



Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND ISO 21930:2017

Program Operator: Smart EPD®

www.smartepd.com



SmartEPD-2025-056-0290-01.1

Versatex Classic White PVC Trim

Date of Issue

Jan 31, 2025

Expiration date

Jan 31, 2030

Last updated

Sep 19, 2025



Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

The AZEK Company

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Product Name:	Versatex Classic White PVC Trim
Declared Unit:	1 kg
Declaration Number:	SmartEPD-2025-056-0290-01.1
Date of Issue:	January 31, 2025
Expiration:	January 31, 2030
Last updated:	September 19, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, B1 - B7, C1 - C4
Market(s) of Applicability:	North America

General Organization Information

Versatex was founded in 2004 by building industry professionals dedicated to bringing quality building products to the marketplace. The company manufactures cellular PVC trim products and are focused on innovation, quality, and technical assistance. The trim products are strong, durable, lightweight, and easy to install. The trim is resistant to moisture, insects, and capable of below-grade installation. Versatex's market-backed approach ensures that product development focuses on the needs of customers and innovations that will make a difference in design and efficiency.

Further information can be found at: <https://versatex.com/>

Limitations, Liability and Ownership

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

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

The environmental impact results of products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

Reference Standards

Standard(s):	ISO 14025 and ISO 21930:2017
Core PCR:	Smart EPD® Part A Product Category Rules for Building and Construction Products and Services v1.01
	Date of issue: January 15, 2024
	Valid until: July 15, 2025
Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Nathan Ayer EarthShift Global nathan@earthshiftglobal.com
EPD Program Operator:	Smart EPD info@smartepd.com www.smartepd.com 585 Grove St., Ste. 145, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: Nicole Kennard Independent Consultant nicolejjk.17@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): Nicole Kennard Independent Consultant nicolejjk.17@gmail.com

External

External

Product Information

Declared Unit:	1 kg
Mass:	1 kg
Reference Service Life:	50 Years
Product Specificity:	☒ Product Average ☒ Product Specific

Product Description

Versatex manufactures classic white PVC trim board, which replaces conventional wood materials on the exterior of homes for a variety of applications. The free foam cellular PVC material is made with a small-cell microstructure and has a density of 0.55 g/cm³. The trim board is available in nominal widths of 3"-16", nominal thickness of 5/8", 1", 5/4", 6/4" and 8/4", and lengths of 12 ft, 18ft, or custom. The trim board comes in two finishes: smooth or reversible with a smooth and timber ridge finish. Versatex trim board doesn't need paint or stain for protection and is moisture resistant.

The PVC trim board is composed of both virgin and recycled material, with the goal of increasing the recycled content in these products over time through AZEK’s Full Cycle Recycling Program, which collects scrap PVC trim board from installation and end-of-life, as well as other PVC building material scrap, and recycles it back into the system.

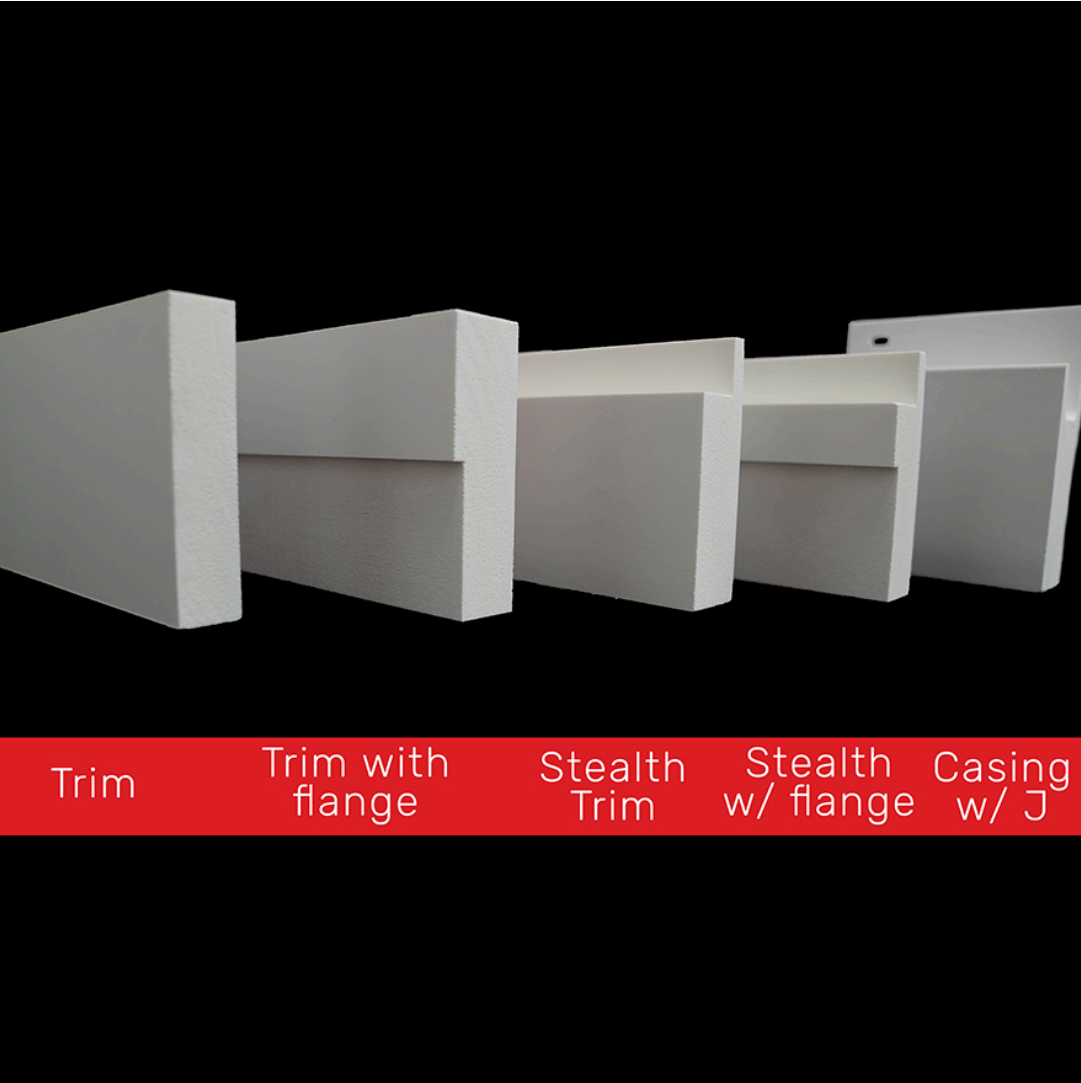
This EPD is intended for both business-to-business and business-to-consumer communication. The EPD will be made available to Versatex customers on the Versatex website, in addition to explanatory material to facilitate understanding of the EPDs. The EPD will also be published on BuildingTransparency.org, ICC-ES, and Arcat.

Further information can be found at: <https://versatex.com/product/trimboard/>

Product Specifications

Product SKU(s):	TBSM
Product Classification Codes:	Masterformat - 06 65 00
	EC3 - Cladding

Product Composition Diagram



Material Composition

Material/Component Category	Origin	% Mass
Virgin PVC	U.S.	57.1
Recycled PVC (sourced from external operations)	U.S.	5.5
Recycled PVC (sourced from internal operations)	Internally sourced	20.1
Thermal stabilizer	U.S.	1.2

Material/Component Category	Origin	% Mass
Acrylic process aid (high molecular weight)	U.S.	4.0
Acrylic process aid (low molecular weight)	U.S.	0.8
Epoxidized soy oil	U.S.	0.3
Calcium stearate	U.S.	0.6
Lubricant	U.S.	0.8
Wax	U.S.	0.01
Calcium carbonate	U.S.	5.5
Titanium dioxide pigment	Canada	2.2
Fatty acid ester	U.S.	0.9
Blowing agent	U.S.	1.2

Packaging Material	Origin	kg Mass
Pallets	Not specified	2.08E-02
Lumber wrap (polypropylene)	Not specified	1.71E-03
Corrugated boxes	Not specified	2.34E-03
Corrugated rolls	Not specified	1.17E-03
Cardboard sheets	Not specified	8.30E-03
Cardboard tray	Not specified	1.78E-05
Ink ribbon (polyester resin)	Not specified	3.55E-06
Blue film (low density polyethylene)	Not specified	3.98E-04
Slip sheet (low density polyethylene)	Not specified	1.91E-04
Labels (low density polyethylene)	Not specified	1.46E-04
Tape (low density polyethylene)	Not specified	6.65E-04
Green strapping coil (polyester resin)	Not specified	6.44E-04

Biogenic Carbon Content	kg C per kg
Biogenic carbon content in product	0None

Biogenic Carbon Content	kg C per kg
Biogenic carbon content in accompanying packaging	0.059

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specifity

Primary Data Year:	2022
Manufacturing Specificity:	✗ Industry Average ✗ Manufacturer Average ✓ Facility Specific

Averaging:
Averaging was not conducted for this EPD.

System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	✓
	B2	Maintenance	✓
	B3	Repair	✓
	B4	Replacement	✓
	B5	Refurbishment	✓
	B6	Operational Energy Use	✓
	B7	Operational Water Use	✓

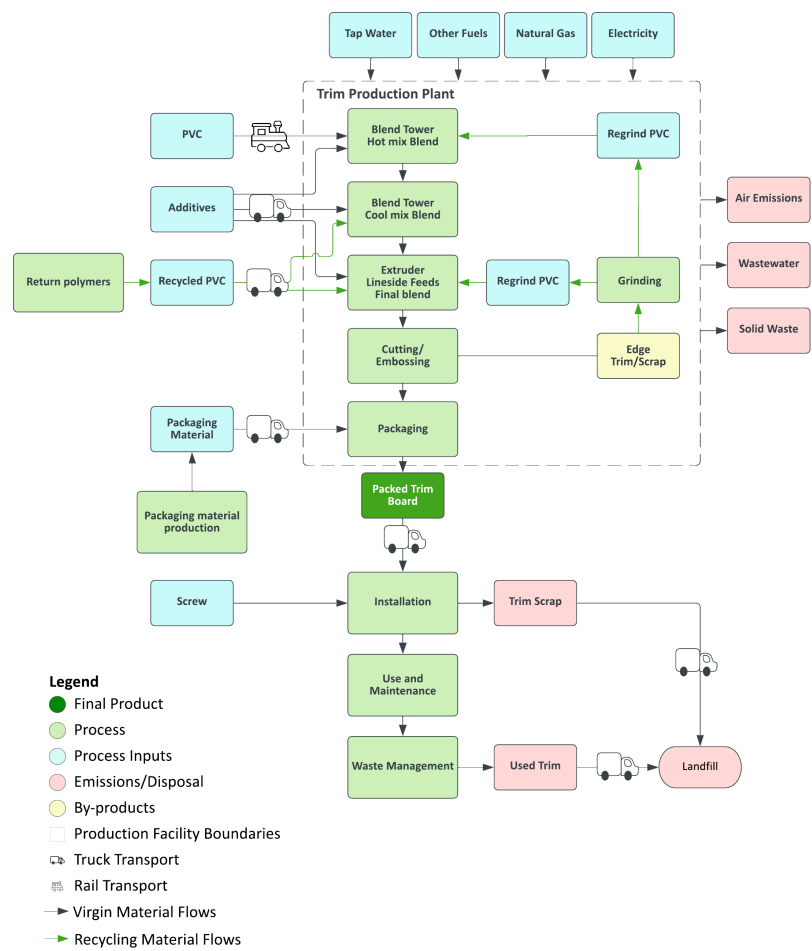
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	ND

Note:
ND = Module not declared

Plants

 Versatex Building Products 400 Steel St, Aliquippa, PA 15001, United States

Product Flow Diagram



Software And Database

LCA Software:

SimaPro v. 9.6

LCI Foreground Database(s):

Ecoinvent v. 3.10 | US-RFC, US, RoW, GLO | Economic

LCI Background Database(s):

Ecoinvent v. 3.10 | US-RFC, US, RoW, GLO | Economic

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

Primary data was used for the product bill of materials (BOM), product raw material transport, packaging raw materials, and production outputs, and is assumed to be of high quality. There were assumptions when modeling the packaging data, such as material composition, production mechanism, and packaging dimensions, but these assumptions are not expected to be significant given the low environmental impact of product packaging relative to the rest of the life cycle for Versatex PVC trim board. Secondary data was used to guide the selection of the ecoinvent datasets used to model the BOM materials. The most recent version of the ecoinvent 3.10 cut-off database was used, which was released in November 2023. Foreground and background datasets are representative of the Versatex processes.

Secondary data from the Part A PCR was used to supplement the transport data of raw packaging materials from distributors to the Versatex production facility, the transport of packaging waste to disposal streams, and the transport of trim waste to disposal streams. This data is considered to be of good quality data, as it is based on assumptions from the Part A PCR.

Screw data for trim affixation is assumed to be of low quality, as the quantity of material required is based on assumptions from a previous LCA conducted by AZEK. Screw disposal data is assumed to be of good quality because it is based on the Part A PCR default waste stream assumptions.

Primary data is used as the basis for the most impactful life cycle phases, including trim board production, therefore the results of this study are expected to be representative of the potential impacts of Versatex PVC trim boards. While secondary data is used to supplement data gaps in the model, this data is often sourced from the Part A PCR default assumptions, which is verified data representing the worst-case scenario.

Data quality criteria defined in "Assessing Data Quality of Background Life Cycle Inventory (LCI) Datasets" and the Enhanced Pedigree Matrix were considered for verifying data quality in this study (Mukherjee and Bhat, 2022). Data quality indicators included flow level (reliability of data, data collection methods, time period of data, geography of data, and technology of data) and process level (process review and process completeness) indicators. Data quality standards were met for all flow level and process level indicators.

Life Cycle Module Description

Module A1:

For Versatex PVC trim boards, the life cycle starts with the production of raw materials used for trim board manufacturing and packaging. The primary components of the PVC trim boards are virgin PVC, externally sourced recycled PVC, and internally recycled PVC. **Externally recycled PVC** is primarily sourced from Return Polymers, a subsidiary of AZEK that collects and recycles scrap PVC material from construction sites, other manufacturers, and fabricators through AZEK's Full Cycle Recycling Program. The externally recycled PVC is cleaned and pre-processed into granules at Return Polymers prior to use at the AZEK and Versatex facilities. **Internally recycled PVC** is sourced from the manufacturing processes at the AZEK and Versatex facilities, where edge PVC gets recycled back into the system through a grinding process. This internally recycled content is referred to as 'regrind PVC'. Per cut-off rules, the burden of regrind PVC as a product input should be accounted in Module A1; however, the burden associated with the regrind process is aggregated across modules A1-A3 because it is not possible to separate the whole plant electricity use for the Versatex facility.

The additional components involved in the production of the PVC trim board products, including the chemical additives and packaging components, are manufactured by various suppliers. The packaging includes single-use and reusable components, primarily consisting of wooden pallets, plastic wraps, and cardboard, to assure safe, unblemished delivery to the job site.

The production of all material inputs, including the pre-processing of recycled materials, is included in the system boundary for this study.

Module A2:

Following raw material production, the raw materials are transported to the Versatex facility, located in Aliquippa, Pennsylvania. The transport of all external raw material inputs is included in the system boundary for this study. The internal transport of regrind PVC (i.e. potential use of forklifts) is not included in the system boundary.

Module A3:

PVC trim board manufacturing is completed at the Versatex production facility. At the facility, raw virgin PVC and recycled PVC are heated and blended in a blending tower with additives. The blended PVC is cooled and transferred to an extrusion line pneumatically, where more recycled PVC is added. The materials are extruded onto a set of chill rolls and a three-roll stack to establish gauge. As the sheet cools, the edge trim is slit from the sides and the sheet is cut into individual boards. Edge trim is reground and recycled back into the system as regrind PVC. The burden associated with the regrind process is aggregated across modules A1-A3 because it is not possible to separate the whole plant electricity use for the Versatex facility. Finished boards may be embossed on one side before they are cut to length and stacked on a pallet for packaging.

The products are packaged on-site and stored prior to product distribution.

The Versatex manufacturing facility is powered by 100% emission-free energy certificate (EFEC) electricity, sourced from nuclear electricity. While this is not considered a renewable energy source, it is considered an emission-free energy source. It must be noted that the EPD shall be updated if the GWP results change by more than 10% as a result of the percentage or type of EFEC changing.

All material and energy inputs, emissions, and waste associated with manufacturing and packaging are included in the system boundary. Foreground infrastructure (i.e. Versatex buildings and auxiliary plant equipment) and employee activities (i.e. internal transport, employee transport to and from work) are excluded from the system boundary.

Module A4:

After packaging, the trim board is transported from the Versatex production facility to consumers via truck. The average distance from production facility to installation site is considered to be 500 km. This estimation was provided by Versatex and is based on the average location of their distributors and lumberyard customers, throughout the United States.

Module A5:

Once the product is received by the consumer, the trim board is installed, and the associated packaging and scrap trim board is recycled, reused, or disposed of. It is assumed that 10% of trim board is lost as waste during installation as a result of cutting and installation practices. All burdens related to the production and transport of the 10% installation waste (lifecycle stages A1-A4) are accounted for under module A5. It is assumed that all waste PVC from installation goes to the landfill based on the product disposal assumptions outlined in the Part A PCR. While a portion of waste PVC is actually recycled through AZEK's Full-Circle PVC Recycling Program, this assumption represents the worst-case scenario due to a lack of primary data.

The production and transport of material inputs required for installation (i.e. screws for affixing the trim) and waste flows from packaging/scrap disposal are included in the system boundary.

Module B1:

In the use phase, consumers use the product according to the parameters established in the declared unit. This study assumes zero use phase inputs.

Module B2:

The maintenance phase is highly variable given differences in consumer preferences. In this study, it is assumed that trim board is cleaned every five years throughout the ESL. There are no paint inputs in the maintenance phase as painting over a 50-year lifetime is considered an aesthetic preference rather than required maintenance.

Module B3:

Versatex trim board products are highly durable; therefore, this study assumes zero repair phase inputs.

Module B4:

A replacement factor of 0.5 is considered for the replacement phase given the RSL of the trim board products is 50 years and the ESL is 75 years. Therefore, the inputs required to produce, transport, and install 0.5 kg of trim board is considered in the replacement phase, in addition to the waste processing of the

original trim board.

Modules B5-B7:

Refurbishment, operational energy use, and operational water use, are considered zero for this study.

Module C1:

After providing the key function for an estimated 50-year lifespan, the PVC trim board is deconstructed, removed from the consumers' houses, and disposed of. This study assumed no deconstruction-phase inputs, as trim board products can be removed without the use of additional inputs or power devices. Therefore, the deconstruction-phase impacts considered for this study are zero.

Module C2:

Following deconstruction of the PVC trim board products, 100% of the trim board waste is transported to landfill. The associated transportation is within the system boundaries and included in the model.

Module C3:

Waste processing impacts are considered 0 for this study because 100% of PVC trim board products are assumed to go to landfill at end-of-life based on the Part A product disposal assumptions. While a portion of waste PVC is actually recycled through AZEK's Full-Circle PVC Recycling Program, this assumption represents the worst-case scenario for end-of-life due to a lack of primary data.

Module C4:

100% of PVC trim board products are assumed to go to landfill at end-of-life based on the Part A product disposal assumptions. While a portion of waste PVC is actually recycled through AZEK's Full-Circle PVC Recycling Program, this assumption represents the worst-case scenario for end-of-life due to a lack of primary data. The associated waste flows are included in the model.

LCA Discussion

Allocation Procedure

Electricity data was provided for the entire Versatex facility, which includes the production of white PVC trim board among other building products. Electricity was allocated according to the mass of white trim produced in relation to other products, with approximately 35% of electricity allocated to Versatex PVC trim boards. The Versatex facility is covered by 100% emission-free energy certificate (EFEC) electricity; therefore, no allocation of EFECs was necessary.

The Versatex process does not yield any co-products and all impacts from the foreground system are fully allocated to the product under study.

Cut-off Procedure

The cut-off procedure was established according to Section 7.1.8 in ISO 21930:2017, which states that in cases of insufficient input data or data gaps for a unit process, the cut-off criteria shall be 1 % of renewable primary resource (energy), 1 % nonrenewable primary resource (energy) usage, 1 % of the total mass input of that unit process and 1 % of environmental impacts. The total of neglected input flows per module shall be a maximum of 5 % of energy usage, mass and environmental impacts.

Recycling and reuse were modeled for some materials at end of life and were based on the cut-off approach. With the cut-off approach, the benefits of avoiding virgin material production are assigned to the second life of the material (i.e., the user of the material), and the recycler of the material avoids the burden of disposal. In this study, burdens of recycling for internally and externally recycled materials were included in the system boundary in Modules A1-A3.

In addition, different sources of secondary data were used, including ecoinvent (Wernet et al., 2016). The ecoinvent unit processes used were based on the cut-off approach, and no changes in allocation approach were made to the secondary data.

The following impacts were excluded from the scope and boundaries of this study because their impacts are expected to be de minimis:

- Foreground infrastructure (i.e. Versatex buildings and auxiliary plant equipment).
- Employee activities at the Versatex facility (i.e. internal transport, employee travel to and from work).
- The skid runners are small, lightweight, wood pieces. Their impact on the packaging is below the cut off criteria, therefore they are excluded from the model.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✓ Yes
Electricity Source:	Offsite
Renewable type(s):	Nuclear
Percent of EPD Owner's product-related electricity covered:	100 %
Commitment pledged for entire EPD validity period:	✓ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Vehicle Type:	Truck
Transport Distance:	500 km
Packaging Mass:	0.04 kg
Weight of products transported:	1.0 kg
Assumptions for scenario development:	The average transport from production facility to installation site is assumed to be 500 km via truck. This estimation was provided by Versatex and is based on the average location of their distributors and lumberyard customers, throughout the United States.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	10 %
Other Resources:	0.17 kg
Product Lost per Declared/Functional Unit:	0.11 kg
Waste Materials at the Construction Site Before Waste Processing:	0.11 kg
Mass of Packaging Waste Specified by Type:	0.04 kg
Biogenic Carbon Contained in Packaging (kg C):	5.90E-02 kg

Assumptions for scenario development:	It is assumed that 0.17 kg of steel screws are required to affix 1 kg of trim board product. It is also assumed that 10% of trim board product is lost during installation. Therefore, to install 1 kg of trim, 1.11 kg of trim is required, resulting in 0.11 kg of product lost per declared unit. Module A5 encompasses the total material, manufacturing, and transport burdens (A1-A4) of the wasted material. The biogenic C from packaging includes 2.13E-02 kg CO2 from 1.18E-02 kg of corrugated cardboard per 1 kg Versatex trim board, and 3.77E-02 kg CO2 from 2.08E-02 kg of pallet wood per 1 kg Versatex trim board.
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Use (B1)

B1 Module

Declared Product Properties:	White PVC trim board, available in two finishes: smooth, semimatte or a rustic, woodgrain appearance. Trim board is packaged with a protective film at the gate to protect the product and preserve the finish on both sides. The RSL is assumed to be 50 years based on estimates from the Vinyl Siding Institute and their industry average vinyl siding EPD. Vinyl Siding Institute (May 23, 2022). Environmental Product Declaration, Vinyl Siding – Industry Averaged Vinyl Siding. Available at: https://polymericexteriors.org/wp-content/uploads/2022/06/VSI-EPD-VinylSiding-2022.pdf
Design Application Parameters:	Refer to AZEK Trim & Moulding Install Guide for proper installation practices. https://azekexteriors.com/docs/default-source/warranty/azek-trim-moulding-install-guide-2024.pdf
An Assumed Quality of Work, When Installed in Accordance with The Manufacturer's Instructions:	Extremely durable in non-load bearing applications on the outside of homes when installed in accordance with the installation guide.
Outdoor Environment:	Used in outdoor settings. These products are moisture and rot resistant, and resilient towards the elements, including extreme weather, UV and wind exposure etc.
Indoor Environment:	Not relevant.
Use Conditions:	The trim board is used on the outside of homes, such as window or door trim. Trim board may be cut to the desired length using mechanical tools, but it is not required by the manufacturer.
Maintenance:	Trim board should be cleaned periodically. The study assumes a cleaning event every 5 years. Painting is considered optional maintenance as the trim board products do not require paint.

Maintenance (B2)

B2 Module

Maintenance Cycle:	10 Cycles/RSL 14 Cycles/ESL
Net Fresh Water Consumption Specified by Water Source and Fate:	0.00146 m3
Ancillary Materials Specified by Type:	0.024 kg
Waste Materials from Maintenance:	1.484 kg
Maintenance Process Information:	The maintenance phase assumes that there is a cleaning event every five years throughout the trim board RSL and ESL (14 cleaning events total, as a cleaning event is not required at end of ESL). The data is sourced from a previous LCA on AZEK building products, conducted by Sphera Solutions, Inc. (Birke, 2020). Birke, S. (2020). Comparative LCA of Three Decking Materials (Report V3). Sphera Solutions, Inc.

Further assumptions for scenario development:

The trim is assumed to be cleaned with tap water and a cleaning agent (ancillary material). The waste materials include the wastewater and cleaning agent. The wastewater is assumed to go to municipal wastewater treatment. It is assumed that there are no painting inputs because painting is considered an aesthetic preference rather than required maintenance.

Repair (B3)

B3 Module

Further assumptions for scenario development:

AZEK trim board products are highly durable; therefore, this study assumes zero repair phase inputs.

Replacement (B4)

B4 Module

Reference Service Life:

50 Years

Replacement Cycle:

0.5 (ESL/RSL)-1

Replacement of Worn Parts:

0.5 kg

Further assumptions for scenario development:

Further assumptions for scenario development: It is assumed that the original 1 kg of trim board is disposed of under the replacement module, with 100% of this trim landfilled.

Refurbishment (B5)

B5 Module

Further assumptions for scenario development:

This study assumed zero refurbishment inputs as refurbishment is not necessary given the durability of the trim board products over the RSL.

Operational Energy Use (B6) & Operational Water Use (B7)

B6 & B7 Modules

Further assumptions for scenario development:

It is assumed that there are no operational energy or water use inputs during the use phase. Therefore, the operational energy or water use inputs are considered to be zero.

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected Separately:

0.5 kg

Recovery

Recycling:

0 kg

Landfill:

0.5 kg

Disposal

Product or Material for Final Disposal:

0.5 kg

Assumptions for scenario development:

At the trim board end of life, it is assumed that 100% of the trim product goes to landfill based on the Part A PCR product disposal assumptions.

Results

Environmental Impact Assessment Results

IPCC AR5 GWP 100, TRACI 2.1

per 1 kg of product.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Baseline Scenario

Impact Category	Method	Indicator	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
GWP-total	IPCC AR5 GWP 100	ND	3.09e+0	7.83e-2	4.54e-1	0	9.12e-2	0	1.91e+0	0	0	0	0	2.83e-2	0	4.75e-2
ODP	TRACI 2.1	ND	6.10e-7	1.23e-9	6.80e-8	0	2.68e-9	0	3.40e-7	0	0	0	0	4.46e-10	0	1.58e-10
AP	TRACI 2.1	ND	1.29e-2	3.20e-4	1.73e-3	0	4.71e-4	0	7.57e-3	0	0	0	0	1.17e-4	0	4.09e-5
EP	TRACI 2.1	ND	2.50e-3	2.40e-5	3.47e-4	0	3.37e-4	0	1.54e-3	0	0	0	0	8.78e-6	0	5.32e-5
POCP	TRACI 2.1	ND	1.72e-1	8.38e-3	2.38e-2	0	5.12e-3	0	1.04e-1	0	0	0	0	3.09e-3	0	9.66e-4

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particulate Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

RPRT and NRPR: These values were calculated using the relevant midpoints in the "Cumulative Energy Demand (LHV) V1.01" impact assessment method for each stage. For RPRT, all renewable categories, including "Renewable, biomass," "Renewable, wind, solar, geothermal," and "Renewable, water," were summed. For NRPR, the remaining categories, including "Non-renewable, fossil," "Non-renewable, nuclear," and "Non-renewable, biomass," were summed.

Due to modeling limitations for energy flows such as electricity and natural gas, it was not possible to separate the packaging energy demand. Consequently, the CED of packaging is included in these values.

RPRM and NRPRM: These metrics were calculated based on the lower heating value (LHV) and mass of each input in each life cycle module. In accordance with ACLCA guidance, these calculations included both primary materials and packaging materials. Packaging was included because it was already part of the RPRT and NRPR values and its impact slightly exceeded the cut-off criteria. For transparency, the deviations between the relevant stages for RPRM and NRPRM are detailed in Table 31 in the LCA report.

To calculate these results, all inputs and outputs of trim and packaging were separated into renewable and non-renewable categories and multiplied by their respective LHV values. The summation of modules A1–A3 was multiplied by a wastage factor (0.11) to determine A5. Subsequently, the summation of A1–A5 was multiplied by a replacement factor (0.5) to calculate B4.

Based on the guidance that states, "The product system cannot claim a negative contribution to NRPRM from any waste flows sent to landfill, incinerated, stockpiled, or lost in the form of emissions," none

of the waste flows were included in these categories. Additionally, as these resources must account only for primary resources, there is no burden allocated to the recycled content used in these categories.

RPRE and NRPRE: These values were calculated as the difference between the total amount and the material-relevant amount.

SM: The calculation of SM considered both external recycled content for each stage. Trim board production was included in modules A1–A3 (original trim production), module A5 (trim wastage factor), and module B4 (trim replacement production).

RSF, NRSF and RE: Since no energy or fuel recovery occurs during the trim production process, these categories were not applicable to this study.

ADP fossil: The Abiotic Depletion Potential (ADP, fossil) was assessed using the midpoint of the "CML-IA baseline V3.10 / EU25" impact assessment method for each stage, applied via SimaPro software. This version of the CML method, included in the latest ecoinvent database package, is based on the spreadsheet version 4.7 (August 2016) as published on the CML website.

FW: The FW indicator was evaluated using the midpoint of the "Selected LCI Results Additional V1.06" impact assessment method for each stage, applied via SimaPro software.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicator

per 1 kg of product.

Baseline Scenario

Indicator	Unit	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
RPRE	MJ, LHV	4.83e+0	1.45e-2	6.41e-1	0	3.92e-1	0	2.75e+0	0	0	0	0	5.30e-3	0	1.93e-3
RPRM	MJ, LHV	1.24e+0	ND	1.36e-1	ND	0	0	6.88e-1	0	ND	ND	ND	ND	ND	ND
RPRT	MJ, LHV	6.07e+0	1.45e-2	7.77e-1	0	3.92e-1	0	3.43e+0	0	0	0	0	5.30e-3	0	1.93e-3
NRPRE	MJ, LHV	3.91e+1	1.11e+0	5.32e+0	0	1.37e+0	0	2.30e+1	0	0	0	0	4.02e-1	0	1.26e-1
NRPRM	MJ, LHV	1.76e+1	ND	1.94e+0	ND	0	0	9.79e+0	0	ND	ND	ND	ND	ND	ND
NRPRT	MJ, LHV	5.67e+1	1.11e+0	7.26e+0	0	1.37e+0	0	3.28e+1	0	0	0	0	4.02e-1	0	1.26e-1
SM	kg	6.80e-2	0	7.48e-3	0	0	0	3.77e-2	0	0	0	0	0	0	0
RSF	MJ, LHV	ND	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND	ND
NRSF	MJ, LHV	ND	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND	ND
RE	MJ, LHV	5.28e+1	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND	ND
ADPF	MJ, LHV	5.19e+1	1.10e+0	6.63e+0	0	1.27e+0	0	3.01e+1	0	0	0	0	3.96e-1	0	0
FW	m3	2.95e-2	1.57e-4	3.26e-3	0	6.02e-4	0	1.28e-2	0	0	0	0	5.70e-5	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

RPRT and NRPRT: These values were calculated using the relevant midpoints in the "Cumulative Energy Demand (LHV) V1.01" impact assessment method for each stage. For RPRT, all renewable categories, including "Renewable, biomass," "Renewable, wind, solar, geothermal," and "Renewable, water," were summed. For NRPRT, the remaining categories, including "Non-renewable, fossil," "Non-renewable, nuclear," and "Non-renewable, biomass," were summed. RPRM and NRPRM: These metrics were calculated based on the lower heating value (LHV) and mass of each input in each life cycle module.

In accordance with ACLCA guidance, these calculations included both primary materials and packaging materials. Packaging was included because its impact slightly exceeded the cut-off criteria (1.7% of the total primary raw materials across all stages). The share of packaging in A1–A3 is approximately 3% of the total primary raw materials. For transparency regarding the packaging share, the breakdown for

RPRM and NRPRM for packaging is detailed in Table 45, in Appendix A3 in the LCA report. To calculate these results, all inputs and outputs of trim and packaging were separated into renewable and non-renewable categories and multiplied by their respective LHV values. The summation of modules A1–A3 was multiplied by a wastage factor (0.11) to determine A5. Subsequently, the summation of A1–A5 was multiplied by a replacement factor (0.5) to calculate B4. Based on the ACLCA guidance, “the product system cannot claim a negative contribution to NRPRM from any waste flows sent to landfill, incinerated, stockpiled, or lost in the form of emissions,” therefore no waste flows were included in these categories (ACLCA, 2019). Additionally, as these resources must account only for primary resources, there is no burden allocated to the recycled content used in these categories.

RPRE and NRPRE: These values were calculated as the difference between the total amount and the material-relevant amount. SM: The calculation of SM considered externally recycled PVC for each life cycle stage. However, internally recycled material (0.225 kg required to produce 1 kg of AZEK trim board) was excluded from this category to align with ACLCA guidance. RSF, NRSF and RE: Since no energy or fuel recovery occurs during the trim production process, these categories were not applicable to this study. ADP fossil: The Abiotic Depletion Potential (ADP, fossil) was assessed using the midpoint of the "CML-IA baseline V3.10 / EU25" impact assessment method for each stage, calculated via SimaPro. This version of the CML method, included in the latest ecoinvent database package, is based on the spreadsheet version 4.7 (August 2016) as published on the CML website. FW: The FW indicator was evaluated using the midpoint of the "Selected LCI Results Additional V1.06" impact assessment method for each stage, calculated via SimaPro.

Waste and Output Flow Indicators

per 1 kg of product.

Baseline Scenario

Indicator	Unit	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
HWD	kg	4.56e-7	ND	4.56e-8	ND	0	0	2.51e-7	0	ND	ND	ND	ND	ND	0
NHWD	kg	1.51e-2	ND	3.24e-1	ND	0	0	1.17e+0	0	ND	ND	ND	ND	ND	5.00e-1
HLRW	kg	0	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND	0
ILLRW	kg	0	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND	0
CRU	kg	0	ND	0	ND	0	0	0	ND	ND	ND	0	ND	0	ND
MFR	kg	2.47e-1	ND	8.97e-2	ND	0	0	1.68e-1	0	ND	ND	0	ND	0	ND
MER	MJ	0	ND	ND	ND	0	0	ND	0	ND	ND	ND	ND	0	ND
EE	MJ	0	ND	ND	ND	0	0	ND	0	ND	ND	ND	ND	0	ND

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Return Polymers (external PVC processing facility) and Versatex manufacturing facilities are supplied by EFEC electricity, which is sourced from nuclear energy. Nuclear electricity produces hazardous waste; therefore, there is hazardous waste reported under modules A1-A3, module A5, and module B4. The quantity of hazardous waste was calculated using the ecoinvent processes, Electricity, high voltage {US-RFC}| electricity production, nuclear, boiling water reactor | Cut-off, U, and Electricity, high voltage {US-RFC}| electricity production, nuclear, pressure water reactor | Cut-off, U, and their relative proportions in the EFEC dataset.

Based on the product and packaging disposal assumptions outlined in the Part A PCR, 100% of trim board waste, 75.5% of plastic packaging waste, and 28.4% of pulp packaging waste is assumed to go to the landfill for non-hazardous waste disposal. There is non-hazardous waste recorded within modules A1-A3, from municipal solid waste generated from trim board production processes. In module A5, there is non-hazardous waste generated from the 10% wastage factor generated from trim installation processes and waste packaging. Module B4 encompasses non-hazardous waste generated from the replacement trim processes and module C4 includes the trim board disposal at product EoL.

In module A3, 0.247 kg of waste PVC is recycled back into the system for every 1 kg of Versatex PVC trim board produced. This internally recycled PVC is also considered under module A5 to account for the quantity of internally recycled PVC associated with the production of the 10% wastage factor. 9.5% of plastic packaging waste and 64.7% of pulp packaging waste is assumed to be recycled based on the Part A PCR and is also considered under module A5. Module B4 accounts for the recycled materials associated with the production, installation, and waste for the 0.5 kg trim board replacement.

Although 15% of plastic packaging waste and 6.9% of pulp packaging waste is assumed to be incinerated based on the Part A PCR default assumptions, no energy recovery is considered to maintain the most conservative estimate.

There is no low/intermediate/high-level radioactive waste or components for reuse considered throughout the product life cycles.

Carbon Emissions and Removals

per 1 kg of product.

Baseline Scenario

Indicator	Unit	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
BCRP	kg CO2	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BCEP	kg CO2	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BCRK	kg CO2	5.90e-2	ND	-9.26e-3	ND	ND	ND	2.49e-2	ND	ND	ND	ND	ND	ND	ND
BCEK	kg CO2	0	ND	4.97e-2	ND	ND	ND	2.49e-2	ND	ND	ND	ND	ND	ND	ND
BCEW	kg CO2	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CCE	kg CO2	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CCR	kg CO2	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CWNR	kg CO2	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

The raw materials used in the production of the trim boards are synthetic, and the electricity used in the Versatex manufacturing plant is sourced from nuclear power; therefore, the biogenic carbon removal from product (BCRP) and biogenic carbon emission from product (BCEP) are considered zero.

In contrast, there are wooden pallets and cardboard components used in the product packaging system, which are derived from biogenic carbon sources. Their associated carbon uptake and emissions are captured under biogenic carbon removal from packaging (BCRK) and biogenic carbon emissions from packaging (BCEK). These parameters were calculated using the ACLCA Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017. The carbon content of cardboard components was assumed to be 0.491 kg C/kg dry mass based on the ecoinvent process, Corrugated board box {US} corrugated board box production | Cut-off, U. The carbon content of the pallet was assumed to be 0.494 kg C/kg dry mass based on the ecoinvent process, Sawnwood, hardwood, dried (u=20%), planed {RoW} sawnwood production, hardwood, dried (u=20%), planed | Cut-off, U.

In accordance with ACLCA Guidance, BCRK was calculated considering the biogenic carbon uptake and amount of biogenic carbon leaving the system from recycled materials. In module A3, biogenic carbon uptake was calculated by multiplying the quantity of material, the carbon content of the material, and the conversion factor between CO2 and carbon (44 kg CO2/12 kg C). The biogenic carbon uptake for the wooden pallet and corrugated packaging materials were summed for this module.

In module A5, biogenic carbon uptake was calculated by multiplying the quantity of biogenic carbon uptake from module A3 by the installation wastage factor (10%). The quantity of biogenic carbon leaving the system was calculated by multiplying the quantity of corrugated cardboard used per functional unit ($2.13E-2$), 1 + the 10% wastage factor, the assumed recycling rate of corrugated cardboard (64.7%), the carbon content of the material, and the conversion factor between CO₂ and carbon. Since module D was not declared for this study, the biogenic carbon associated with recycled packaging must be expressed as a negative CO₂ uptake, as indicated by the ACLCA guidance. Therefore, the quantity of biogenic carbon leaving the system was subtracted from the biogenic carbon uptake in module A5.

In module B4, the quantity of biogenic carbon uptake was calculated by summing the biogenic carbon uptake in modules A3 and A5 and multiplying this value by the replacement factor (0.5). Biogenic carbon leaving the system was calculated by multiplying the quantity of biogenic carbon leaving the system in module A5 by the replacement factor. The total BCRK for module B4 was calculated by subtracting the amount of biogenic carbon leaving the system through recycling from the biogenic carbon uptake.

BCEK was calculated by summing the biogenic carbon emissions from landfill and incineration waste treatments of packaging. ISO 21930 instructs that the degradation of carbon should be calculated without a time limit; therefore, it is assumed that all remaining biogenic carbon is released as an emission, and none is sequestered. In accordance with ACLCA Guidance, BCEK for module A5 was calculated by multiplying the quantity of CO₂ in packaging materials (0.0213 kg CO₂ for corrugate materials + 0.0377 kg CO₂ for pallet), 1 + the 10% wastage factor, and the combined landfill and incineration rate (35.3% for corrugate materials and 100% for the wooden pallet). In module B4, biogenic CO₂ emissions were calculated by multiplying the emissions in module A5 by the replacement factor.

There is no combustion of waste from renewable or non-renewable sources used in the production process of Versatex trim boards; therefore, biogenic carbon emission from combustion of waste from renewable sources used in production processes (BCEW) and carbon emissions from combustion of waste from non-renewable sources used in production processes (CWNR) are considered zero.

Carbonation carbon removals (CCR), calcination carbon emissions (CCE), and carbon emissions from land-use change (GWP-luc) are considered not applicable (N/A) for this study.

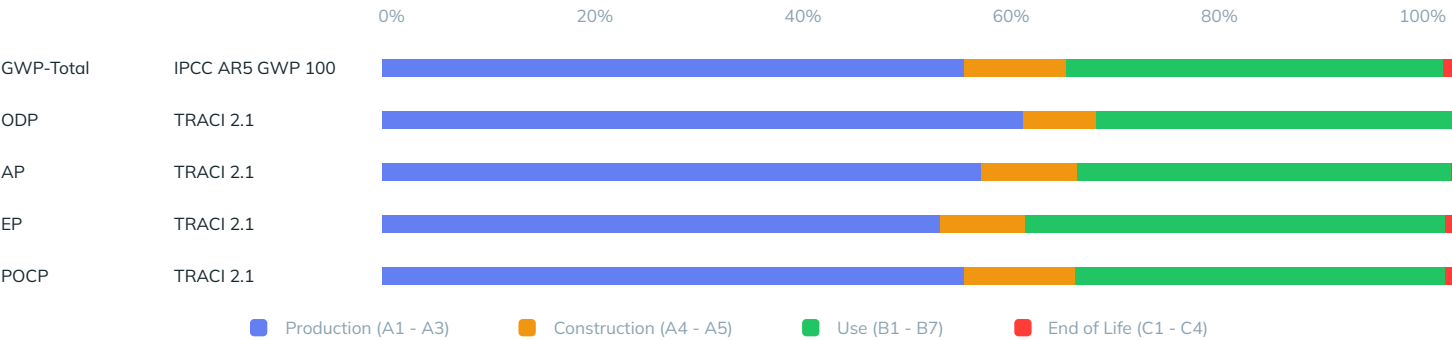
Interpretation

Contribution of Life Cycle Phases:

- Modules A1-A3 (raw material supply, raw material transport, and product manufacturing) account for the highest impact shares across all impact categories.
- Module B4 (trim board replacement) is a secondary driver of impact across all impact categories analyzed.
- Module A5 (trim board installation) is a tertiary driver of impact for GWP 2013, 100 years, ozone depletion potential, smog formation potential, and acidification potential.
- Module B2 (trim board maintenance) is a tertiary driver for eutrophication potential, driven by the cleaning agent and associated wastewater from cleaning the trim board products.
- End-of-life is not a significant source of environmental impact for AZEK PVC trim boards relative to other life cycle phases.

Life Cycle Hotspots:

- GWP hotspots include virgin PVC trim board, acrylic process aid HMW, truck transport, and titanium dioxide pigment.
- Ozone depletion potential is driven by the use of virgin PVC trim board. The other life cycle flows have marginal impacts on ozone depletion potential.
- Smog formation hotspots include virgin PVC trim board, followed by rail transport, truck transport, and acrylic process aid (HMW).
- Acidification hotspots include virgin PVC resin, acrylic process aid (HMW), titanium dioxide pigment, and rail transport.
- Eutrophication impacts are driven by virgin PVC resin, followed by blowing agent, fatty acid ester, and acrylic process aid (HMW).
- While electricity is often a source of GWP impacts in LCA studies, the AZEK facility is powered by 100% nuclear energy; thus, electricity use is not a major source of environmental impact across the AZEK PVC trim board life cycle.



Additional Environmental Information

While the LCA study assumes that 100% of trim board waste is sent to landfill during installation processes and EoL, Versatex encourages users to recycle their PVC trim board. In fact, The AZEK Company operates a trim take-back program, the Full Circle Recycling Program, where users can recycle their trim at EoL. This can reduce the environmental impacts associated with PVC trim boards in landfills or the use of virgin PVC resin for trim board production. Find out more at: <https://azekco.com/about-us/full-circle-recycling-program/>.

Environmental Activities and Certifications

Certification
AZEK's Full Cycle Recycling Program

Further Information

Calculating Emissions for Different Trim Dimensions

The results of the EPD for trim product are expressed per the declared unit of 1 kg of trim board. If you only know the dimensions of the trim product you can still calculate the environmental impacts using the reference formulas below.

Step 1 - Calculate the mass of the trim board based on its dimensions

Let:

t = thickness (inches)

w = width (inches)

L = length (feet)

ρ = density (kg/m³), for Versatex = 550 kg/m³

$$\text{Board Mass (kg)} = \rho \times (t \times 0.0254) \times (w \times 0.0254) \times (L \times 0.3048)$$

Step 2 - Calculate the impacts based on the calculated mass of the board:

Using the mass you calculated in Step 1, use the following formula to calculate the impacts for the trim board:

$$\text{Impacts for any given board} = \text{Board Mass} \times \text{Declared Unit Results for 1 kg}$$

References

ACLCA. (2019). *ACLCA Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017*. <https://aclca.org/wp-content/uploads/ISO-21930-Final.pdf>

Bare, J. (2011). TRACI 2.0: The tool for the reduction and assessment of chemical and other environmental impacts 2.0. *Clean Technologies and Environmental Policy*, 13(5), 687–696. <https://doi.org/10.1007/S10098-010-0338-9/METRICS>

Birke, S. (2020). *Comparative LCA of Three Decking Materials* (Report V3). Sphera Solutions, Inc.
EarthShift Global (April 1st, 2010). AZEK Building Products, Screening Life Cycle Assessment of AZEK PVC Decking and Trim.

EPD International. (n.d.). *Environmental Performance Indicators*. <https://environdec.com/resources/indicators>

Frischknecht, R., Jungbluth, N., Althaus, H.-J., Hischier, R., Doka, G., Dones, R., Heck, T., Hellweg, S., Wernet, G., Nemecek, T., Rebitzer, G., & Spielmann, M. (2007). *Overview and methodology. Data v2.0 (2007). Ecoinvent report No. 1*. http://inis.iaea.org/Search/search.aspx?orig_q=RN:41028087

Huijbregts, M. A. J., Steinmann, Z. J. N., Elshout, P. M. F., Stam, G., Verones, F., Vieira, M., Zijp, M., Hollander, A., & van Zelm, R. (2017). ReCiPe2016: a harmonised life cycle impact assessment method at midpoint and endpoint level. *International Journal of Life Cycle Assessment*, 22(2), 138–147. <https://doi.org/https://doi.org/10.1007/s11367-016-1246-y>

Intertape Polymer Group. (2014). *Supreme 2 Polypropylene Lumber Wrap Technical Data Sheet*. Available at: https://www.itape.com/wp-content/uploads/2023/01/LUM_Supreme2_TDS.pdf

IPCC, Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, & B. Zhou. (2021). *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.

<https://doi.org/https://doi.org/10.1017/9781009157896>

ISO. (2006a). *ISO 14040:2006 - Environmental management — Life cycle assessment — Principles and framework*. International Organization for Standardization. <https://www.iso.org/standard/37456.html>

ISO. (2006b). *ISO 14044:2006 - Environmental Management—Life Cycle Assessment—Requirements and Guidelines*. International Organization for Standardization. <https://www.iso.org/standard/38498.html>

ISO. (2014). *ISO 14046:2014 – Environmental Management – Water footprint – Principles, requirements and guidelines*. International Organization for Standardization. <https://www.iso.org/standard/43263.html>

ISO. (2017). *ISO 21930:2017 – Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services*. International Organization for Standardization. <https://www.iso.org/standard/61694.html>

Mukherjee, A., and Bhat, C. (2022). Guidance for Assessing Data Quality of Background Life Cycle Inventory (LCI) Datasets. *ACLCA*. https://aclca.org/wp-content/uploads/2022-ACLCA-PCR-Guidance_Addendum_Assessing_LCI_Quality_05252022-1.pdf

Nemecek, T., & Schnetzer, J. (2011). Methods of assessment of direct field emissions for LCIs of agricultural production systems. Agroscope Reckenholz-Tänikon Research Station ART.

Owsianiak, M., Hauschild, M. Z., Posthuma, L., Saouter, E., Vijver, M. G., Backhaus, T., Douziech, M., Schlegel, T., & Fantke, P. (2023). Ecotoxicity characterization of chemicals: Global recommendations and implementation in USEtox. *Chemosphere*, 310, 136807. <https://doi.org/10.1016/j.CHEMOSPHERE.2022.136807>

Phoenix Contact. (n.d.). *Thermomark-Ribbon 110-TC – Ink Ribbon*. Available at: <https://www.phoenixcontact.com/en-ca/products/ink-ribbon-thermomark-ribbon-110-tc-0801371>

PPM Industries. (2020). *What is masking tape? Let's see what it's made of and used for*. Available at: <https://www.ppmindustries.com/en/news/what-is-masking-tape-let-s-see-what-it-s-made-of-and-used-for>

Prado, V., & Heijungs, R. (2018). Implementation of stochastic multi attribute analysis (SMAA) in comparative environmental assessments. *Environmental Modelling & Software*, 109, 223–231. <https://doi.org/10.1016/j.ENVSOFT.2018.08.021>

Prado-Lopez, V., Seager, T. P., Chester, M., Laurin, L., Bernardo, M., & Tylock, S. (2014). Stochastic multi-attribute analysis (SMAA) as an interpretation method for comparative life-cycle assessment (LCA). *International Journal of Life Cycle Assessment*, 19(2), 405–416. <https://doi.org/10.1007/S11367-013-0641-X/FIGURES/7>

Premier Pallets, Inc. (n.d.). *The Pallet Size Your Business Needs: Your Guide to the Average Pallet Weight*. Premier Pallets Inc. Available at: <https://premier-pallets.com/the-pallet-size-your-business-needs-your-guide-to-the-average-pallet-weight/>

PRé Sustainability. (2024). *SimaPro LCA software - PRé Sustainability*. <https://network.simapro.com/pre/>

Rollaway Container. (n.d.). *Plastic runners kit for lightweight pallets 8- x 120 and 100 x 120*. Available at: <https://www.rollawaycontainer.com/plastic-runners-kit-lightweight-pallets.html>

SmartEPD. (2024). *Part A Product Category Rule for Building and Construction Products and Services*. Standard 1000, version 1.01.

Uline. (n.d.a). *Standard Woven Poly Tarp – Blue, 40 x 40'*. Available at: <https://www.uline.ca/Product/Detail/S-23460/Tarps/Standard-Woven-Poly-Tarp-Blue-40-x-40>

Uline. (n.d.b). *Top Sheeting Rolls – 1.5 Mil, 72 x 72"*. Available at: <https://www.uline.ca/Product/Detail/S-11472/Top-Sheeting/Top-Sheeting-Rolls-15-Mil-72-x-72>

Uline. (n.d.c). *Uline Machine Length Wrap – Cast, 80 gauge, 20" x 6,000', Blue*. Available at: <https://www.uline.ca/Product/Detail/S-6146/Machine-Length-Stretch-Wrap-Rolls/Uline-Machine-Length-Wrap-Cast-80-gauge-20-x-6000-Blue>

Uline. (n.d.d). *Uline Polyester Strapping*. Available at: https://www.uline.ca/BL_2801/Uline-Polyester-Strapping

Vinyl Siding Institute (May 23, 2022). Environmental Product Declaration, Vinyl Siding – Industry Averaged Vinyl Siding. Available at: <https://polymericexteriors.org/wp-content/uploads/2022/06/VSI-EPD-VinylSiding-2022.pdf>

Weidema, B. P., & Wesnæs, M. S. (1996). Data quality management for life cycle inventories—an example of using data quality indicators. *Journal of Cleaner Production*, 4(3–4), 167–174. [https://doi.org/10.1016/S0959-6526\(96\)00043-1](https://doi.org/10.1016/S0959-6526(96)00043-1)

Uline. (n.d.d). *Uline Polyester Strapping*. Available at: https://www.uline.ca/BL_2801/Uline-Polyester-Strapping

Weidema, B. P., & Wesnæs, M. S. (1996). Data quality management for life cycle inventories—an example of using data quality indicators. *Journal of Cleaner Production*, 4(3–4), 167–174. [https://doi.org/10.1016/S0959-6526\(96\)00043-1](https://doi.org/10.1016/S0959-6526(96)00043-1)