stain - Gloss for 60 years. Three lifetime scenarios are presented for module of replacement (B4).

| Impact Category | A1-A3 | A4 | A5 | B1 | B2 | B3 | Design Life B4 | Market-Based Life B4 | System Based B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Resource Use Indicators** | | | | | | | | | | | | | | | | |
| **$RPR_E$ [MJ]** | 2.65E-01 | 7.26E-03 | 2.92E-02 | 0 | 0 | 0 | 5.74E+00 | 5.74E+00 | 1.51E-01 | 0 | 0 | 0 | 0 | 2.09E-04 | 0 | 6.04E-03 |
| **$RPR_M$ [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **$NRPR_E$ [MJ]** | 3.23E+00 | 1.82E-01 | 3.55E-01 | 0 | 0 | 0 | 7.15E+01 | 7.15E+01 | 1.88E+00 | 0 | 0 | 0 | 0 | 5.25E-03 | 0 | 5.15E-02 |
| **$NRPR_M$ [MJ]** | 1.17E+00 | 0 | 1.17E-01 | 0 | 0 | 0 | 2.44E+01 | 2.44E+01 | 6.43E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SM [kg]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **RSF [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **NRSF [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **RE [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **FW [$m^3$]** | 1.47E-03 | 2.49E-05 | 1.60E-04 | 0 | 0 | 0 | 3.14E-02 | 3.14E-02 | 8.26E-04 | 0 | 0 | 0 | 0 | 7.18E-07 | 0 | 6.39E-06 |
| **Output Flows and Waste Categories** | | | | | | | | | | | | | | | | |
| **HWD [kg]** | 3.19E-06 | 5.24E-13 | 3.19E-07 | 0 | 0 | 0 | 6.66E-05 | 6.66E-05 | 1.75E-06 | 0 | 0 | 0 | 0 | 1.51E-14 | 0 | 1.29E-12 |
| **NHWD [kg]** | 4.00E-03 | 1.59E-05 | 2.54E-02 | 0 | 0 | 0 | 5.59E-01 | 5.59E-01 | 1.47E-02 | 0 | 0 | 0 | 0 | 4.57E-07 | 0 | 1.54E-01 |
| **HLRW [kg]** | 1.11E-07 | 6.20E-10 | 1.17E-08 | 0 | 0 | 0 | 2.35E-06 | 2.35E-06 | 6.18E-08 | 0 | 0 | 0 | 0 | 1.79E-11 | 0 | 6.37E-10 |
| **ILLRW [kg]** | 9.33E-05 | 5.22E-07 | 9.85E-06 | 0 | 0 | 0 | 1.97E-03 | 1.97E-03 | 5.18E-05 | 0 | 0 | 0 | 0 | 1.50E-08 | 0 | 5.70E-07 |
| **CRU [kg]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **MR [kg]** | 0 | 0 | 1.23E-03 | 0 | 0 | 0 | 2.33E-02 | 2.33E-02 | 6.13E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **MER [kg]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EE [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## StoColor Wood Stain - Matte

The LCIA results presented below are for 1 $m^2$ of StoColor Wood Stain - Matte for 60 years. Three lifetime scenarios are presented for module of replacement (B4).

| Impact Category | A1-A3 | A4 | A5 | B1 | B2 | B3 | Design Life B4 | Market-Based Life B4 | System Based B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IPCC AR5** | | | | | | | | | | | | | | | | |
| **GWP [kg $CO_2$ eq]** | 3.47E-01 | 1.24E-02 | 4.10E-02 | 0 | 0 | 0 | 7.61E+00 | 7.61E+00 | 2.00E-01 | 0 | 0 | 0 | 0 | 3.52E-04 | 0 | 3.10E-03 |
| **TRACI LCIA Impacts (North America)** | | | | | | | | | | | | | | | | |
| **AP [kg $SO_2$ eq]** | 7.01E-04 | 6.07E-05 | 8.05E-05 | 0 | 0 | 0 | 1.60E-02 | 1.60E-02 | 4.21E-04 | 0 | 0 | 0 | 0 | 1.05E-06 | 0 | 1.60E-05 |
| **EP [kg N eq]** | 5.14E-05 | 5.27E-06 | 9.88E-06 | 0 | 0 | 0 | 1.26E-03 | 1.26E-03 | 3.33E-05 | 0 | 0 | 0 | 0 | 1.07E-07 | 0 | 7.02E-07 |
| **ODP [kg CFC 11 eq]** | 8.27E-12 | 3.16E-17 | 8.27E-13 | 0 | 0 | 0 | 1.73E-10 | 1.73E-10 | 4.55E-12 | 0 | 0 | 0 | 0 | 9.04E-19 | 0 | 1.48E-16 |
| **SFP [kg $O_3$ eq]** | 1.13E-02 | 1.40E-03 | 2.57E-02 | 0 | 0 | 0 | 7.29E-01 | 7.29E-01 | 1.92E-02 | 0 | 0 | 0 | 0 | 2.39E-05 | 0 | 2.92E-04 |
| **CML 2001-Jan 2016** | | | | | | | | | | | | | | | | |
| **ADPF [MJ]** | 6.11E+00 | 1.71E-01 | 6.41E-01 | 0 | 0 | 0 | 1.32E+02 | 1.32E+02 | 3.46E+00 | 0 | 0 | 0 | 0 | 4.89E-03 | 0 | 4.68E-02 |
| **Carbon Emissions and Uptake** | | | | | | | | | | | | | | | | |
| **BCRP [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCEP [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCRK [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCEK [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **BCEW [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CCE [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CCR [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CWNR [kg $CO_2$]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

The LCI results presented below are for 1 $m^2$ of StoColor Wood Stain - Matte for 60 years. Three lifetime scenarios are presented for module of replacement (B4).

| Impact Category | A1-A3 | A4 | A5 | B1 | B2 | B3 | Design Life B4 | Market-Based Life B4 | System Based B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Resource Use Indicators** | | | | | | | | | | | | | | | | |
| **$RPR_E$ [MJ]** | 6.17E-01 | 6.86E-03 | 6.43E-02 | 0 | 0 | 0 | 1.31E+01 | 1.31E+01 | 3.44E-01 | 0 | 0 | 0 | 0 | 1.96E-04 | 0 | 5.66E-03 |
| **$RPR_M$ [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **$NRPR_E$ [MJ]** | 4.49E+00 | 1.72E-01 | 4.81E-01 | 0 | 0 | 0 | 9.78E+01 | 9.78E+01 | 2.57E+00 | 0 | 0 | 0 | 0 | 4.93E-03 | 0 | 4.83E-02 |
| **$NRPR_M$ [MJ]** | 1.02E+00 | 0 | 1.02E-01 | 0 | 0 | 0 | 2.14E+01 | 2.14E+01 | 5.63E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SM [kg]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **RSF [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **NRSF [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **RE [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **FW [$m^3$]** | 2.38E-03 | 2.35E-05 | 2.51E-04 | 0 | 0 | 0 | 5.04E-02 | 5.04E-02 | 1.33E-03 | 0 | 0 | 0 | 0 | 6.73E-07 | 0 | 5.99E-06 |
| **Output Flows and Waste Categories** | | | | | | | | | | | | | | | | |
| **HWD [kg]** | 2.82E-06 | 4.95E-13 | 2.82E-07 | 0 | 0 | 0 | 5.90E-05 | 5.90E-05 | 1.55E-06 | 0 | 0 | 0 | 0 | 1.42E-14 | 0 | 1.21E-12 |
| **NHWD [kg]** | 3.17E-02 | 1.50E-05 | 2.72E-02 | 0 | 0 | 0 | 1.12E+00 | 1.12E+00 | 2.94E-02 | 0 | 0 | 0 | 0 | 4.29E-07 | 0 | 1.45E-01 |
| **HLRW [kg]** | 1.51E-07 | 5.86E-10 | 1.57E-08 | 0 | 0 | 0 | 3.19E-06 | 3.19E-06 | 8.39E-08 | 0 | 0 | 0 | 0 | 1.68E-11 | 0 | 5.98E-10 |
| **ILLRW [kg]** | 1.51E-04 | 4.93E-07 | 1.56E-05 | 0 | 0 | 0 | 3.18E-03 | 3.18E-03 | 8.37E-05 | 0 | 0 | 0 | 0 | 1.41E-08 | 0 | 5.35E-07 |
| **CRU [kg]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **MR [kg]** | 0 | 0 | 1.23E-03 | 0 | 0 | 0 | 2.33E-02 | 2.33E-02 | 6.13E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **MER [kg]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EE [MJ]** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Interpretation

For all the products in study, the majority of the environmental impacts come from the Product Stage, which includes raw material sourcing, transportation and manufacturing. The only exception is SFP whose dominant source is Use & Maintenance Stage because of VOC emission in the curing process. From a functional unit perspective, the lifetime of the product and the coverage rate play a major role in scaling the impacts. This explains why products of coarse finishes have a higher impact than those of fine finishes.

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