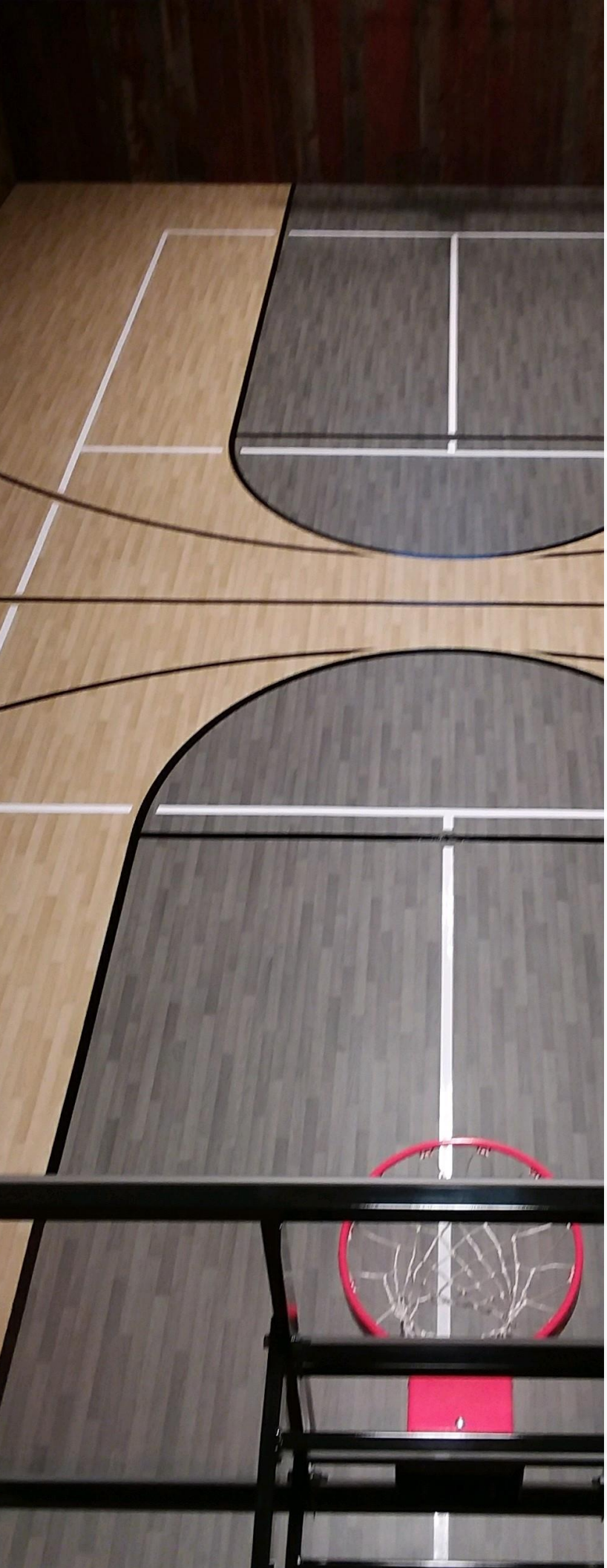


Declaration Owner

PLAE
190 Etowah Industrial Court,
Canton GA 30114
United States
404-645-7900| www.plae.us

Product
Rubber Flooring:
Exceed 7mm;
Exceed 12mm

EPD represents delivery of product to customers globally.

Functional Unit
The functional unit is one square meter of flooring over a 75-year period

EPD Number and Period of Validity
SCS-EPD-06148
EPD Valid May 20, 2020 through May 19, 2025
Version: May 27, 2020

Product Category Rule
PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 3.2. UL Environment. Sept. 2018

PCR Guidance for Building-Related Products and Services Part B: Flooring EPD Requirements. Version 2. UL Environment. May 2018.

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

Declaration Owner:	PLAE
Address:	190 Etowah Industrial Court, Canton GA 30114, United States
Declaration Number:	SCS-EPD-06148
Declaration Validity Period:	May 20, 2020 through May 19, 2025
Version:	May 27, 2020
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA 1.7 software and the Ecoinvent v3.6 database
Product RSL:	5 years
Markets of Applicability:	Global
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Grave
LCIA Method and Version:	CML-IA and TRACI 2.1
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Part A Product Category Rule:	PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 3.2. UL Environment. Sept. 2018
Part A PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
Part B Product Category Rule:	PCR Guidance for Building-Related Products and Services Part B: Flooring EPD Requirements. Version 2. UL Environment. May 2018.
Part B PCR Review conducted by:	Jack Geibig (chair), Ecoform; Thomas Gloria, Industrial Ecology Consultants; Thaddeus Owen
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and ISO 21930.*

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.*

In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

1. PLAE

PLAE innovates and distributes the most advanced athletic products in the world for clients who refuse to accept second best. We use the hardiest materials available to create dynamic surfaces that outperform, outlast, and totally dominate their competition. We run our own race, pursue our own goals, because when it comes to the athletes who fuel our passion, good enough is never enough.

2. Product

2.1 PRODUCT DESCRIPTION

Exceed takes multi-purpose flooring to an unprecedented new place. Its high-tension top layer offers a randomized wood grain aesthetic complete with vinyl embossing, available in three natural hues, suitable for any event. But underneath lies our acclaimed Plaetech shock layer, made of reclaimed rubber, engineered alongside strength coaches around the world to deliver ideal force absorption and energy return levels. The dual layers undergo a patented fusion process, which fuses them into a single system that will never separate or weaken, regardless of age or application

2.2 PRODUCT FLOW DIAGRAM

A flow diagram illustrating the production processes and life cycle phases included in the scope of the EPD is provided below.

2.3 APPLICATION

The PLAE rubber flooring products provide the primary function of flooring for interior applications. The products are used in various commercial applications including athletic facilities, healthcare, education, and hospitality.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

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.

Cut-off and allocation procedures are described below and conform to the PCR and ISO standards.

Table 1. *Life cycle phases included in the PLAE Rubber flooring 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

X = Module Included | MND = Module Not Declared

2.5 TECHNICAL DATA

Technical specifications for the flooring product are summarized in Table 2 and Table 3.

Table 2. *Product specifications for the PLAE Exceed 7mm flooring products.*

Characteristic			Average Value	Unit	Minimum Value	Maximum Value
Product thickness			7.00 (0.28)	mm (in)	7.00 (0.28)	7.00 (0.28)
Wear layer thickness			2.00 (0.08)	mm (in)	2.00 (0.08)	2.00 (0.08)
Product weight			6835.4 (22.4)	g/m^2 (oz/ft^2)	6835.4 (22.4)	6835.4 (22.4)
VOC emissions test method			FloorScore®			
Sustainable certifications			-			
Product Form	Rolls	Width	1828.80 (72.00)	mm (in)	1828.80 (72.00)	1828.80 (72.00)
		Length	9,144 (360)	mm (inch)	9,144 (360)	9,144 (360)

Table 3. *Product specifications for the PLAE Exceed 12mm flooring products.*

Product Characteristics			Nominal value	Unit	Minimum value	Maximum value
Product Thickness			12.0 (0.47)	mm (inch)	12.0 (0.47)	12.0 (0.47)
Wear layer thickness			2.0 (0.078)	mm (inch)	2.0 (0.078)	2.0 (0.078)
Product Weight			8,788 (28.8)	g/m^2 (oz./ft^2)	8,788 (28.8)	8,788 (28.8)
VOC emissions test method			FloorScore®			
Sustainable certifications			-			
Product Form	Tiles	Width	1,828.8 (72)	mm (inch)	1,828.8 (72)	1,828.8 (72)
		Length	9,144 (360)	mm (inch)	9,144 (360)	9,144 (360)

2.6 MARKET PLACEMENT/APPLICATION RULES

Technical specifications and product performance results for the flooring products can be found on the manufacturer's website: www.plae.us.

2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

The products are delivered for installation in the form of rubber tiles and rolls.

2.8 MATERIAL COMPOSITION

The primary materials include virgin and recycled rubber, binders and adhesives.

Table 4. *Material content for the rubber flooring products in kg per square meter and percent of total mass.*

Component	Exceed 7mm		Exceed 12mm	
	kg/m^2	%	kg/m^2	%
Adhesive	$8.68x10^{-2}$	1.4%	$8.68x10^{-2}$	0.91%
Other	$1.33x10^{-2}$	0.22%	$4.04x10^{-2}$	0.42%
Polymer binder	0.133	2.2%	0.379	4.0%
Rubber	4.35	71%	4.35	46%
Regrind/Crumb rubber	1.57	26%	4.67	49%
Total Product	**6.15**	**100%**	**9.52**	**100%**

No substances required to be reported as hazardous are associated with the production of this product

2.9 MANUFACTURING

PLAE rubber flooring is produced at a manufacturing facility in the United States. The rubber flooring is made primarily from virgin and recycled rubber.

2.10 PACKAGING

The products are packaged for shipment using cardboard cartons and plastic wrap.

Table 5. *Material content for the flooring product packaging, in kg per square meter and percent of total mass.*

Component	Exceed 7mm		Exceed 12mm	
	kg/m^2	Percent	kg/m^2	percent
Cardboard	0.119	29%	0.119	29%
Plastic	0.293	71%	0.293	71%
Total Packaging	**0.412**	**100%**	**0.412**	**100%**

2.11 PRODUCT INSTALLATION

Installation of the product is accomplished using hand tools with negligible impacts and waste. The impacts associated with packaging disposal are included with the installation phase as per PCR requirements.

2.12 USE CONDITIONS

No special conditions of use are noted.

2.13 PRODUCT REFERENCE SERVICE LIFE AND BUILDING ESTIMATED SERVICE LIFE

The Reference Service Life (RSL) of the flooring product is based on the manufacturer's estimated product lifetime and is summarized in Table 6 below. The building Estimated Service Life (ESL) is 75 years, consistent with the PCR.

2.14 RE-USE PHASE

The flooring products are not reused at end-of-life.

2.15 DISPOSAL

At end-of-life, the products are disposed of in a landfill, per PCR guidance. It is assumed that no components of the product are recycled at end-of-life.

2.16 FURTHER INFORMATION

Further information on the product can be found on the manufacturers' website at https://plae.us/

3. LCA: Calculation Rules

3.1 FUNCTIONAL UNIT

The functional unit used in the study is defined as 1 m^2 of floor covering installed for use over a 75-year period. The corresponding reference flow for each product system is presented in Table 6. For the present assessment, a reference service lifetime (RSL) corresponding to the manufacturer's warranted lifetime is assumed. The total number of required product lifecycles during the 75-year period over which the product system is modeled is also summarized for the product in Table 6.

Table 6. *Reference flows and RSL for the Rubber flooring product.*

Product	Reference Flow (kg/m^2)	Reference Service Life (RSL)	Replacement Cycle (ESL/RSL-1)
PLAE Exceed 7mm	6.15	5	14
PLAE Exceed 12mm	9.52	5	14

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 EPD scope are described in Table 7 and illustrated in Figure 1.

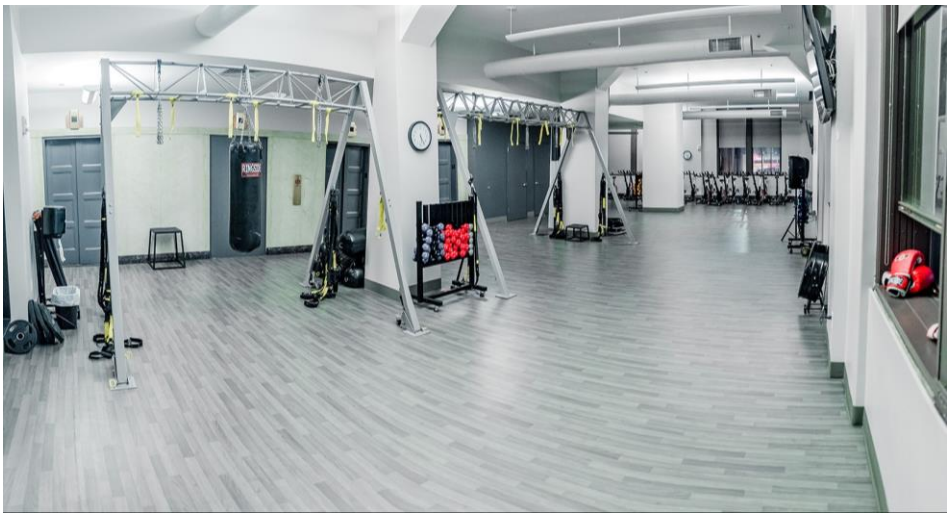


Table 7. *The modules and unit processes included in the scope for the PLAE flooring products.*

Module	Module description from the PCR	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other, recovery processes from secondary fuels	Extraction and processing of raw materials for the rubber flooring components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facility.
A3	Manufacturing, including ancillary material production	Manufacturing of flooring products and packaging (incl. upstream unit processes*)
A4	Transport (to the building site)	Transport of product (including packaging) to the building site.
A5	Construction-installation process	Impacts from the installation of the product are assumed negligible. Only impacts from packaging disposal are included in this phase.
B1	Product use	Use of the flooring in a commercial building setting. There are no associated emissions or impacts from the use of the product.
B2	Product maintenance	Maintenance of products, including periodic cleaning over the 75-year ESL of the assessment.
B3	Product repair	The flooring is not expected to require repair over its lifetime. Impacts from this phase are reported as zero.
B4	Product replacement	The materials and energy required for replacement of the product over the 75-year ESL of the assessment are included in this phase.
B5	Product refurbishment	The flooring is not expected to require refurbishment over its lifetime. Impacts from this phase are reported as zero.
B6	Operational energy use by technical building systems	There is no operational energy use associated with the use of the product.
B7	Operational water use by technical building systems	There is no operational water use associated with the use of the product.
C1	Deconstruction, demolition	Demolition of the product is accomplished using hand tools with no associated emissions and negligible impacts
C2	Transport (to waste processing)	Transport of flooring product to waste treatment at end-of-life.
C3	Waste processing for reuse, recovery and/or recycling	The product is disposed of by landfilling which require no waste processing.
C4	Disposal	Disposal of flooring product in municipal landfill.
D	Reuse-recovery-recycling potential	Module Not Declared

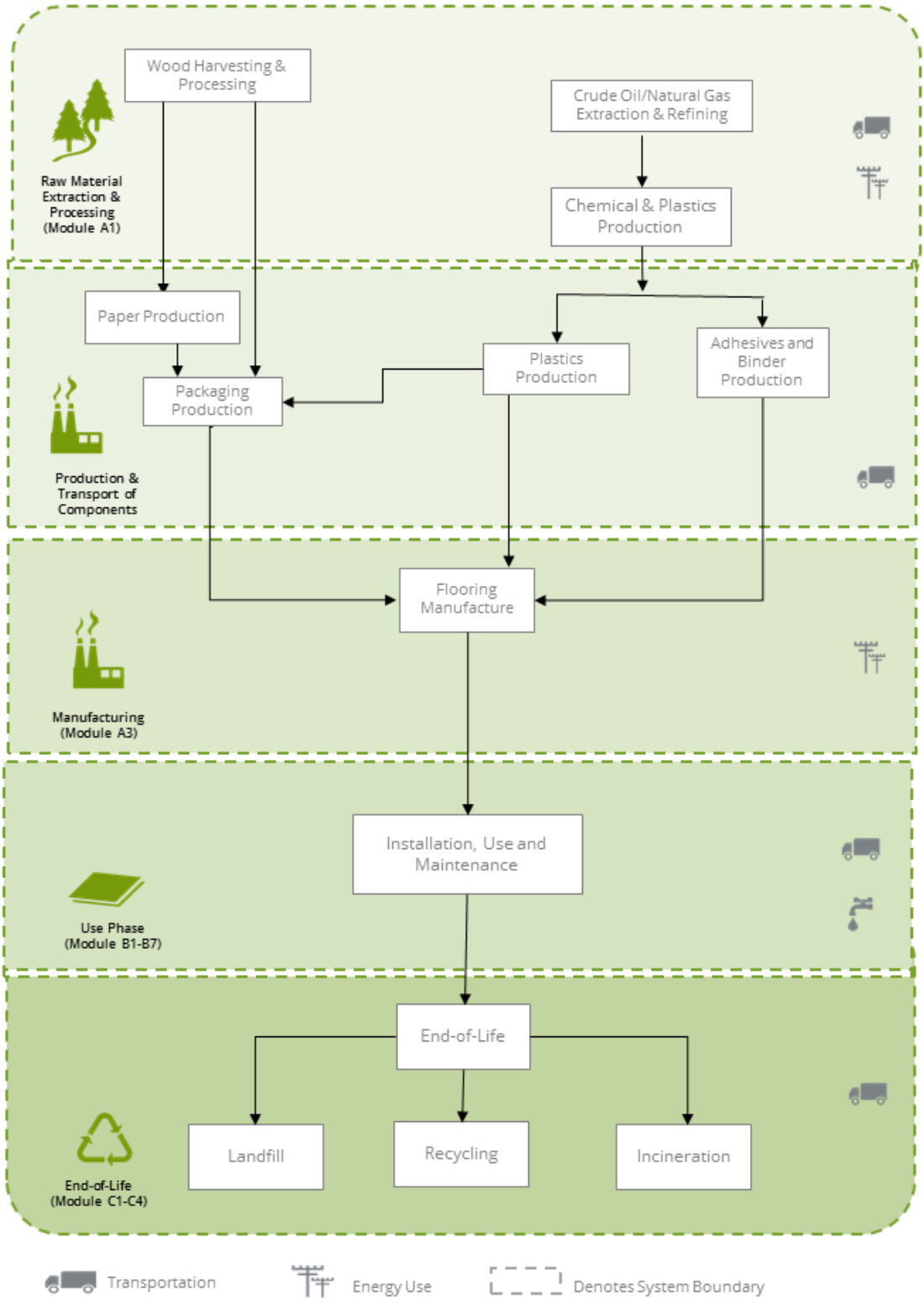


Figure 1. *Flow Diagram for the life cycle of the PLAE Exceed rubber flooring product system.*

3.3 PRODUCT SPECIFIC CALCULATION FOR USE PHASE

The recommended cleaning regime is highly dependent on the use of the premises where the floor covering is installed. In high traffic areas more frequent cleaning will be needed compared to areas where there is low traffic. For the purposes of this EPD, average maintenance (moderate traffic levels) is presented based on typical installations.

3.4 UNITS

All data and results are presented using SI units.

3.5 ESTIMATES AND ASSUMPTIONS

- The Reference Service Life (RSL) of the products was modeled based on information provided by the manufacturer assuming their products are installed and maintained as recommended and used for the specific application noted.
- For the product end-of-life, disposal of product and packaging is modeled based on the PCR guidance regarding recycling rates of product and packaging materials.
- For final disposal of the packaging material and flooring products at end-of-life, all materials are assumed to be transported 20 miles by diesel truck to either a landfill or material reclamation facility (for recycling). Datasets representing disposal in a landfill and waste incineration are from Ecoinvent.
- Modeling of recycled materials follows the recycled content method (also known as 100-0 method or cut-off method) whereby only the burdens of reprocessing the waste material are allocated to the system from the use of the recycled material.
- Electricity use at the York, Pennsylvania manufacturing facility was allocated to the flooring products based on the product area as a fraction of the total production.
- The production facility is located in the RFCE eGRID EPA NERC subregion. An Ecoinvent inventory dataset was modified to reflect the eGRID energy mix for RFCE to estimate resource use and emissions from electricity use at the manufacturing facility.
- Downstream transport was modeled based on information provided by the manufacturer representing transport for global product distribution.
- The use phase of the product life cycle was modeled based on information provided by the manufacturer including recommended installation and cleaning methods, as well as cleaning frequency.

The PCR requires the results for several inventory flows related to construction products to be reported including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted considering this limitation.

3.6 CUT-OFF RULES

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. No known flows are deliberately excluded from this EPD.

3.7 DATA SOURCES

Primary data were provided by the manufacturer for its operations. The sources of secondary LCI data are the Ecoinvent database.

Table 8. *Data sources for the PLAE rubber flooring product system.*

Component	Dataset	Source	Publication date
Product			
Adhesive			
Adhesive	market for ethylene vinyl acetate copolymer | ethylene vinyl acetate copolymer | Cutoff, S/RoW	EI v3.6	2019
Other			
Water	market group for tap water | tap water | Cutoff, S/GLO	EI v3.6	2019
Polymer binder			
Binder	market for methylene diphenyl diisocyanate | methylene diphenyl diisocyanate | Cutoff, S/RoW	EI v3.6	2019
Rubber			
EPDM	market for synthetic rubber | synthetic rubber | Cutoff, S/GLO	EI v3.6	2019
Vinyl			
Wear layer	market for polyvinylchloride, bulk polymerised | polyvinylchloride, bulk polymerised | Cutoff, S/GLO	EI v3.6	2019
Regrind/Crumb rubber			2019
SBR-Crumb	SBR - Crumb, recycled (Liberty) - LCI	EI v3.6	2019
Packaging			
Plastic	market for packaging film, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/GLO	EI v3.6	2019
Pulp	market for corrugated board box | corrugated board box | Cutoff, S/RoW	EI v3.6	2019
Resources			
Grid electricity	Electricity, medium voltage, per kWh - RFCE/RFCE	EI v3.6	2019
Heat, natural gas	market group for heat, district or industrial, natural gas | heat, district or industrial, natural gas | Cutoff, S/GLO	EI v3.6	2019
Water	Process water, unspecified, natural origin/kg	EI v3.6	2019
Transportation			
Truck	market for transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.6	2019
Ship	transport, freight, sea, transoceanic ship | transport, freight, sea, transoceanic ship | Cutoff, S/GLO	EI v3.6	2019

3.8 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 9. *Data quality assessment for the PLAE flooring 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 5 years old (typically 2016). 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 annualized production for 2018.
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. Electricity use for product manufacture is modeled using representative data for the US. Surrogate data used in the assessment are representative of global 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 flooring 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.
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 v3.6 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 manufacturing facility represents 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. For secondary LCI data, Ecoinvent v3.6 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the flooring products and packaging is low. Actual supplier data for upstream operations was not available for all suppliers 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.

3.9 PERIOD UNDER REVIEW

The period of review is the calendar year 2018.

3.10 ALLOCATION

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

3.11 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 flooring products to the point of installation is included in the assessment. Transportation parameters for modeling product distribution are summarized in Table 10. Production-weighted average distances by transport mode were used to represent product distribution globally.

Table 10. *Product distribution parameters, per 1 m^2 (A4).*

Parameter	Unit	Exceed 7mm	Exceed 12mm
Diesel truck – Fuel utilization	L/100 km	42	42
Diesel truck – Capacity utilization	%	76%	76%
Diesel truck – Distance	km	1,733	1,733
Freight train – Fuel utilization	g/tkm	10	10
Freight train – Capacity utilization	%	67%	67%
Freight train – Distance	km	425	425
Ocean freighter – Fuel utilization	g/tkm	2.5	2.5
Ocean freighter – Capacity utilization	%	65%	65%
Ocean freighter – Distance	km	312	312
Gross mass of products transported (including packaging)	kg	6.56	9.92

The impacts associated with the product installation are assumed negligible. The impacts associated with packaging disposal are included with the installation phase as per PCR requirements.

Table 11. *Installation parameters for the rubber flooring products, per 1 m^2 (A5).*

Parameter		Exceed 7mm	Exceed 12mm
Ancillary materials (kg)		negligible	negligible
Net freshwater consumption (m^3)		-	-
Electricity consumption (kWh)		-	-
Product loss per functional unit (kg)		negligible	negligible
Waste materials generated by product installation (kg)		negligible	negligible
Output materials resulting from on-site waste processing (kg)		na	na
Mass of packaging waste (kg)	Corrugated board	0.119	0.119
	Plastic	0.293	0.293
Biogenic carbon contained in packaging (kg CO_2)		0.209	0.209
Direct emissions to ambient air, soil and water (kg)		-	-

Use stage (B1)

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

Maintenance stage (B2)

According to the manufacturer, typical maintenance involves regular sweeping and damp mopping. The present assessment is based on a recommended weekly cleaning schedule including sweeping and damp mopping with a neutral cleaner.

Table 12. *Maintenance parameters for the PLAE Exceed flooring products, per 1 m^2.*

Parameter	Unit	Value
Maintenance cycle	-	*Initial cleaning (one time)*
Net freshwater consumption	$kg/m^2/yr$	$2.03x10^{-2}$
Cleaning agent	$kg/m^2/yr$	$1.53x10^{-3}$
Maintenance process	-	*Damp mopping (weekly)*
Net freshwater consumption	$kg/m^2/yr$	0.352
Cleaning agent	$kg/m^2/yr$	$7.93x10^{-3}$
Maintenance process	-	*Restorative cleaning (once per RSL)*
Net freshwater consumption	$kg/m^2/RSL$	$3.39x10^{-2}$
Cleaning agent	$kg/m^2/RSL$	$4.07x10^{-3}$
Further assumptions	-	Moderate traffic; weekly maintenance

Repair/Refurbishment stage (B3; B5)

Product repair and refurbishment are not relevant during the lifetime of the product.

Replacement stage (B4)

The materials and energy required for replacement of the product over the 75-year ESL of the assessment are included in this stage.

Building operation stage (B6 – B7)

There is no operational energy or water use associated with the use of the product.

Disposal stage (C1 - C4)

The disposal stage includes removal of the products (C1); transport of the flooring 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 the flooring products, no emissions are generated during demolition (C1) while no waste processing (C3) is required for incineration or landfill disposal.

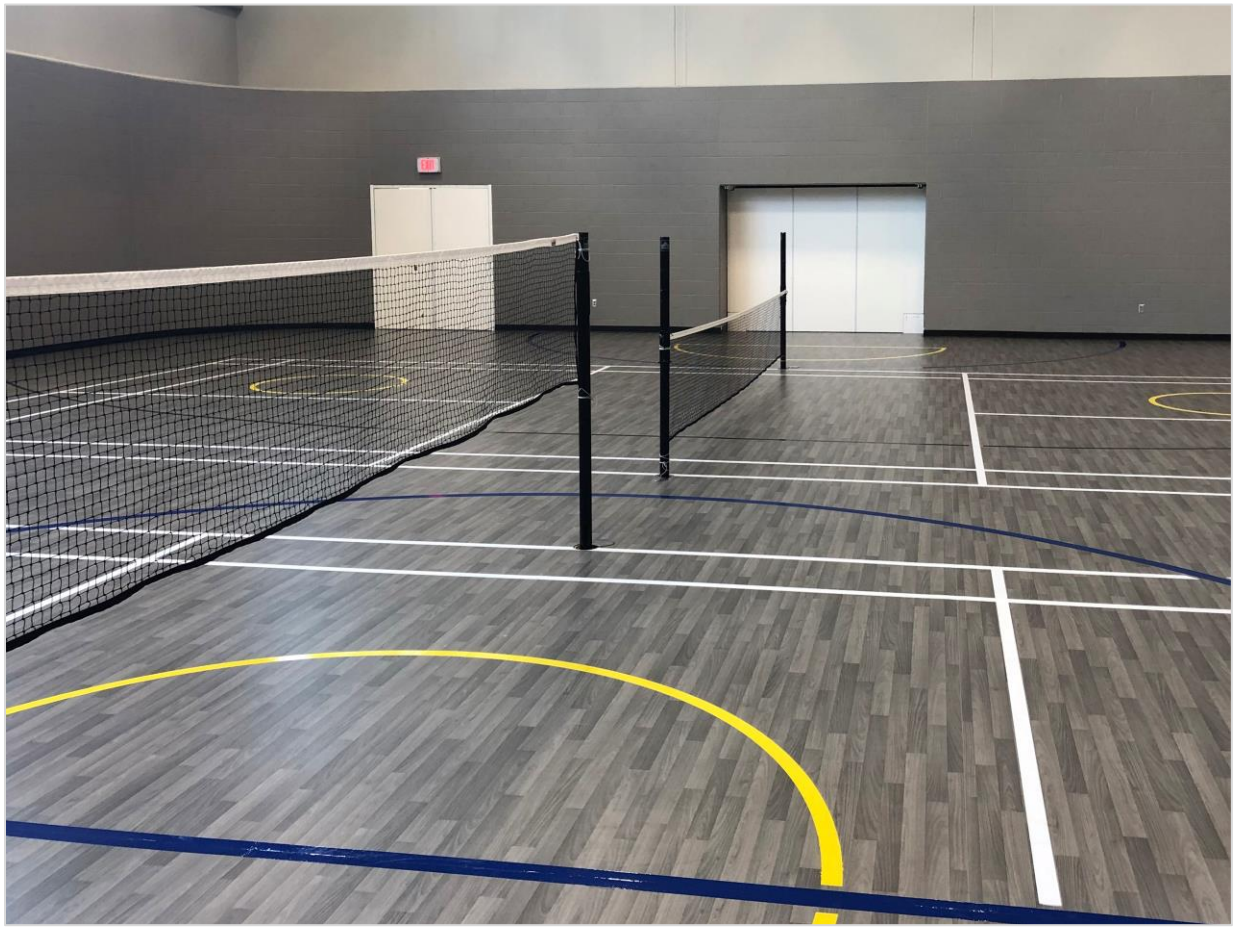
Transportation of waste materials at end-of-life (C2) assumes a 20 mile (~32 km) average distance to disposal, consistent with assumptions used in the US EPA WARM model. The recycling rates used for the product packaging are based on the PCR. No recycling of the product materials is assumed at end-of-life. The relevant disposal statistics used for the packaging are summarized in Table 13 and Table 14. For material not recycled, 80% are assumed landfilled and 20% incinerated.

Table 13. *Recycling rates for packaging materials at end-of-life.*

Material	Recycling Rate
Paper & Pulp	75%
Plastics	15%

Table 14. *End-of-life disposal scenario parameters for the flooring products.*

Parameter		Exceed 7mm	Exceed 12mm
Assumptions for scenario development		100% landfill	100% landfill
Collection process	Collected separately (kg)		-
	Collected with mixed construction waste (kg)	95.6	146
Recovery	na	-	-
Disposal	Landfill (kg)	95.6	146
Removals of biogenic carbon, excluding packaging (kg CO_2 eq)		na	na



5. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The following environmental impact category indicators are reported using characterization factors based on the U.S. EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts – TRACI 2.1 and CML-IA.

CMLI-A Impact Category	Unit	TRACI 2.1 Impact Category	Unit
Global Warming Potential (GWP)	kg CO_2 eq	Global Warming Potential (GWP)	kg CO_2 eq
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq	Ozone Depletion Potential (ODP)	kg CFC 11 eq
Acidification Potential of soil and water (AP)	kg SO_2 eq	Acidification Potential (AP)	kg SO_2 eq
Eutrophication Potential (EP)	kg PO_4^{3-} eq	Eutrophication Potential (EP)	kg N eq
Photochemical Oxidant Creation Potential (POCP)	kg C_2H_4 eq	Smog Formation Potential (SFP)	kg O_3 eq
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq	Fossil Fuel Depletion Potential (ADP_{fossil})	MJ Surplus, LHV
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ, LHV	-	-

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes.

The following inventory parameters, specified by the PCR, are also reported.

Resources	Unit	Waste and Outflows	Unit
RPR_E: Renewable primary resources used as energy carrier (fuel)	MJ, LHV	**HWD:** Hazardous waste disposed	kg
RPR_M: Renewable primary resources with energy content used as material	MJ, LHV	**NHWD:** Non-hazardous waste disposed	kg
$NRPR_E$: Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	**HLRW:** High-level radioactive waste, conditioned, to final repository	kg
$NRPR_M$: Non-renewable primary resources with energy content used as material	MJ, LHV	**ILLRW:** Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
SM: Secondary materials	MJ, LHV	**CRU:** Components for re-use	kg
RSF: Renewable secondary fuels	MJ, LHV	**MR:** Materials for recycling	kg
NRSF: Non-renewable secondary fuels	MJ, LHV	**MER:** Materials for energy recovery	kg
RE: Recovered energy	MJ, LHV	**EE:** Recovered energy exported from the product system	MJ, LHV
FW: Use of net fresh water resources	m^3	-	-

Modules B1, B3, B5, B6, and B7 are not associated with any impact and are therefore declared as zero. In addition, module C1 is likewise not associated with any impact as the floor is manually deconstructed. Additionally, as rubber flooring products do not typically contain bio-based materials, biogenic carbon emissions and removals are not declared. Module D is not declared. In the interest of space and table readability, these modules are not included in the results presented below.

Table 15. Life Cycle Impact Assessment (LCIA) results for the PLAE *Exceed 7mm* flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML-IA									
GWP (kg CO_2 eq)	12.7	4.06	2.43	2.32	0.229	0.648	322	0.251	1.07
	3.7%	1.2%	0.70%	0.67%	0.07%	0.19%	93%	0.07%	0.31%
ODP (kg CFC-11 eq)	$5.25x10^{-2}$	0.103	$8.86x10^{-3}$	$1.65x10^{-2}$	$1.13x10^{-4}$	$3.00x10^{-3}$	2.56	$1.17x10^{-3}$	$2.49x10^{-4}$
	1.9%	3.8%	0.32%	0.60%	0.00%	0.11%	93%	0.04%	0.01%
AP (kg SO_2 eq)	$1.88x10^{-2}$	$1.16x10^{-2}$	$4.35x10^{-3}$	$2.83x10^{-3}$	$1.13x10^{-3}$	$1.15x10^{-3}$	0.616	$2.53x10^{-4}$	$4.92x10^{-3}$
	2.9%	1.8%	0.66%	0.43%	0.17%	0.17%	93%	0.04%	0.74%
EP (kg $(PO_4)^{3-}$ eq)	$3.38x10^{-3}$	$2.70x10^{-3}$	$7.40x10^{-4}$	$4.98x10^{-4}$	$1.51x10^{-5}$	$2.00x10^{-4}$	0.106	$3.88x10^{-5}$	$2.28x10^{-4}$
	3.0%	2.4%	0.65%	0.44%	0.01%	0.18%	93%	0.03%	0.20%
POCP (kg C_2H_4 eq)	$5.32x10^{-6}$	$6.53x10^{-7}$	$1.99x10^{-7}$	$4.02x10^{-7}$	$3.65x10^{-9}$	$3.60x10^{-8}$	$9.27x10^{-5}$	$4.37x10^{-8}$	$5.30x10^{-9}$
	5.4%	0.66%	0.20%	0.40%	0.00%	0.04%	93%	0.04%	0.01%
ADPE (kg Sb eq)	$1.33x10^{-7}$	$1.56x10^{-9}$	$6.78x10^{-7}$	$2.16x10^{-9}$	$1.25x10^{-11}$	$3.57x10^{-9}$	$1.14x10^{-5}$	$6.85x10^{-11}$	$1.07x10^{-10}$
	1.1%	0.01%	5.5%	0.02%	0.00%	0.03%	93%	0.00%	0.00%
ADPF (MJ eq)	250	52.1	41.3	33.6	0.301	14.1	5,330	3.43	0.565
	4.4%	0.91%	0.72%	0.59%	0.01%	0.25%	93%	0.06%	0.01%
TRACI 2.1									
GWP (kg CO_2 eq)	12.5	4.05	2.37	2.31	0.222	0.637	317	0.251	0.954
	3.7%	1.2%	0.70%	0.68%	0.07%	0.19%	93%	0.07%	0.28%
ODP (kg CFC-11 eq)	$5.47x10^{-2}$	0.110	$9.50x10^{-3}$	$1.84x10^{-2}$	$1.57x10^{-4}$	$3.11x10^{-3}$	2.72	$1.45x10^{-3}$	$5.71x10^{-4}$
	1.9%	3.8%	0.33%	0.63%	0.01%	0.11%	93%	0.05%	0.02%
AP (kg SO_2 eq)	$3.68x10^{-2}$	$6.15x10^{-3}$	$8.82x10^{-3}$	$2.83x10^{-3}$	$3.12x10^{-3}$	$2.27x10^{-3}$	0.994	$1.90x10^{-4}$	$1.31x10^{-2}$
	3.4%	0.58%	0.83%	0.26%	0.29%	0.21%	93%	0.02%	1.2%
EP (kg N eq)	0.725	2.02	0.138	0.388	$3.85x10^{-3}$	$3.60x10^{-2}$	46.6	$4.10x10^{-2}$	$5.30x10^{-3}$
	1.5%	4.1%	0.28%	0.78%	0.01%	0.07%	93%	0.08%	0.01%
SFP (kg O_3 eq)	$5.51x10^{-6}$	$8.68x10^{-7}$	$2.30x10^{-7}$	$5.35x10^{-7}$	$4.85x10^{-9}$	$4.33x10^{-8}$	$1.01x10^{-4}$	$5.82x10^{-8}$	$7.01x10^{-9}$
	5.1%	0.80%	0.21%	0.49%	0.00%	0.04%	93%	0.05%	0.01%
FFD (MJ eq)	30.0	7.26	5.11	4.54	$4.18x10^{-2}$	1.75	665	0.486	$6.62x10^{-2}$
	4.2%	1.0%	0.71%	0.63%	0.01%	0.24%	93%	0.07%	0.01%

Table 16. Resource use and waste flows for the PLAE *Exceed 7mm* flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	9.53	0.353	15.9	0.354	$2.49x10^{-3}$	1.36	366	$1.27x10^{-2}$	$2.50x10^{-2}$
	2.4%	0.09%	4.0%	0.09%	0.00%	0.35%	93%	0.00%	0.01%
RPR_M (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$NRPR_E$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
$NRPR_M$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
SM (kg)	1.57	0.00	0.00	0.00	0.00	0.00	22.0	0.00	0.00
	6.7%	0.00%	0.00%	0.00%	0.00%	0.00%	93%	0.00%	0.00%
RSF/NRSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW (m^3)	0.958	$2.04x10^{-2}$	0.214	$2.28x10^{-2}$	$2.47x10^{-4}$	0.102	17.0	$1.11x10^{-3}$	$1.39x10^{-3}$
	5.2%	0.11%	1.2%	0.12%	0.00%	0.56%	93%	0.01%	0.01%
Wastes									
HWD (kg)	$1.86x10^{-4}$	$5.14x10^{-5}$	$6.14x10^{-5}$	$8.23x10^{-5}$	$8.65x10^{-7}$	$7.89x10^{-6}$	$5.51x10^{-3}$	$9.33x10^{-6}$	$1.94x10^{-6}$
	3.1%	0.87%	1.0%	1.4%	0.01%	0.13%	93%	0.16%	0.03%
NHWD (kg)	1.68	0.210	0.618	1.41	0.226	$6.10x10^{-2}$	83.6	$1.63x10^{-2}$	1.81
	1.9%	0.23%	0.69%	1.6%	0.25%	0.07%	93%	0.02%	2.0%
HLRW (kg)	$6.81x10^{-4}$	$1.75x10^{-4}$	$2.46x10^{-4}$	$2.80x10^{-4}$	$2.93x10^{-6}$	$2.84x10^{-5}$	$1.99x10^{-2}$	$3.16x10^{-5}$	$6.68x10^{-6}$
	3.2%	0.82%	1.2%	1.3%	0.01%	0.13%	93%	0.15%	0.03%
ILLRW (kg)	$3.18x10^{-4}$	$3.63x10^{-4}$	$2.05x10^{-4}$	$2.24x10^{-4}$	$2.00x10^{-6}$	$1.06x10^{-5}$	$1.59x10^{-2}$	$2.44x10^{-5}$	$3.00x10^{-6}$
	1.9%	2.1%	1.2%	1.3%	0.01%	0.06%	93%	0.14%	0.02%
CRU (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR (kg)	0.00	0.00	0.00	0.00	0.133	0.00	1.86	0.00	0.00
	0.00%	0.00%	0.00%	0.00%	6.7%	0.00%	93%	0.00%	0.00%
MER (kg)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
EE (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.

INA = Indicator not assessed | Neg. = Negligible

Table 17. Life Cycle Impact Assessment (LCIA) results for the PLAE *Exceed 12mm* flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML-IA									
GWP (kg CO_2 eq)	14.9	4.30	2.43	3.51	0.229	0.648	404	0.389	3.06
	3.4%	0.99%	0.56%	0.81%	0.05%	0.15%	93%	0.09%	0.71%
ODP (kg CFC-11 eq)	$6.39x10^{-2}$	0.104	$8.86x10^{-3}$	$2.50x10^{-2}$	$1.13x10^{-4}$	$3.00x10^{-3}$	2.87	$1.82x10^{-3}$	$7.14x10^{-4}$
	2.1%	3.4%	0.29%	0.81%	0.00%	0.10%	93%	0.06%	0.02%
AP (kg SO_2 eq)	$2.44x10^{-2}$	$1.19x10^{-2}$	$4.35x10^{-3}$	$4.28x10^{-3}$	$1.13x10^{-3}$	$1.15x10^{-3}$	0.848	$3.92x10^{-4}$	$1.41x10^{-2}$
	2.7%	1.3%	0.48%	0.47%	0.12%	0.13%	93%	0.04%	1.6%
EP (kg $(PO_4)^{3-}$ eq)	$4.90x10^{-3}$	$2.73x10^{-3}$	$7.40x10^{-4}$	$7.53x10^{-4}$	$1.51x10^{-5}$	$2.00x10^{-4}$	0.138	$6.00x10^{-5}$	$6.55x10^{-4}$
	3.3%	1.8%	0.50%	0.51%	0.01%	0.14%	93%	0.04%	0.44%
POCP (kg C_2H_4 eq)	$5.67x10^{-6}$	$6.95x10^{-7}$	$1.99x10^{-7}$	$6.09x10^{-7}$	$3.65x10^{-9}$	$3.60x10^{-8}$	$1.02x10^{-4}$	$6.77x10^{-8}$	$1.52x10^{-8}$
	5.2%	0.64%	0.18%	0.56%	0.00%	0.03%	93%	0.06%	0.01%
ADPE (kg Sb eq)	$2.52x10^{-7}$	$1.80x10^{-9}$	$6.78x10^{-7}$	$3.27x10^{-9}$	$1.25x10^{-11}$	$3.57x10^{-9}$	$1.31x10^{-5}$	$1.06x10^{-10}$	$3.06x10^{-10}$
	1.8%	0.01%	4.8%	0.02%	0.00%	0.03%	93%	0.00%	0.00%
ADPF (MJ eq)	282	55.7	41.3	50.9	0.301	14.1	6,120	5.31	1.62
	4.3%	0.85%	0.63%	0.77%	0.00%	0.21%	93%	0.08%	0.02%
TRACI 2.1									
GWP (kg CO_2 eq)	14.7	4.30	2.37	3.50	0.222	0.637	395	0.388	2.74
	3.5%	1.0%	0.56%	0.83%	0.05%	0.15%	93%	0.09%	0.65%
ODP (kg CFC-11 eq)	$6.62x10^{-2}$	0.111	$9.50x10^{-3}$	$2.78x10^{-2}$	$1.57x10^{-4}$	$3.11x10^{-3}$	3.06	$2.24x10^{-3}$	$1.64x10^{-3}$
	2.0%	3.4%	0.29%	0.85%	0.00%	0.09%	93%	0.07%	0.05%
AP (kg SO_2 eq)	$4.80x10^{-2}$	$6.43x10^{-3}$	$8.82x10^{-3}$	$4.28x10^{-3}$	$3.12x10^{-3}$	$2.27x10^{-3}$	1.52	$2.95x10^{-4}$	$3.76x10^{-2}$
	2.9%	0.39%	0.54%	0.26%	0.19%	0.14%	93%	0.02%	2.3%
EP (kg N eq)	0.889	2.05	0.138	0.587	$3.85x10^{-3}$	$3.60x10^{-2}$	52.5	$6.35x10^{-2}$	$1.52x10^{-2}$
	1.6%	3.6%	0.25%	1.0%	0.01%	0.06%	93%	0.11%	0.03%
SFP (kg O_3 eq)	$5.90x10^{-6}$	$9.25x10^{-7}$	$2.30x10^{-7}$	$8.10x10^{-7}$	$4.85x10^{-9}$	$4.33x10^{-8}$	$1.12x10^{-4}$	$9.02x10^{-8}$	$2.01x10^{-8}$
	4.9%	0.77%	0.19%	0.68%	0.00%	0.04%	93%	0.08%	0.02%
FFD (MJ eq)	33.1	7.74	5.11	6.87	$4.18x10^{-2}$	1.75	753	0.753	0.190
	4.1%	0.96%	0.63%	0.85%	0.01%	0.22%	93%	0.09%	0.02%

Table 18. Resource use and waste flows for the PLAE *Exceed 12mm* flooring products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	10.9	0.393	15.9	0.535	$2.49x10^{-3}$	1.36	389	$1.96x10^{-2}$	$7.17x10^{-2}$
	2.6%	0.09%	3.8%	0.13%	0.00%	0.33%	93%	0.00%	0.02%
RPR_M (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$NRPR_E$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
$NRPR_M$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
SM (kg)	4.67	0.00	0.00	0.00	0.00	0.00	65.4	0.00	0.00
	6.7%	0.00%	0.00%	0.00%	0.00%	0.00%	93%	0.00%	0.00%
RSF/NRSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW (m^3)	1.10	$2.30x10^{-2}$	0.214	$3.44x10^{-2}$	$2.47x10^{-4}$	0.102	19.3	$1.72x10^{-3}$	$4.00x10^{-3}$
	5.3%	0.11%	1.0%	0.17%	0.00%	0.49%	93%	0.01%	0.02%
Wastes									
HWD (kg)	$2.29x10^{-4}$	$6.09x10^{-5}$	$6.14x10^{-5}$	$1.25x10^{-4}$	$8.65x10^{-7}$	$7.89x10^{-6}$	$6.96x10^{-3}$	$1.45x10^{-5}$	$5.56x10^{-6}$
	3.1%	0.82%	0.82%	1.7%	0.01%	0.11%	93%	0.19%	0.07%
NHWD (kg)	1.87	0.381	0.618	2.14	0.226	$6.10x10^{-2}$	146	$2.52x10^{-2}$	5.19
	1.2%	0.24%	0.39%	1.4%	0.14%	0.04%	93%	0.02%	3.3%
HLRW (kg)	$8.40x10^{-4}$	$2.07x10^{-4}$	$2.46x10^{-4}$	$4.23x10^{-4}$	$2.93x10^{-6}$	$2.84x10^{-5}$	$2.50x10^{-2}$	$4.89x10^{-5}$	$1.92x10^{-5}$
	3.1%	0.77%	0.92%	1.6%	0.01%	0.11%	93%	0.18%	0.07%
ILLRW (kg)	$3.96x10^{-4}$	$3.87x10^{-4}$	$2.05x10^{-4}$	$3.39x10^{-4}$	$2.00x10^{-6}$	$1.06x10^{-5}$	$1.92x10^{-2}$	$3.78x10^{-5}$	$8.62x10^{-6}$
	1.9%	1.9%	0.99%	1.6%	0.01%	0.05%	93%	0.18%	0.04%
CRU (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR (kg)	0.00	0.00	0.00	0.00	0.133	0.00	1.86	0.00	0.00
	0.00%	0.00%	0.00%	0.00%	6.7%	0.00%	93%	0.00%	0.00%
MER (kg)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
EE (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.

INA = Indicator not assessed | Neg. = Negligible

6. LCA: Interpretation

The contributions to total impact indicator results are dominated by the product replacement phase (B4) of the assessment. Of the remaining life cycle phases, the product maintenance phase is generally the largest contributor to the overall impacts, followed by raw material extraction and processing (A1), product distribution (A4), disposal (C4) and product manufacturing (A3).

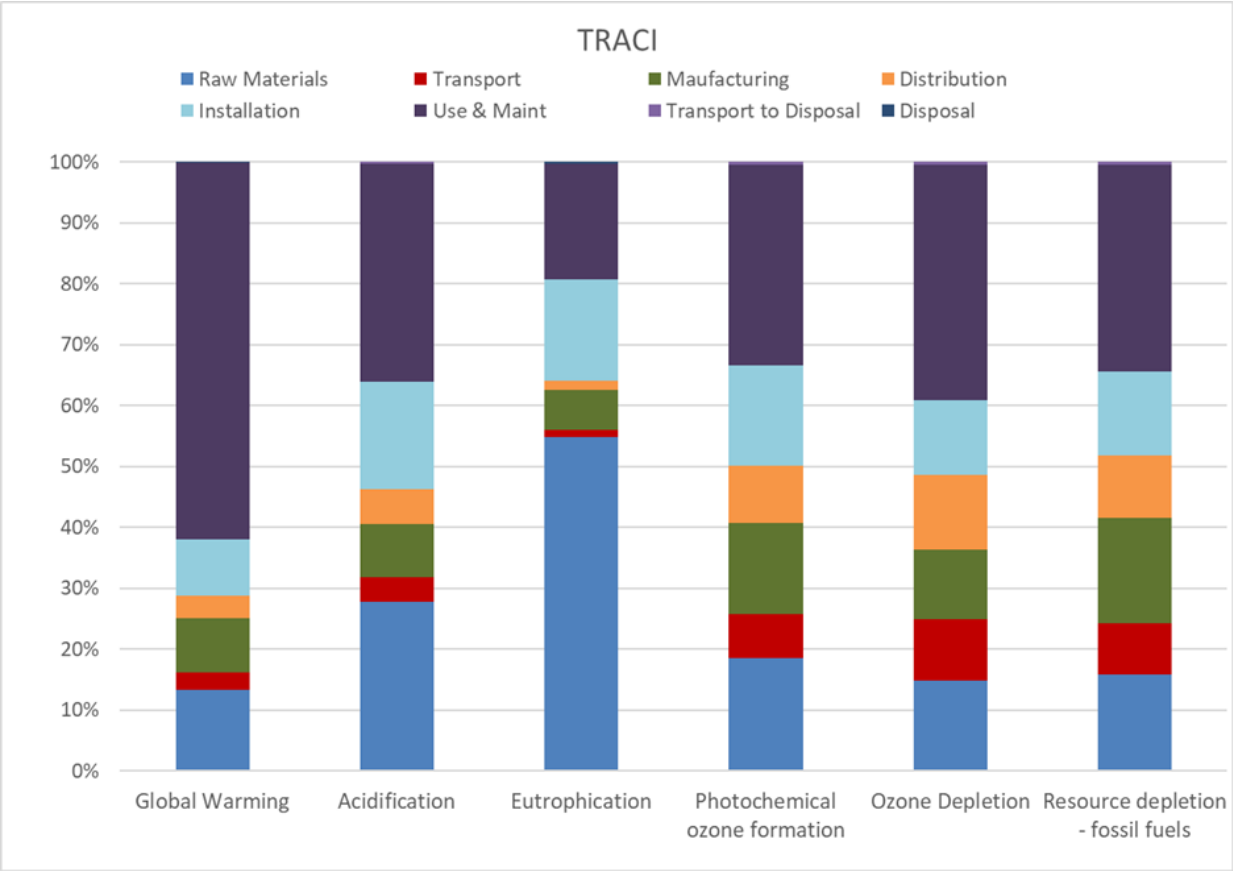


Figure 2. *Contribution analysis for the PLAE Exceed 7mm Rubber flooring product – TRACI v2.1. (excluding product replacements)*

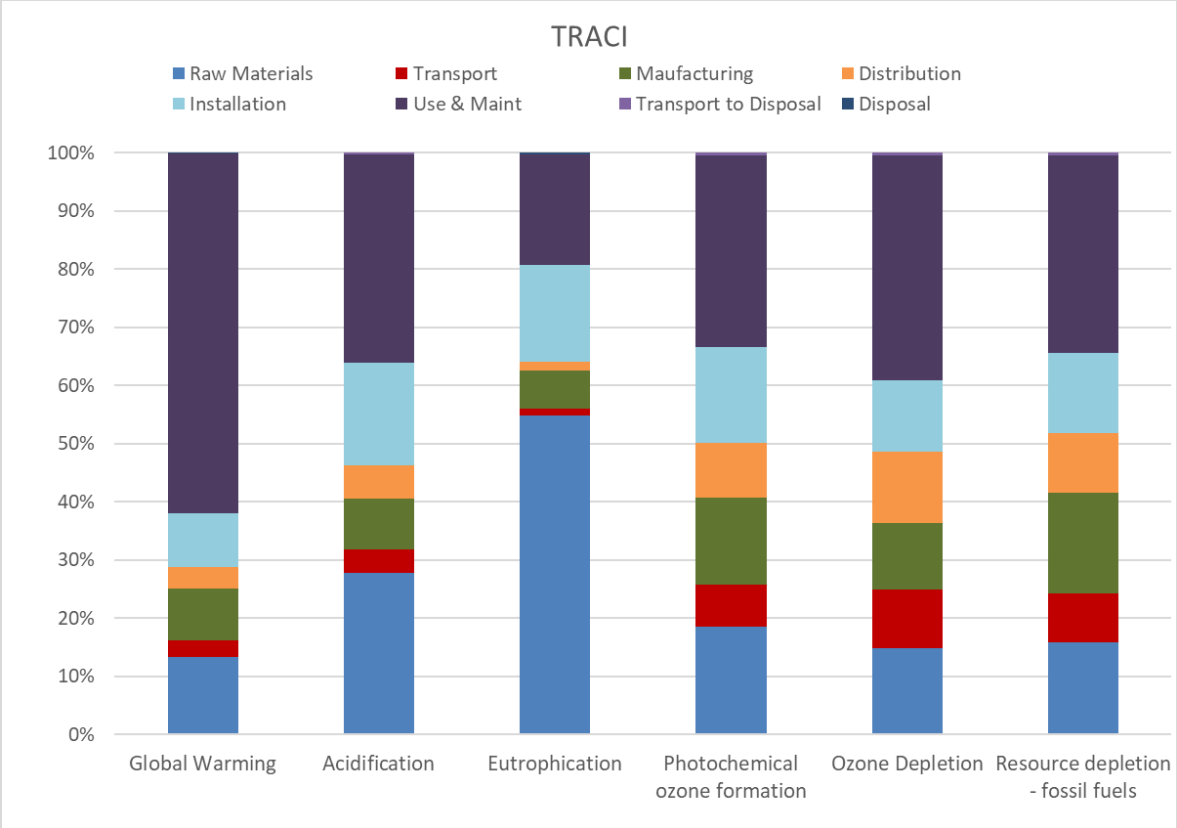


Figure 3. *Contribution analysis for the PLAE Exceed 12mm Rubber flooring product – TRACI v2.1. (excluding product replacements)*

7. Additional Environmental Information

7.1 ENVIRONMENT AND HEALTH DURING INSTALLATION

The PLAE Exceed flooring products meet the requirements of FloorScore® CDPH/EHLB Standard Method v1.2-2017 (California Section 01350)

7.2 ENVIRONMENTAL ACTIVITIES AND CERTIFICATIONS

For more information on PLAE' certifications and environmental initiatives please view the website at www.plae.us

8. References

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