J•JOSEPHSON

VERIFIED by SCS GLOBAL SERVICES
ENVIRONMENTAL PRODUCT DECLARATION
BASED ON LCA

Declaration Owner
J. Josephson, Inc.
35 Horizon Boulevard
South Hackensack, NJ 07606
http://www.P3TECwall.com/
CustomerService@P3TECwall.com
201.440.7000

Product
P3TEC Advanced Wall Protection

Functional Unit
The functional unit is one square meter of wall protection product over a five-year period

EPD Number and Period of Validity
SCS-EPD-04675
EPD Valid September 28, 2017 through September 27, 2022
Version: April 16, 2018

Product Category Rule
Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. Version 1.5, 2016.
Part B: Requirements on the EPD for Wall coverings. Version 1.1, 2016.

Program Operator
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608
+1.510.452.8000 | www.SCSglobalServices.com

SCSglobal SERVICES

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Disclaimers: *This EPD conforms to ISO 14025, 14040, ISO 14044, and EN 15804.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

PCR review, was conducted by	Institut Bauen und Umwelt e.V., (IBU).
Approved Date: September 28, 2017 – End Date: September 27, 2022	
Independent verification of the declaration and data, according to ISO 14025:2006. EN 15804 serves as the core PCR	☐ internal ☑ external
Third party verifier	Tom Gloria, PhD, Industrial Ecology Consultants

1. ABOUT J. Josephson

J. Josephson is the largest commercial wallcovering manufacturer in North America, selling to over 50 countries world-wide. J. Josephson's state-of-the-art manufacturing facility is located in South Hackensack, New Jersey, only about ten miles west of New York City. Running twenty-four hours a day, with an emphasis on innovation and world-class design, J. Josephson stays focused on the customer and provides the highest quality product in the shortest lead times. With the largest portfolio of print and emboss rollers, there are no limits in terms of color and design that can be created. Constantly investing in the future, J. Josephson supports 5 distinct brands, Bolta, Genon, Symphony, Tower and Vycon that are distributed to all market segments globally.

J. Josephson's environmental responsibility and compliance have earned the highest ratings in the industry for its sustainability practices and independent certification for reductions in water and energy usage.

2. PRODUCT

2.1 Product Description

J. Josephson's P3TEC Advanced Wall Protection is manufactured at the South Hackensack, New Jersey facility. The primary materials include polyvinyl chloride, polyester/cotton blend woven backing, adhesives and pigments. P3TEC includes a rigid vinyl laminate and a polyvinyl fluoride cap film.

2.2 Application

J. Josephson's P3TEC Advanced Wall Protection is designed for use in commercial interiors.

2.3 Technical Data

Table 1. *Product specifications for the P3TEC Advanced Wall Protection product.*

Property	Test Method	Test Results
Building Code Classification	2015 Intl. Building Code Sec. 803.1.1	Class A
Flame Spread Index	ASTM E84	10
Smoke Developed Index	ASTM E84	120
Heat Release	NFPA 286	< 800 kW
Smoke Release	NFPA 286	< 1000 m^2

2.4 Delivery Status

Product dimensions are 48" (1,2192 meter) wide in 15 yard (13.72 meter) rolls. The product has a nominal thickness of 0.038" (0.097 cm) and a nominal weight of 38 oz./linear yd (0.86 kg/m^2).

2.5 Base Materials

The primary materials include polyvinyl chloride, polyester/cotton blend woven backing, adhesives and pigments. P3TEC also includes a rigid vinyl laminate and a polyvinyl fluoride cap film.

Table 2. *Material content for the P3TEC Advanced Wall Protection product, per square meter.*

Component	Material	(kg/m^2)	(%)
Substrate	Polyvinyl Chloride (PVC)	0.37	44%
Substrate	Polyvinyl Chloride (uPVC)	0.38	44%
Backing	Polyester/Cotton	$4.4x10^{-2}$	5.2%
Cap Film	Polyvinyl Fluoride (PVF)	$1.7x10^{-2}$	2.0%
Adhesive	PVC resin/DOTP	$2.9x10^{-2}$	3.4%
Ink	Pigment	$1.7x10^{-2}$	2.0%
Total Product		**0.86**	**100%**
Packaging	Corrugated	$1.3x10^{-2}$	100%
Total Packaging		**0.13**	**100%**

2.6 Manufacture

P3TEC Advanced Wall Protection is manufactured in a multi-stage printing and laminating process. Inks are blended for each pattern and applied to the PVC substrate in a printing machine. The fabric backing is laminated to the PVC substrate, and cap film, and an embossing is applied for finish. The product is then cut to size, packaged and shipped.

2.7 Environment and Health during Manufacture

J. Josephson has an Environmental Management System. Details regarding this program can be downloaded through the following link: http://www.P3TECwall.com/environment.html

2.8 Product Processing/ Installation

Typical installation involves preparation of the surface with a primer, followed by application of an adhesive. Manufacturer recommended primer and adhesives, as well as typical application rates are summarized in Section 4.

2.9 Packaging

J. Josephson's Wall Protection is packaged for shipment in recycled cardboard cartons.

2.10 Condition of Use

No special conditions of use are noted.

2.11 Environment and Health during use

No environmental or health impacts are expected due to normal use of the wall protection product

2.12 Reference Service Life

The Reference Service Life (RSL) of the wall protection is 5 years, based on the manufacturers' warranty.

2.13 Extraordinary Effects

No environmental or health impacts are expected due to extraordinary effects including fire and/or water damage and product destruction.

2.14 Re-Use Phase

Commercial wall protection is not typically reused or recycled at end-of-life. Energy recovery at end-of-life is possible through waste incineration.

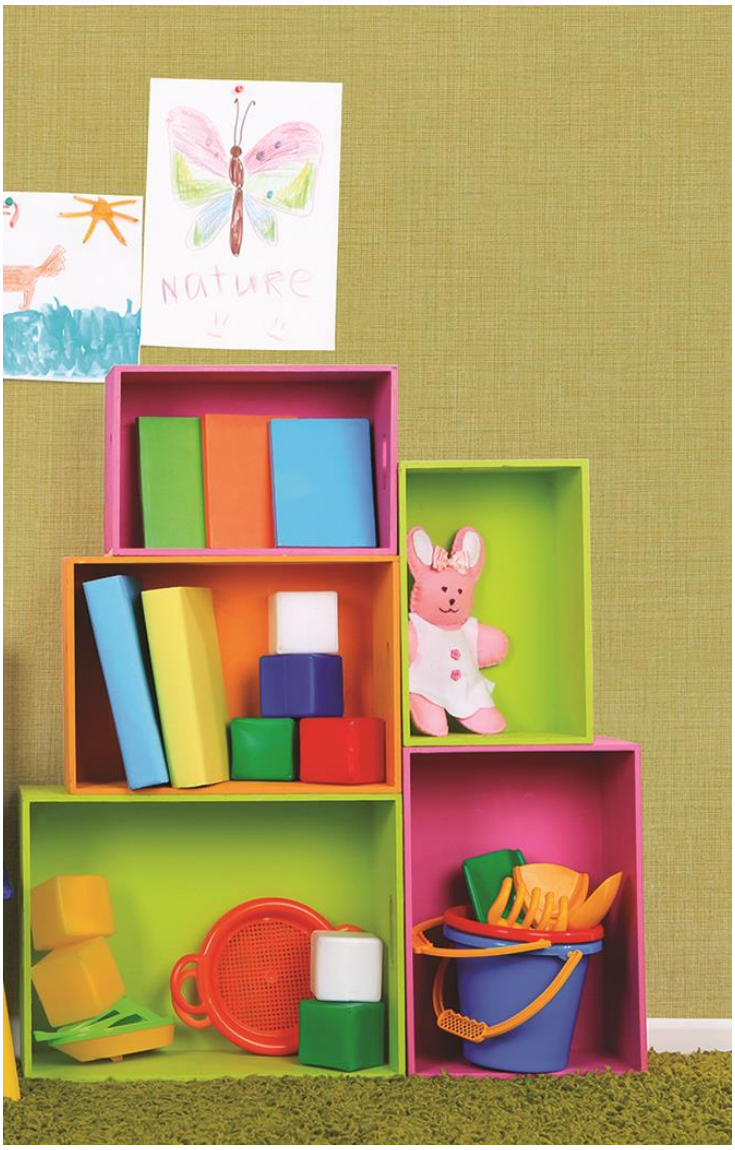
2.15 Disposal

At end-of-life, the wall protection may be disposed of in a landfill or via incineration.

European Waste Code: 07 02 13 (Waste Plastic)

2.16 Further Information

Further information on the product can be found on the manufacturers' website at http://www.P3TECwall.com/.



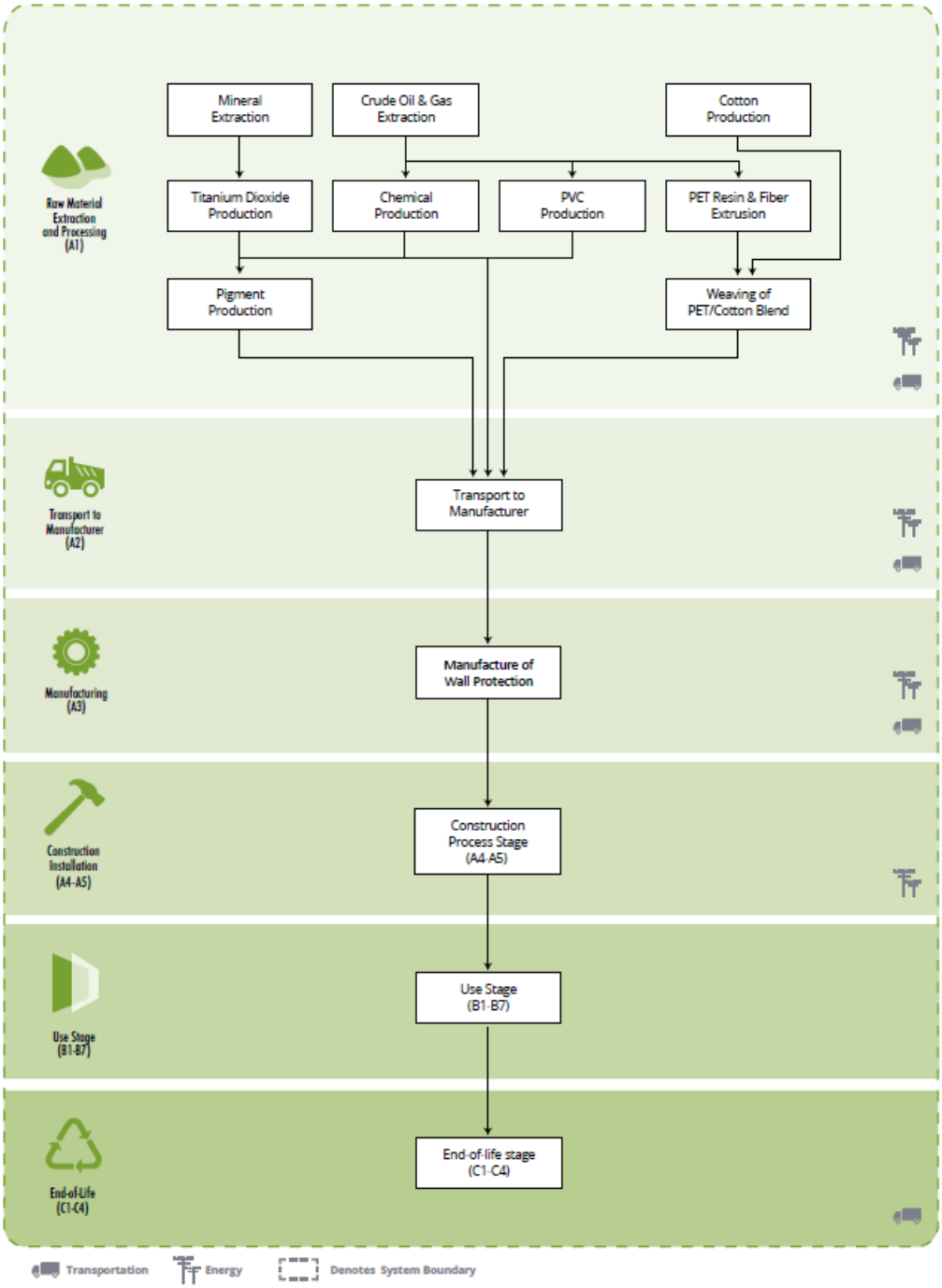
3. LCA: Calculation Rules

3.1 Functional Unit

The functional unit used in the study, as specified in the PCR, is 1 m^2 of wall protection, installed for use over a five-year period. The reference flow for the product system is 0.857 kg/m^2.

3.2 System Boundary

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The life cycle phases included in the product system boundary are shown below.



3.3 Estimates and Assumptions

- An ecoinvent life cycle inventory (LCI) dataset was modified to reflect the eGRID energy mix for the RFCE[1] eGRID EPA NERC[2] subregion to estimate resource use and emissions from electricity use at the J. Josephson manufacturing facility located in South Hackensack, New Jersey.
- Resource use and emissions at the manufacturing facility were allocated to the wall protection product based on the mass of the product as a fraction of the total facility production (i.e., mass-based allocation).

[1] Reliability First Corporation/East
[2] North American Electric Reliability Corporation

- Material data for various components of the wall protection products were provided by the manufacturer. Much of the upstream raw materials extraction and processing could not be modeled with actual process information. Representative data from the Ecoinvent LCI databases were utilized as appropriate.
- Product and packaging disposal at end-of-life were modeled using recycling rates based on solid waste statistics from the US Environmental Protection Agency. Datasets representing disposal in a landfill and waste incineration are from Ecoinvent.

It should also be noted that LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The PCR allows for the results for several inventory flows related to construction products to be reported as "other parameters". These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted taking into account this limitation.

3.4 Cut-off criteria

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results.

3.5 Background Data

Primary data were provided by J. Josephson for the South Hackensack, New Jersey facility. The sources of secondary LCI data are the Ecoinvent database (v3.2, 2015 & v3.3, 2016).

Table 3. *Data sources for the P3TEC product system.*

Component	Material Description	Material Dataset	Data Source	Publication Date
PRODUCT				
Vinyl/Rigid Vinyl	Polyvinyl Chloride	Polyvinylchloride, suspension {GLO} | market for | Alloc Rec	Ecoinvent[1]	2016
Cap Film	Polyvinyl Fluoride film	Polyvinylfluoride, film {GLO} | market for | Alloc Rec	Ecoinvent[1]	2016
Adhesive	PVC resin/DOTP	Polyvinylchloride, bulk polymerised {GLO} | market for | Alloc Rec; 2-ethylhexyl phthalate (DEHP)* {GLO} | market for | Alloc Rec	Primary data; Ecoinvent[1]	2016; 2016
Backing	PET/Cotton blend	Polyethylene terephthalate, granulate, amorphous {GLO} | market for | Alloc Rec; Cotton fibre {GLO} | market for | Alloc Rec;	Primary data; Ecoinvent[1]	2016; 2016
Pigment	Pigment	Titanium dioxide {RoW} | market for | Alloc Rec; Ethyl acetate {GLO} | market for | Alloc Rec; Isopropyl acetate {GLO} | market for | Alloc Rec;	Primary data; Ecoinvent[1]	2016; 2016; 2016
PACKAGING				
Packaging	Corrugated	Corrugated board, recycling fibre, double wall, at plant/RER	Ecoinvent[2]	2010
TRANSPORTATION				
Transport	Truck	Transport, freight, lorry 16-32 metric ton, EURO4 {GLO} | market for | Alloc Rec	Ecoinvent[1]	2016
Transport	Ship	Transport, freight, sea, transoceanic ship {GLO} | market for | Alloc Rec	Ecoinvent[1]	2016

**This product does not contain DEHP.*
1) Ecoinvent v3.3 Life Cycle Database
2) Ecoinvent v2.2 Life Cycle Database

3.6 Data Quality

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 4. *Data quality assessment for the P3TEC Advanced Wall Protection product system.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 10 years old (typically 2015 or more recent). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2015.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American or European operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing product disposal are based on US statistics.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the wall protection products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded. In total, these missing data represent less than 5% of the mass or energy flows.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources, and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used with a bias towards Ecoinvent v3.3 data where available. Different portions of the product life cycle are equally considered; however, it must be noted that final disposition of the product is based on assumptions of current average practices in the United States.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	Data representing energy use at the J. Josephson New Jersey facility represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. The Ecoinvent databases are used for secondary LCI datasets.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the wall protection product and packaging is low. Actual supplier data for upstream operations was sought, but not available and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years), but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

3.7 Period under review

The period of review is calendar year 2015.

3.8 Allocation

Manufacturing resource use was allocated to the products based on mass. Impacts from transportation were allocated based on the mass of material and distance transported.

3.9 Comparability

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

4. LCA: Scenarios and additional Technical Information

Delivery and Installation stage (A4 - A5)

Distribution of the wall protection product to the point of installation assumed a transport distance of 3,420 km by diesel truck and 1,240 km by ocean freighter. Transportation parameters for modeling are summarized in Table 5.

Table 5. *Transport parameters, per m^2 (A4)*

Parameter	Value	Unit
Transport distance (truck)	3,420	km
Transport distance ship)	1,240	km
Gross mass of products transported	0.86	kg

Typical installation involves preparation of the surface with a primer, followed by application of an adhesive. The manufacturer provides recommended installation guidance summarized below.
http://www.P3TECwall.com/installation.html

Table 6. *Parameters for Installation into the building (A5).*

Parameter	Value	Unit
Auxiliary (Primer - Roman ECO-988; Gardner Dynamite 221/222)	0.12	kg
Auxiliary (Adhesive - Roman ECO-732; Gardner Dynamite 433)	0.18	kg
Water consumption	0.0	m^3
Other resources	0.0	kg
Electricity consumption	0.0	kWh
Other energy carriers	0.0	MJ
Material loss	0.0	kg
Output substances following waste treatment on site	0.0	kg
Dust in the air	0.0	kg

During installation, waste may be generated. Waste material can be disposed of in a landfill or incinerated.

Use stage (B1)

No impacts are associated with the use of the product over the Reference Service Lifetime.

Maintenance stage (B2)

The wall protection product can be cleaned and maintained with mild detergent and water: www.P3TECwall.com.

Relevant parameters are summarized below.

Table 7. *Maintenance parameters (B2)*

Parameter	Value	Unit
Information on maintenance	Monthly cleaning	-
Maintenance cycle	60	Number/RSL
Water consumption	$6.0x10^{-4}$	m^3
Auxiliary (mild detergent)	0.02	kg
Other resources	0.0	kg
Electricity consumption	0.0	kWh
Other energy carriers	0.0	MJ
Material Loss	0.0	kg

The declared values in module B2 can be multiplied with the RSL (in years) of the product considered.

Repair/Replacement/Refurbishment stage (B3 - B5)

Repair of the wall protection product requires only hand tools and causes no emissions or additional impacts. Product replacement and refurbishment are not relevant during the lifetime of the product.

Building operation stage (B6 – B7)

There is no operational energy or water use associated with the use of the product and the results for these stages are zero.

Disposal stage (C1 - C4)

The disposal stage includes demolition of the products (*C1*); transport of the wall protection products to waste treatment facilities (*C2*); waste processing (*C3*); and associated emissions as the product degrades in a landfill or is burned in an incinerator (*C4*).

For P3TEC Advanced Wall Protection product, no emissions are generated during demolition (*C1*) while no waste processing (*C3*) is required for incineration or landfill disposal. Transportation of waste materials at end-of-life (*C2*) assumes a 20-mile average distance to disposal, consistent with assumptions used in the US EPA WARM model. While no recycling of the product materials occurs at end-of-life. The relevant recycling rates used for the product packaging are based on 2014 US EPA solid waste disposal statistics (Paper and paperboard: 75.4%; Plastics: 14.8%; Wood: 26.4%). For the materials not recycled, 20% are incinerated, and 80% go to landfill, based on this US EPA data (*C4*). Relevant parameters for the product disposal are summarized in Table 8.

Table 8. *Parameters for End of life (C1-C4)*

Parameter	Value	Unit
Collected separately	0.0	kg
Collected as mixed construction waste	0.858	kg
Reuse	0.0	kg
Recycling	0.0	kg
Energy recovery	0.0	kg
Landfilling	0.858	kg

5. LCA: Results

Table 9. *Life cycle phases included in the product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B1	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	MND

Table 10. *TRACI Life Cycle Impact Assessment (LCIA) results for the J. Josephson Advanced Wall Protection product over a 5-yr time horizon. All values are rounded to two significant digits. Results reported in MJ are calculated using higher heating values.*

Impact category	Unit	Module A1 - Raw material extraction and processing	Module A2 - Transport to manufacturer	Module A3 - Manufacturing	Module A4 - Transport	Module A5 - Construction - installation	Module B1 - Maintenance	Module C2 - Transport	Module C4 - Disposal	Module D - Reuse, recovery and/or recycling potential
Global warming (GWP, 100 year)	kg CO_2 eq	2.1	0.26	0.76	0.58	0.52	0.13	0.45	$4.8x10^{-3}$	MND
	%	44%	5.3%	16%	12%	11%	2.6%	9.3%	0.10%	
Acidification	kg SO_2 eq	$7.9x10^{-3}$	$1.5x10^{-3}$	$3.3x10^{-3}$	$2.9x10^{-3}$	$4.2x10^{-3}$	$3.5x10^{-4}$	$7.5x10^{-4}$	$2.2x10^{-5}$	MND
	%	38%	7.4%	16%	14%	20%	1.7%	3.6%	0.10%	
Eutrophication	kg N eq	$2.9x10^{-3}$	$3.0x10^{-4}$	$2.3x10^{-3}$	$6.5x10^{-4}$	$4.3x10^{-3}$	$7.0x10^{-4}$	$5.9x10^{-3}$	$5.3x10^{-6}$	MND
	%	17%	1.8%	13%	3.9%	25%	4.1%	35%	0.03%	
Ozone depletion	kg CFC-11 eq	$7.2x10^{-8}$	$6.3x10^{-8}$	$7.5x10^{-8}$	$1.4x10^{-7}$	$5.5x10^{-8}$	$4.7x10^{-9}$	$5.9x10^{-8}$	$1.2x10^{-9}$	MND
	%	15%	13%	16%	30%	12%	1.0%	12%	0.25%	
Smog	kg O_3 eq	0.12	$3.2x10^{-2}$	$3.0x10^{-2}$	$6.5x10^{-2}$	$3.3x10^{-2}$	$4.0x10^{-3}$	$9.0x10^{-3}$	$5.1x10^{-4}$	MND
	%	40%	11%	10%	23%	11%	1.4%	3.1%	0.18%	
Fossil fuel depletion	MJ surplus	6.0	0.56	0.94	1.3	0.72	$3.4x10^{-2}$	0.12	$1.2x10^{-2}$	MND
	%	62%	5.8%	10%	13%	7.5%	0.36%	1.2%	0.25%	

MND = Module not declared

Table 11. *CML Life Cycle Impact Assessment (LCIA) results for the J. Josephson P3TEC Advanced Wall Protection product over a 5-yr time horizon. All values are rounded to two significant digits. Results reported in MJ are calculated using higher heating values.*

Impact category	Unit	Module A1 - Raw material extraction and processing	Module A2 - Transport to manufacturer	Module A3 - Manufacturing	Module A4 - Transport	Module A5 - Construction - installation	Module B1 - Maintenance	Module C2 - Transport	Module C4 - Disposal	Module D - Reuse, recovery and/or recycling potential
Global warming (GWP, 100 year)	kg CO_2 eq	2.1	0.26	0.76	0.58	0.52	0.13	0.45	$4.8x10^{-3}$	MND
	%	44%	5.3%	16%	12%	11%	2.6%	9%	0.10%	
Acidification	kg SO_2 eq	$7.7x10^{-3}$	$1.4x10^{-3}$	$3.5x10^{-3}$	$2.5x10^{-3}$	$4.2x10^{-3}$	$3.2x10^{-4}$	$6.4x10^{-4}$	$1.9x10^{-5}$	MND
	%	38%	6.9%	17%	13%	21%	1.6%	3.2%	0.09%	
Eutrophication	kg $(PO_4)^{3-}$ eq	$1.7x10^{-3}$	$2.6x10^{-4}$	$1.1x10^{-3}$	$5.4x10^{-4}$	$2.1x10^{-3}$	$3.4x10^{-4}$	$2.2x10^{-3}$	$4.3x10^{-6}$	MND
	%	21%	3.1%	13%	6.5%	25%	4.1%	27%	0.05%	
Ozone depletion	kg CFC-11 eq.	$5.6x10^{-8}$	$4.7x10^{-8}$	$6.1x10^{-8}$	$1.1x10^{-7}$	$4.5x10^{-8}$	$4.0x10^{-9}$	$5.6x10^{-8}$	$8.8x10^{-10}$	MND
	%	15%	12%	16%	28%	12%	1.0%	15%	0.23%	
Smog	kg C_2H_4 eq	$4.8x10^{-4}$	$5.5x10^{-5}$	$2.9x10^{-4}$	$1.1x10^{-4}$	$2.6x10^{-4}$	$7.2x10^{-5}$	$4.0x10^{-5}$	$8.1x10^{-7}$	MND
	%	37%	4.2%	22%	8.1%	20%	5.6%	3.1%	0.06%	
Abiotic depletion (elements)	kg Sb eq	$3.8x10^{-6}$	$7.1x10^{-7}$	$5.7x10^{-7}$	$1.7x10^{-6}$	$3.6x10^{-6}$	$2.0x10^{-7}$	$4.3x10^{-7}$	$1.4x10^{-8}$	MND
	%	35%	6.4%	5.1%	15%	32%	1.8%	3.9%	0.13%	
Abiotic depletion (fossil fuels)	MJ	46	4.1	8.5	9.2	6.8	0.35	1.4	$7.6x10^{-2}$	MND
	%	60%	5.4%	11.2%	12%	9.0%	0.46%	1.8%	0.10%	

Table 12. *Resource use for the J. Josephson P3TEC Advanced Wall Protection product over a 5-yr time horizon. All values are rounded to two significant digits. Results reported in MJ are calculated using higher heating values.*

Impact category	Unit	Module A1 - Raw material extraction and processing	Module A2 - Transport to manufacturer	Module A3 - Manufacturing	Module A4 - Transport	Module A5 - Construction - installation	Module B1 - Maintenance	Module C2 - Transport	Module C4 - Disposal	Module D - Reuse, recovery and/or recycling potential
Use of renewable primary energy excluding the renewable primary energy resources used as raw materials	MJ	1.6	$5.3x10^{-2}$	1.8	0.11	4.0	0.95	0.15	$9.3x10^{-4}$	MND
	%	19%	0.61%	21%	1.3%	46%	10.8%	1.7%	0.01%	
Use of renewable primary energy resources used as raw materials	MJ	-	-	-	-	-	-	-	-	MND
Total use of renewable primary energy resources	MJ	1.6	$5.3x10^{-2}$	1.8	0.11	4.0	0.95	0.15	$9.3x10^{-4}$	MND
	%	19%	0.61%	21%	1.3%	46%	10.8%	1.7%	0.01%	
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	MND
Use of non-renewable primary energy resources used as raw materials	MJ.	INA	INA	INA	INA	INA	INA	INA	INA	MND
Total use of non-renewable primary energy resources	MJ.	56	4.2	12	9.4	7.5	0.59	1.6	$7.7x10^{-2}$	MND
	%	61%	4.6%	14%	10%	8.2%	0.64%	1.7%	0.08%	
Use of secondary materials	kg	0	0	$1.3x10^{-2}$	0	0	0	0	0	MND
	%	0%	0%	100%	0%	0%	0%	0%	0%	
Use of renewable secondary fuels	MJ.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	MND
Use of non-renewable secondary fuels	MJ.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	MND

MND = Module not declared
INA = Indicator not assessed
Neg. = Negligible

Table 13. *Waste and outflows for the J. Josephson P3TEC Advanced Wall Protection product over a 5-yr time horizon. All values are rounded to two significant digits. Results reported in MJ are calculated using higher heating values.*

Impact category	Unit	Module A1 - Raw material extraction and processing	Module A2 - Transport to manufacturer	Module A3 - Manufacturing	Module A4 - Transport	Module A5 - Construction - installation	Module B1 - Maintenance	Module C2 - Transport	Module C4 - Disposal	Module D - Reuse, recovery and/or recycling potential
Non-hazardous waste disposed	kg	0.13	0.17	0.16	0.40	0.15	$9.9x10^{-3}$	0.69	$3.4x10^{-3}$	MND
	%	7.5%	9.8%	10%	23%	8.7%	0.57%	40%	0.20%	
Hazardous waste disposed	Kg	$1.8x10^{-5}$	$2.3x10^{-6}$	$1.1x10^{-5}$	$5.3x10^{-6}$	$9.7x10^{-6}$	$6.6x10^{-7}$	$4.7x10^{-6}$	$4.3x10^{-8}$	MND
	%	35%	4.5%	21%	10%	19%	1.3%	9.1%	0.08%	
Radioactive waste disposed	Kg	$2.8x10^{-5}$	$2.7x10^{-5}$	$1.1x10^{-5}$	$6.1x10^{-5}$	$2.2x10^{-5}$	$1.3x10^{-6}$	$6.5x10^{-6}$	$5.0x10^{-7}$	MND
	%	18%	17%	6.8%	39%	14%	0.81%	4.1%	0.32%	
Components for re-use	Kg	0	0	0	0	0	0	0	0	MND
Materials for recycling	kg	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	MND
Materials for energy recovery	kg	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	MND
Exported energy	MJ eq.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	MND
Use of renewable material resources	kg	0	0	0	0	0	0	0	0	MND

MND = Module not declared
Neg. = Negligible

6. LCA: Interpretation

The interpretation phase conforms to ISO 14044 with further guidance from the ILCD General Guide for Life Cycle Assessment. The interpretation included the use of evaluation and sensitivity checks to steer the iterative process during the assessment, and a final evaluation including completeness, sensitivity, and consistency checks, at the end of the study.

With few exceptions, the main contributions to indicator results are from the Production phase (A1-A3). Impact contributions from other life cycle stages vary across indicators although generally the Use stage (Module B) is the next highest contributor followed by the Installation (A4/A5) and End-of-Life phases (Module C).

7. Requisite Evidence

7.1 VOC emissions

Table 14. *VOC emissions test results based on California Department of Public Health CDPH/EHLB/Standard Method Version 1.2, 2017*

Chemical	CAS No.	Chamber Concentration ($\mu g/m^3$)	Emission Factor ($\mu g/m^2$-h)	Estimated Indoor Air Concentration ($\mu g/m^3$)	
				Classroom	Office
Ethyl acetate	141-78-6	45.6	96.6	47.8	156.2
1-Butanol	71-36-3	13	27.6	13.7	44.6
n-Propyl acetate	109-60-4	2.9	6.1	3	9.9
Toluene	108-88-3	3	6.5	3.2	10.4

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J • JOSEPHSON

For more information, contact:

J. Josephson, Inc.
35 Horizon Boulevard, South Hackensack, NJ 07606
+1.201.440.7000 | CustomerService@P3TECwall.com | http://www.P3TECwall.com/

SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA
Main +1.510.452.8000 | fax +1.510.452.8001