Declaration Owner
Nydree Flooring LLC
1115 Vista Park Drive Suite C, Forest, VA 24551
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Product
7/16" Acrylic Infused Hardwood Flooring
7/16" Acrylic Infused Hardwood Flooring with iron film backing
9/16" Acrylic Infused Hardwood Flooring

(UNSPSC Class Code 30161702)

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

EPD Number and Period of Validity
SCS-EPD-09445
EPD Valid October 3, 2023 through October 2, 2028

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. December 2018.

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

Program Operator
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608
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Declaration Number:	SCS-EPD-09445
Declaration Validity Period:	October 3, 2023 through October 2, 2028
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 v1.11 software and the Ecoinvent v3.9 database
Product RSL:	30 years
Markets of Applicability:	North America
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. December 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. September 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 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. Nydree Flooring LLC

Nydree Flooring began in 2001 with the acquisition of Gammapar acrylic infused wood flooring, and acquired its primary competitor, PermaGrain, in 2003. Today, these technologies, which have been refined since 1968, are used to manufacture extremely durable, yet stylish acrylic infused wood flooring products. Nydree Flooring delivers superior customer service, impeccable manufacturing quality and a constant focus on innovation backed by a strong commitment to sustainability. The company is FloorScore® certified and Chain of Custody certified by SCS Global Services to the Forest Stewardship Council (FSC) standards (Chain of Custody Number SCS- COC-003343). For more information, contact the company at 800-682-5698 or nydreeflooring.com.

2. Product

2.1 PRODUCT DESCRIPTION

The natural warmth, beauty and sound of real wood, combined with the natural durability of acrylic. That's how we make wood floors for life. From high traffic to high fashion, our mission is to provide the architectural and design community with real wood floors for real life applications.

- 300% MORE DENT RESISTANT THAN STANDARD WOOD!
- 4,000+ Taber Abrasion Finish for best in industry wear
- Water resistant plywood core - provides enhanced moisture resistance and greater dimensional stability than traditional substrates
- Nydree SB1587 adhesive system providing all in one moisture retarder and adhesive. 0% VOC, 0% solvent
- Urethane finish products can be refinished using Bona Prep and Bona Traffic sandless recoat products
- Limited Lifetime Wear Warranty
- High end lamination glue holds wear layer firmly to plywood core - no delams
- FloorScore® certified - low emitting material under LEED guidelines
- We publish specific Janka ranges of hardness for each product before and after infusion, compare it to benchmarks like Red Oak or Ipe
- ADA compliant slip rating
- Tongue and grooved and end-matched
- Built specifically to meet the demands of high traffic interiors
- Built in the USA

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 products provide the primary function of flooring for interior applications. The flooring products are used in various residential and commercial applications including retail, healthcare, education, and hospitality.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

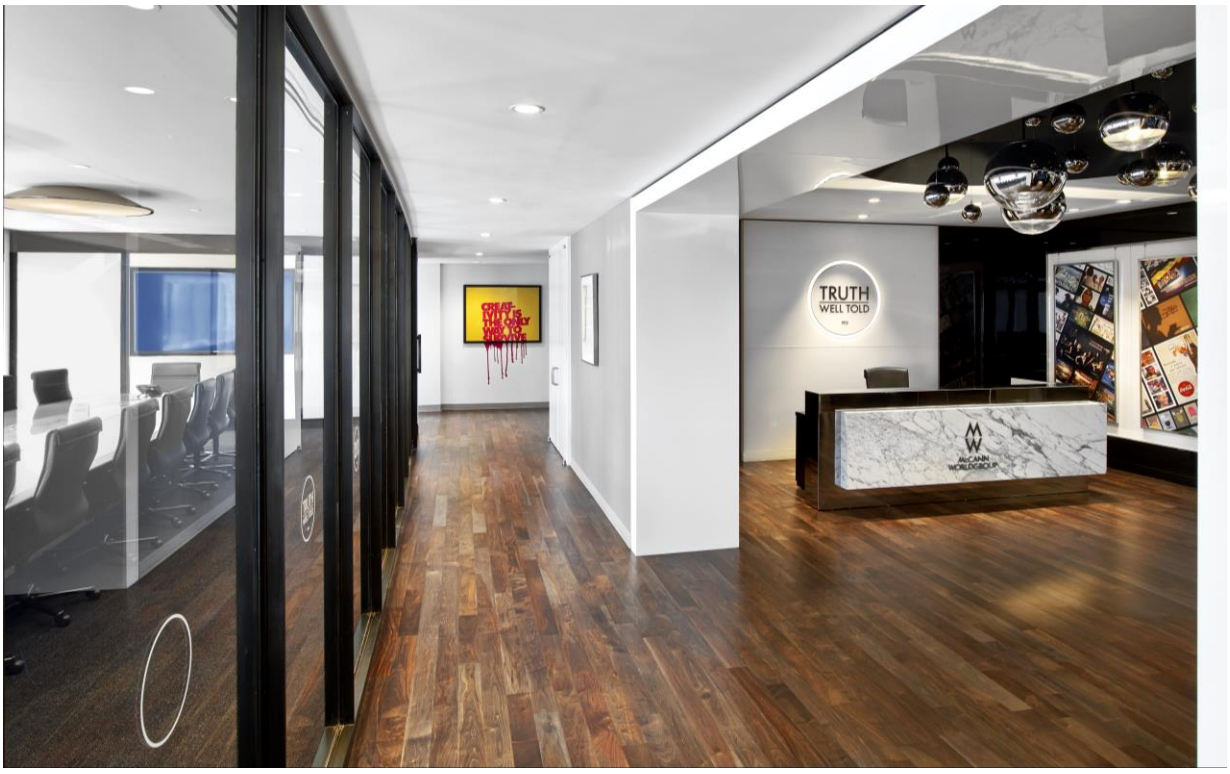
The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The life cycle phases included in the product system boundary are shown below.

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

Table 1. *Life cycle phases included in the product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	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 = included | MND = Module Not Declared



2.5 TECHNICAL DATA

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

Table 2. *Product specifications for Nydree flooring products.*

Characteristic	Unit	7/16" Flooring	7/16" Flooring with iron film backing	9/16" Flooring
Thickness	mm	11.1 (7/16")	11.1 (7/16")	14.3 (9/16")
Width	mm	133.4 (5 ¼")	133.4 (5 ¼")	133.4 (5 ¼")
Product Weight	g/m^2	9,670	11,250	10,320

2.6 MARKET PLACEMENT/APPLICATION RULES

Technical specifications of the flooring products are summarized below. Detailed product performance results can be found on the manufacturer's website http://nydreeflooring.com.

2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

The flooring products are delivered for installation in the form of planks of various dimensions.

2.8 MATERIAL COMPOSITION

The acrylic infused hardwood flooring products are made primarily from plywood, virgin and recycled hardwood veneer, acrylics and adhesives.

Table 3. *Material content for the flooring products in kg per square meter and percent of total mass.*

Material	7/16" Flooring		7/16" Flooring with iron film backing		9/16" Flooring	
	kg/m^2	Percent	kg/m^2	Percent	kg/m^2	Percent
Plywood	6.19	64%	6.19	55%	8.04	78%
Hardwood veneer	1.18	12%	1.18	10%	1.44	14%
Reclaimed veneer	1.31	14%	1.31	12%	0.00	0%
Acrylic	0.659	6.8%	0.659	5.9%	0.513	5%
Adhesive	0.151	1.6%	0.259	2.3%	0.151	1.5%
Finish	0.181	1.9%	0.181	1.6%	0.181	1.8%
Iron film	0.00	0%	1.48	13%	0.00	0%
Total Product	**9.67**	**100%**	**11.3**	**100%**	**10.3**	**100%**

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

2.9 MANUFACTURING

The products are manufactured at the production facility in Karthaus, Pennsylvania. The manufacturer provided primary data for their annual production, resource use and electricity consumption and waste generation at the facility. Electricity consumption is modeled using regional datasets for the electricity grid resource mix.

2.10 PACKAGING

The products are packaged for shipment using plastic wrap, corrugated board and wooden pallets.

Table 4. *Material content for the flooring product packaging in kg per square meter of flooring.*

Material	7/16" Flooring		7/16" Flooring with iron film backing		9/16" Flooring	
	kg/m²	Percent	kg/m²	Percent	kg/m²	Percent
Corrugate	0.342	58%	0.342	58%	0.381	55%
Wood	0.237	40%	0.237	40%	0.288	42%
Plastic	$1.46x10^{-2}$	2.5%	$1.46x10^{-2}$	2.5%	$1.95x10^{-2}$	2.8%
Total Packaging	**0.594**	**100%**	**0.594**	**100%**	**0.688**	**100%**

2.11 PRODUCT INSTALLATION

Installation of the product is accomplished using hand tools with negligible impacts. 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 REFERENCE SERVICE LIFE

The Reference Service Life (RSL) of the flooring products is estimated as 30 years assuming adherence to the manufacturer's maintenance guidelines.

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.

2.16 FURTHER INFORMATION

Further information on the product can be found on the manufacturer's website www.nydreeflooring.com.

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 5. For the present assessment, a reference service lifetime (RSL) of 30 years is assumed based on product use for the specified application; installation, maintenance and cleaning as recommended in product guidance documents. The total number of required product lifecycles during the 75-year period over which the product system is modeled are also summarized in Table 5.

Table 5. *Reference flow and RSL for the Nydree flooring products.*

Product	7/16" Acrylic Infused Hardwood Flooring	7/16" Acrylic Infused Hardwood Flooring with iron film backing	9/16" Acrylic Infused Hardwood Flooring
Product Thickness (mm)	11.1 (7/16")	11.1 (7/16")	14.3 (9/16")
Reference flow (kg/m²)	9.67	11.25	10.32
Mass conversion factor	9.67	11.25	10.32
Reference Service Life – RSL (years)	30	30	30
# of Product replacements (Replacement cycle)	1.5	1.5	1.5

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 6 and illustrated in Figure 1.

Table 6. *The modules and unit processes included in the scope for the Nydree Flooring product system.*

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 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	The product is installed using the manufacturer's recommended, or similar, adhesives with negligible impacts. 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 over the 75-year ESL, including periodic cleaning.
B3	Product repair	The flooring is not expected to require repair over its lifetime.
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.
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

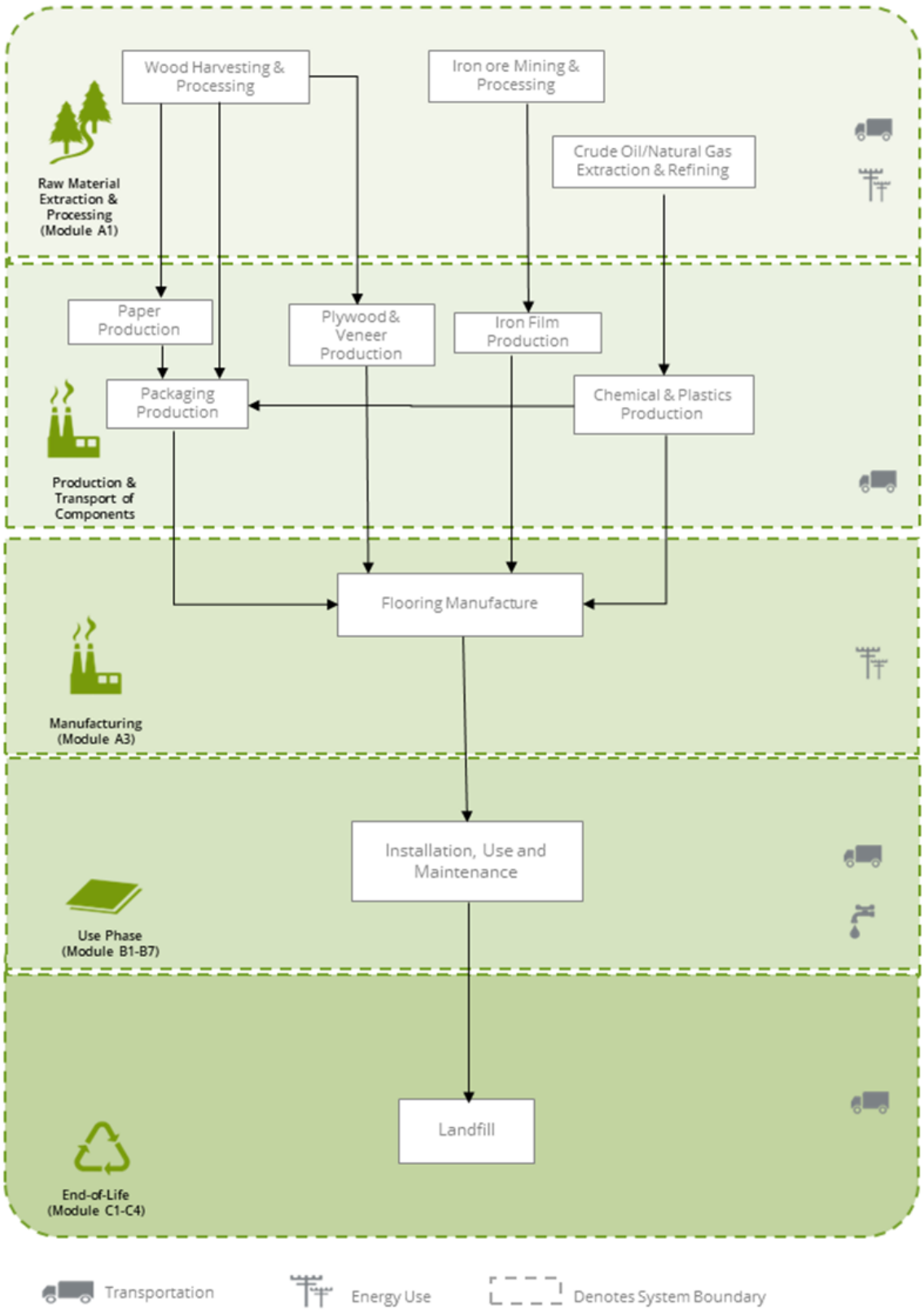


Figure 1. *Flow diagram for the life cycle of the Nydree Flooring products.*

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

- Electricity use at the manufacturing facility was allocated to the products based on the product area as a fraction of the total production.
- The Nydree Flooring 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.
- Inventory data for some material components were unavailable and modeled using proxy datasets from the Ecoinvent LCI databases.
- The Reference Service Life (RSL) of the products was modeled based on information provided by the manufacturer assuming the products are installed and maintained as recommended and used for the specific application noted.
- Downstream transport was modeled based on information provided by the manufacturer representing product distribution to North America.
- The maintenance 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.
- For the product end-of-life, landfill disposal of product is assumed, following PCR guidance. Recycling rates for the packaging materials are based on regional statistics as specified in the PCR.
- For final disposal of the packaging material and flooring products at end-of-life, all materials are assumed to be transported 161 km 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.

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 taking into account 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 for the manufacturing facility. The sources of secondary LCI data are the Ecoinvent database.

Table 7. *Data sources for the flooring products.*

Component	Dataset	Data Source	Publication Date
PRODUCT			
Hardwood			
Plywood	plywood production | plywood | Cutoff, S/RoW	EI v3.9	2022
Veneer	Veneer - US hardwood veneer - 0.6mm thick slicer technology	EI v3.9	2022
Veneer - Reclaimed	Recycled wood	SCS	2023
Acrylic			
Acrylic copolymer	polymethyl methacrylate production, sheet | polymethyl methacrylate, sheet | Cutoff, S/RoW	EI v3.9	2022
Adhesives			
Laminating adhesive	polyurethane adhesive production | polyurethane adhesive | Cutoff, S/GLO	EI v3.9	2022
Iron film			
Ferrite	market for ferrite | ferrite | Cutoff, S/GLO	EI v3.9	2022
PET	polyethylene terephthalate production, granulate, amorphous | polyethylene terephthalate, granulate, amorphous | Cutoff, S/RoW	EI v3.9	2022
Other			
Coatings	chemical production, organic | chemical, organic | Cutoff, S/GLO	EI v3.9	2022
PACKAGING			
Cardboard	containerboard production, linerboard, testliner | containerboard, linerboard | Cutoff, S/RoW	EI v3.9	2022
Plastic	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.9	2022
Wood	EUR-flat pallet production | EUR-flat pallet | Cutoff, S/RoW	EI v3.9	2022
INSTALLATION			
Underlayment			
Magnetic underlayment	acrylic dispersion production, with water, in 58% solution | acrylic dispersion, with water, in 58% solution state | Cutoff, S/RoW	EI v3.9	2022
	chemical production, organic | chemical, organic | Cutoff, S/GLO	EI v3.9	2022
	market for sponge iron | sponge iron | Cutoff, S/GLO	EI v3.9	2022
	polyethylene terephthalate production, granulate, amorphous | polyethylene terephthalate, granulate, amorphous | Cutoff, S/RoW	EI v3.9	2022
TRANSPORT			
Road transport	transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.9	2022
Ship transport	transport, freight, sea, container ship | transport, freight, sea, container ship | Cutoff, S/GLO	EI v3.9	2022
RESOURCES			
Grid electricity	Electricity, medium voltage, per kWh - RFCE/RFCE	eGRID 2021; EI v3.9	2022
Heat - biomass	heat production, wood chips from industry, at furnace 50kW | heat, central or small-scale, other than natural gas | Cutoff, S/RoW	EI v3.9	2022

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 8. *Data quality assessment for the 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. 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 2022.
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 regional power mixes from the Ecoinvent LCI database. Surrogate data used in the assessment are representative of global or North American operations. Data representative of global operations are considered sufficiently similar to actual processes. Data representing product and packaging disposal are based on regional 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 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 v3.9 data where available. Different portions of the product life cycle are equally considered.
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 manufacturing 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. For secondary LCI data, Ecoinvent v3.9 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for all upstream operations were 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.

3.9 PERIOD UNDER REVIEW

The period of review is calendar year 2022.

3.10 ALLOCATION

Manufacturing resource use was allocated to the products based on surface area of the products. 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 based on information provided by the manufacturer. Transportation parameters for modeling transport to consumer markets are summarized in Table 9. All transport in by diesel truck.

Table 9. *Distribution parameters for the flooring products.*

Parameter	Unit	7/16" Flooring	7/16" Flooring with iron film backing	9/16" Flooring
Fuel type	-	Diesel	Diesel	Diesel
Liters of fuel	L/100km	18.7	18.7	18.7
Vehicle type	-	Diesel truck	Diesel truck	Diesel truck
Transport distance	km	1,866	1,866	1,866
Capacity utilization	%	76	76	76
Gross density of products transported	kg/m^3	870	1,013	722
Weight of products transported	kg	10.26	11.85	11.00

Installation of the product is accomplished using hand tools with no associated emissions and negligible impacts. For installation of the iron film backed flooring products, an underlayment, consisting of magnetic polymer-based sheeting, is provided with the product by the manufacturer.

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

Table 10. *Installation parameters for the flooring products, per 1 m^2.*

Parameter	7/16" Flooring	7/16" Flooring with iron film backing	9/16" Flooring
Ancillary materials – underlayment (kg)	-	4.15	-
Net freshwater consumption (m^3)	-	-	-
Electricity consumption (kWh)	-	-	-
Product loss per functional unit (kg)	negligible	negligible	negligible
Waste materials generated by product installation (kg)	negligible	negligible	negligible
Output materials resulting from on-site waste processing (kg)	na	na	na
Direct emissions (kg)	-	-	-
Mass of packaging waste (kg)			
Corrugated	0.342	0.342	0.342
Plastic	$1.46x10^{-2}$	$1.46x10^{-2}$	$1.46x10^{-2}$
Wood	0.237	0.237	0.237
Biogenic carbon in packaging (kg CO_2)	1.06	1.06	1.06
VOC emissions	negligible	negligible	negligible

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 cleaning of the flooring. The present assessment is based on a recommended weekly cleaning schedule including sweeping and mopping with a neutral cleaner.

Table 11. *Maintenance parameters for the flooring products, per 1 m^2.*

Parameter	Unit	Value
Maintenance process	-	Hardwood Floor Cleaning
Maintenance cycle	Cycles/RSL	1,560
Maintenance cycle	Cycles/ESL	3,900
Net freshwater consumption	$m^3/m^2/yr$	0.0058
Hardwood Floor Cleaning	$kg/m^2/yr$	0.119
Further assumptions	-	Moderate traffic

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 estimated service lifetime of the assessment are included in this stage. Modeling parameters for the product replacement stage are summarized in Table 12.

Table 12. Product replacement parameters for the flooring products, per 1 m^2.

Parameter	Units	7/16" Flooring	7/16" Flooring with iron film backing	9/16" Flooring
Reference service life	Years	30	30	30
Replacement cycle	-	1.5	1.5	1.5
Energy input	kWh	-	-	-
Freshwater consumption	m^3	-	-	-
Ancillary materials	kg	-	-	-
Replacement parts	kg	15.4	17.8	16.5
Direct emissions	kg	-	-	-

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 demolition 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 (*C4*). As per the PCR, the product materials are assumed landfilled at end-of-life while 10% of the packaging materials are recycled. Materials not recycled are landfilled at end-of-life. For the flooring products, no emissions are generated during demolition (*C1*) while no waste processing (*C3*) is required for landfill disposal. Transportation of waste materials at end-of-life (*C2*) assumes a 161 km average distance to disposal, consistent with the PCR.

Disposal scenarios for the flooring products are summarized in Table 13.

Table 13. *End-of-life disposal scenario parameters for the flooring product.*

Parameter	7/16" Flooring	7/16" Flooring with iron film backing	9/16" Flooring
Assumptions for scenario development	100% landfill	100% landfill	100% landfill
Collection process			
Collected with mixed construction waste (kg)	9.67	11.25	10.32
Recovery	n/a	n/a	n/a
Landfill disposal (kg)	9.67	11.25	10.32
Removals of biogenic carbon (kg CO_2 eq)[1]	n/a	n/a	n/a

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. All LCA results are stated to three significant figures in agreement with the PCR for this flooring product and therefore the sum of the total values may not exactly equal 100%.

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 freshwater 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. Module D is not declared. In the interest of space and table readability, these modules are not included in the results presented below.

Table 14. *Life Cycle Impact Assessment results for the 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.* (***7/16" Acrylic Infused Hardwood Flooring***)

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML									
GWP (kg CO_2 eq)	23.9	2.14	16.9	3.63	0.623	3.56	76.0	2.14	1.29
	18%	1.6%	13%	2.8%	0.48%	2.7%	58%	1.6%	0.99%
AP (kg SO_2 eq)	0.130	$2.23x10^{-2}$	$4.66x10^{-2}$	$1.20x10^{-2}$	$5.99x10^{-4}$	$1.47x10^{-2}$	0.331	$8.47x10^{-3}$	$6.89x10^{-4}$
	23%	3.9%	8.2%	2.1%	0.11%	2.6%	58%	1.5%	0.12%
EP (kg $(PO_4)^{3-}$ eq)	$3.31x10^{-2}$	$3.14x10^{-3}$	$4.10x10^{-2}$	$3.04x10^{-3}$	$1.57x10^{-3}$	$3.76x10^{-3}$	0.163	$1.92x10^{-3}$	$2.52x10^{-2}$
	12%	1.1%	15%	1.1%	0.57%	1.4%	59%	0.69%	9.1%
POCP (kg C_2H_4 eq)	$1.04x10^{-2}$	$7.02x10^{-4}$	$5.58x10^{-3}$	$5.80x10^{-4}$	$1.29x10^{-4}$	$8.67x10^{-4}$	$2.71x10^{-2}$	$3.68x10^{-4}$	$2.83x10^{-4}$
	23%	1.5%	12%	1.3%	0.28%	1.9%	59%	0.8%	0.62%
ODP (kg CFC-11 eq)	$1.74x10^{-6}$	$2.78x10^{-8}$	$2.02x10^{-7}$	$4.82x10^{-8}$	$1.80x10^{-9}$	$1.78x10^{-8}$	$3.08x10^{-6}$	$2.70x10^{-8}$	$2.28x10^{-9}$
	34%	0.54%	3.9%	0.93%	0.035%	0.35%	60%	0.52%	0.044%
ADPF (MJ eq)	327	28.7	146	51.0	1.87	89.2	878	27.8	2.49
	21%	1.8%	9.4%	3.3%	0.12%	5.7%	57%	1.8%	0.16%
TRACI 2.1									
GWP (kg CO_2 eq)	23.5	2.13	15.6	3.61	0.523	3.51	72.8	2.13	1.05
	19%	1.7%	12%	2.9%	0.42%	2.8%	58%	1.7%	0.84%
AP (kg SO_2 eq)	0.138	$2.43x10^{-2}$	$5.31x10^{-2}$	$1.44x10^{-2}$	$7.66x10^{-4}$	$1.50x10^{-2}$	0.363	$1.08x10^{-2}$	$8.37x10^{-4}$
	22%	3.9%	8.6%	2.3%	0.12%	2.4%	59%	1.7%	0.13%
EP (kg N eq)	$5.54x10^{-2}$	$2.22x10^{-3}$	$9.00x10^{-2}$	$3.41x10^{-3}$	$4.01x10^{-3}$	$6.93x10^{-3}$	0.338	$1.13x10^{-3}$	$6.95x10^{-2}$
	9.7%	0.39%	16%	0.6%	0.7%	1.2%	59%	0.2%	12%
SFP (kg O_3 eq)	2.37	0.489	1.13	0.363	$2.11x10^{-2}$	0.185	7.07	0.322	$1.96x10^{-2}$
	20%	4.1%	9.4%	3%	0.18%	1.5%	59%	2.7%	0.16%
ODP (kg CFC-11 eq)	$1.86x10^{-6}$	$3.66x10^{-8}$	$2.74x10^{-7}$	$6.35x10^{-8}$	$2.40x10^{-9}$	$2.66x10^{-8}$	$3.42x10^{-6}$	$3.59x10^{-8}$	$3.08x10^{-9}$
	33%	0.64%	4.8%	1.1%	0.042%	0.47%	60%	0.63%	0.054%
FFD (MJ eq)	41.1	4.14	19.7	7.25	0.279	12.2	116	4.20	0.347
	20%	2%	9.6%	3.5%	0.14%	6%	56%	2.1%	0.17%

Table 15. *Resource use and waste flows for the 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. (**7/16" Acrylic Infused Hardwood Flooring**)*

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	621	0.318	75.5	0.658	$1.43x10^{-2}$	2.46	1,080	0.110	$5.70x10^{-2}$
	35%	0.018%	4.2%	0.037%	0.0008%	0.14%	61%	0.0062%	0.0032%
RPR_M (MJ)	23.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100%	0%	0%	0%	0%	0%	0%	0%	0%
$NRPR_E$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
$NRPR_M$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
SM (kg)	1.31	0.00	0.00	0.00	0.00	0.00	1.97	0.00	0.00
	40%	0%	0%	0%	0%	0%	60%	0%	0%
RSF/NRSF (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
RE (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
FW (m^3)	1.08	$1.89x10^{-2}$	1.31	$3.95x10^{-2}$	$9.70x10^{-4}$	0.647	3.69	$9.96x10^{-3}$	$3.15x10^{-3}$
	16%	0.28%	19%	0.58%	0.014%	9.5%	54%	0.15%	0.046%
Wastes									
HWD (kg)	$4.16x10^{-4}$	$1.74x10^{-4}$	$5.85x10^{-4}$	$3.34x10^{-4}$	$1.24x10^{-5}$	$5.76x10^{-5}$	$2.59x10^{-3}$	$1.90x10^{-4}$	$1.32x10^{-5}$
	9.5%	4%	13%	7.7%	0.28%	1.3%	59%	4.3%	0.3%
NHWD (kg)	1.36	0.993	11.6	2.51	0.545	0.247	40.2	0.141	9.69
	2%	1.5%	17%	3.7%	0.81%	0.37%	60%	0.21%	14%
HLRW (kg)	$9.12x10^{-5}$	$1.49x10^{-6}$	$2.85x10^{-4}$	$3.09x10^{-6}$	$7.74x10^{-8}$	$9.56x10^{-6}$	$5.73x10^{-4}$	$6.06x10^{-7}$	$2.97x10^{-7}$
	9.5%	0.15%	30%	0.32%	0.008%	0.99%	59%	0.063%	0.031%
ILLRW (kg)	$3.23x10^{-4}$	$3.54x10^{-6}$	$1.44x10^{-3}$	$7.36x10^{-6}$	$1.90x10^{-7}$	$2.22x10^{-5}$	$2.66x10^{-3}$	$1.43x10^{-6}$	$7.53x10^{-7}$
	7.3%	0.08%	32%	0.17%	0.0043%	0.5%	60%	0.032%	0.017%
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	$5.94x10^{-2}$	0.00	$8.91x10^{-2}$	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
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 16. *Life Cycle Impact Assessment results for the 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. (**7/16" Acrylic Infused Hardwood Flooring - w/ iron film backing strip**)*

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML									
GWP (kg CO_2 eq)	30.7	3.93	17.3	4.20	10.7	3.56	107	2.50	2.29
	17%	2.2%	9.5%	2.3%	5.9%	2%	59%	1.4%	1.3%
AP (kg SO_2 eq)	0.155	$3.65x10^{-2}$	$4.66x10^{-2}$	$1.39x10^{-2}$	$3.40x10^{-2}$	$1.47x10^{-2}$	0.446	$9.87x10^{-3}$	$9.05x10^{-4}$
	21%	4.8%	6.2%	1.8%	4.5%	1.9%	59%	1.3%	0.12%
EP (kg $(PO_4)^{3-}$ eq)	$4.03x10^{-2}$	$5.38x10^{-3}$	$4.23x10^{-2}$	$3.51x10^{-3}$	$2.14x10^{-2}$	$3.76x10^{-3}$	0.217	$2.23x10^{-3}$	$2.93x10^{-2}$
	11%	1.5%	12%	0.96%	5.9%	1%	59%	0.61%	8%
POCP (kg C_2H_4 eq)	$1.23x10^{-2}$	$1.19x10^{-3}$	$5.65x10^{-3}$	$6.69x10^{-4}$	$2.55x10^{-3}$	$8.67x10^{-4}$	$3.49x10^{-2}$	$4.28x10^{-4}$	$4.99x10^{-4}$
	21%	2%	9.6%	1.1%	4.3%	1.5%	59%	0.73%	0.84%
ODP (kg CFC-11 eq)	$2.07x10^{-5}$	$5.12x10^{-8}$	$2.02x10^{-7}$	$5.56x10^{-8}$	$8.42x10^{-6}$	$1.78x10^{-8}$	$4.41x10^{-5}$	$3.15x10^{-8}$	$2.76x10^{-9}$
	28%	0.07%	0.28%	0.076%	11%	0.024%	60%	0.043%	0.0038%
ADPF (MJ eq)	468	53.1	146	58.9	136	89.2	1,350	32.4	3.01
	20%	2.3%	6.3%	2.5%	5.8%	3.8%	58%	1.4%	0.13%
TRACI 2.1									
GWP (kg CO_2 eq)	30.2	3.90	15.9	4.16	10.5	3.51	103	2.48	1.86
	17%	2.2%	9%	2.4%	6%	2%	59%	1.4%	1.1%
AP (kg SO_2 eq)	0.164	$4.00x10^{-2}$	$5.32x10^{-2}$	$1.66x10^{-2}$	$3.50x10^{-2}$	$1.50x10^{-2}$	0.484	$1.25x10^{-2}$	$1.11x10^{-3}$
	20%	4.9%	6.5%	2%	4.3%	1.8%	59%	1.5%	0.14%
EP (kg N eq)	$6.90x10^{-2}$	$4.02x10^{-3}$	$9.36x10^{-2}$	$3.94x10^{-3}$	$4.88x10^{-2}$	$6.93x10^{-3}$	0.452	$1.31x10^{-3}$	$8.03x10^{-2}$
	9.1%	0.53%	12%	0.52%	6.4%	0.91%	59%	0.17%	11%
SFP (kg O_3 eq)	2.72	0.819	1.13	0.419	0.465	0.185	8.93	0.374	$2.38x10^{-2}$
	18%	5.4%	7.5%	2.8%	3.1%	1.2%	59%	2.5%	0.16%
ODP (kg CFC-11 eq)	$2.72x10^{-5}$	$6.74x10^{-8}$	$2.75x10^{-7}$	$7.33x10^{-8}$	$1.13x10^{-5}$	$2.66x10^{-8}$	$5.85x10^{-5}$	$4.18x10^{-8}$	$3.74x10^{-9}$
	28%	0.069%	0.28%	0.075%	12%	0.027%	60%	0.043%	0.0038%
FFD (MJ eq)	60.5	7.64	19.8	8.37	13.3	12.2	172	4.89	0.411
	20%	2.6%	6.6%	2.8%	4.5%	4.1%	58%	1.6%	0.14%

Table 17. *Resource use and waste flows for the 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. (**7/16" Acrylic Infused Hardwood Flooring - w/ iron film backing strip**)*

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	626	0.605	75.5	0.760	4.79	2.46	1,100	0.128	$8.26x10^{-2}$
	35%	0.033%	4.2%	0.042%	0.27%	0.14%	61%	0.0071%	0.0046%
RPR_M (MJ)	23.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100%	0%	0%	0%	0%	0%	0%	0%	0%
$NRPR_E$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
$NRPR_M$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
SM (kg)	1.31	0.00	0.00	0.00	0.00	0.00	1.97	0.00	0.00
	40%	0%	0%	0%	0%	0%	60%	0%	0%
RSF/NRSF (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
RE (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
FW (m^3)	1.40	$3.60x10^{-2}$	1.31	$4.56x10^{-2}$	0.325	0.647	4.70	$1.16x10^{-2}$	$4.37x10^{-3}$
	17%	0.43%	15%	0.54%	3.8%	7.6%	55%	0.14%	0.052%
Wastes									
HWD (kg)	$7.70x10^{-4}$	$3.26x10^{-4}$	$5.86x10^{-4}$	$3.86x10^{-4}$	$2.82x10^{-4}$	$5.76x10^{-5}$	$3.88x10^{-3}$	$2.21x10^{-4}$	$1.65x10^{-5}$
	12%	5%	9%	5.9%	4.3%	0.88%	59%	3.4%	0.25%
NHWD (kg)	2.08	1.96	12.1	2.90	3.93	0.247	51.6	0.165	11.3
	2.4%	2.3%	14%	3.4%	4.5%	0.29%	60%	0.19%	13%
HLRW (kg)	$1.12x10^{-4}$	$2.82x10^{-6}$	$2.85x10^{-4}$	$3.57x10^{-6}$	$2.13x10^{-5}$	$9.56x10^{-6}$	$6.39x10^{-4}$	$7.06x10^{-7}$	$4.35x10^{-7}$
	10%	0.26%	27%	0.33%	2%	0.89%	59%	0.066%	0.041%
ILLRW (kg)	$3.71x10^{-4}$	$6.74x10^{-6}$	$1.44x10^{-3}$	$8.49x10^{-6}$	$4.39x10^{-5}$	$2.22x10^{-5}$	$2.80x10^{-3}$	$1.67x10^{-6}$	$1.10x10^{-6}$
	7.9%	0.14%	31%	0.18%	0.93%	0.47%	60%	0.036%	0.024%
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	$5.94x10^{-2}$	0.00	$8.91x10^{-2}$	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
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 18. *Life Cycle Impact Assessment results for the 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.* (***9/16" Acrylic Infused Hardwood Flooring***)

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML									
GWP (kg CO_2 eq)	23.1	1.87	14.8	3.90	0.701	3.56	71.9	2.29	1.26
	19%	1.5%	12%	3.2%	0.57%	2.9%	58%	1.9%	1%
AP (kg SO_2 eq)	0.128	$2.26x10^{-2}$	$4.64x10^{-2}$	$1.29x10^{-2}$	$6.92x10^{-4}$	$1.47x10^{-2}$	0.331	$9.04x10^{-3}$	$7.20x10^{-4}$
	23%	4%	8.2%	2.3%	0.12%	2.6%	58%	1.6%	0.13%
EP (kg $(PO_4)^{3-}$ eq)	$3.63x10^{-2}$	$3.03x10^{-3}$	$3.23x10^{-2}$	$3.26x10^{-3}$	$1.83x10^{-3}$	$3.76x10^{-3}$	0.159	$2.04x10^{-3}$	$2.69x10^{-2}$
	14%	1.1%	12%	1.2%	0.68%	1.4%	59%	0.76%	10%
POCP (kg C_2H_4 eq)	$1.09x10^{-2}$	$6.89x10^{-4}$	$5.14x10^{-3}$	$6.22x10^{-4}$	$1.45x10^{-4}$	$8.67x10^{-4}$	$2.73x10^{-2}$	$3.92x10^{-4}$	$2.77x10^{-4}$
	24%	1.5%	11%	1.3%	0.31%	1.9%	59%	0.85%	0.6%
ODP (kg CFC-11 eq)	$1.76x10^{-6}$	$2.41x10^{-8}$	$2.02x10^{-7}$	$5.16x10^{-8}$	$2.09x10^{-9}$	$1.78x10^{-8}$	$3.11x10^{-6}$	$2.88x10^{-8}$	$2.42x10^{-9}$
	34%	0.46%	3.9%	0.99%	0.04%	0.34%	60%	0.55%	0.047%
ADPF (MJ eq)	313	24.7	146	54.7	2.17	89.2	860	29.7	2.65
	21%	1.6%	9.6%	3.6%	0.14%	5.9%	56%	2%	0.17%
TRACI 2.1									
GWP (kg CO_2 eq)	22.8	1.85	13.9	3.87	0.590	3.51	69.4	2.27	1.03
	19%	1.6%	12%	3.2%	0.49%	2.9%	58%	1.9%	0.86%
AP (kg SO_2 eq)	0.139	$2.45x10^{-2}$	$5.28x10^{-2}$	$1.54x10^{-2}$	$8.85x10^{-4}$	$1.50x10^{-2}$	0.368	$1.15x10^{-2}$	$8.73x10^{-4}$
	22%	3.9%	8.4%	2.5%	0.14%	2.4%	59%	1.8%	0.14%
EP (kg N eq)	$6.02x10^{-2}$	$1.98x10^{-3}$	$6.70x10^{-2}$	$3.66x10^{-3}$	$4.66x10^{-3}$	$6.93x10^{-3}$	0.319	$1.20x10^{-3}$	$7.43x10^{-2}$
	11%	0.37%	12%	0.68%	0.86%	1.3%	59%	0.22%	14%
SFP (kg O_3 eq)	2.58	0.484	1.13	0.389	$2.44x10^{-2}$	0.185	7.45	0.343	$2.07x10^{-2}$
	20%	3.8%	8.9%	3.1%	0.19%	1.5%	59%	2.7%	0.16%
ODP (kg CFC-11 eq)	$1.89x10^{-6}$	$3.17x10^{-8}$	$2.74x10^{-7}$	$6.81x10^{-8}$	$2.78x10^{-9}$	$2.66x10^{-8}$	$3.46x10^{-6}$	$3.83x10^{-8}$	$3.26x10^{-9}$
	33%	0.55%	4.7%	1.2%	0.048%	0.46%	60%	0.66%	0.056%
FFD (MJ eq)	37.5	3.58	19.7	7.77	0.323	12.2	111	4.48	0.369
	19%	1.8%	10%	4%	0.16%	6.2%	56%	2.3%	0.19%

Table 19. *Resource use and waste flows for the 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. (**9/16" Acrylic Infused Hardwood Flooring**)*

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	707	0.263	77.8	0.706	$1.64x10^{-2}$	2.46	1,220	0.118	$5.83x10^{-2}$
	35%	0.013%	3.9%	0.035%	0.00081%	0.12%	61%	0.0059%	0.0029%
RPR_M (MJ)	28.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100%	0%	0%	0%	0%	0%	0%	0%	0%
$NRPR_E$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
$NRPR_M$ (MJ)	INA	INA	INA	INA	INA	INA	INA	INA	INA
SM (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%	0%
RSF/NRSF (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
RE (MJ)	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
FW (m^3)	1.22	$1.56x10^{-2}$	1.31	$4.23x10^{-2}$	$1.11x10^{-3}$	0.647	3.90	$1.06x10^{-2}$	$3.26x10^{-3}$
	17%	0.22%	18%	0.59%	0.016%	9.1%	55%	0.15%	0.046%
Wastes									
HWD (kg)	$4.91x10^{-4}$	$1.47x10^{-4}$	$5.80x10^{-4}$	$3.58x10^{-4}$	$1.44x10^{-5}$	$5.76x10^{-5}$	$2.71x10^{-3}$	$2.02x10^{-4}$	$1.39x10^{-5}$
	11%	3.2%	13%	7.8%	0.31%	1.3%	59%	4.4%	0.3%
NHWD (kg)	1.54	0.762	8.14	2.69	0.631	0.247	36.4	0.151	10.3
	2.5%	1.3%	13%	4.4%	1%	0.41%	60%	0.25%	17%
HLRW (kg)	$1.02x10^{-4}$	$1.22x10^{-6}$	$2.85x10^{-4}$	$3.31x10^{-6}$	$8.84x10^{-8}$	$9.56x10^{-6}$	$5.89x10^{-4}$	$6.47x10^{-7}$	$3.04x10^{-7}$
	10%	0.12%	29%	0.33%	0.0089%	0.97%	59%	0.065%	0.031%
ILLRW (kg)	$3.46x10^{-4}$	$2.92x10^{-6}$	$1.44x10^{-3}$	$7.89x10^{-6}$	$2.17x10^{-7}$	$2.22x10^{-5}$	$2.69x10^{-3}$	$1.53x10^{-6}$	$7.69x10^{-7}$
	7.7%	0.065%	32%	0.17%	0.0048%	0.49%	60%	0.034%	0.017%
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	$6.88x10^{-2}$	0.00	0.103	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
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

Global Warming Potential Results

For the Nydree flooring products, greenhouse gas indicators are calculated as the product of the 100-year GWP, based on IPCC AR6, and the mass of greenhouse emission, summed over all contributing greenhouse gases and for all sources and sinks within the life cycle system boundary for the assessed products. Results are reported in units of kg CO_2 eq. across the cradle-to-grave life cycle.

The primary greenhouse gasses included in the inventory, as well as the corresponding GWPs, are summarized in Table 20. The 100-year GWPs used in the assessment are from the IPCC Sixth Assessment Report (AR6) as implemented in the OpenLCA v1.11 software and databases.

Table 20. *Greenhouse gases and GWPs for the global warming potential indicators.*

GHG	100-yr Global Warming Potential (AR6)	Unit
Caron dioxide (CO_2)	1.0	kg CO_2e/kg CO_2
Methane (CH_4)	29.8	kg CO_2e/kg CH_4
Nitrous oxide (N_2O)	273	kg CO_2e/kg N_2O
Sulfur hexafluoride (SF_6)	25,200	kg CO_2e/kg SF_6
Perfluorocarbons (PFCs)	Various	kg CO_2e/kg PFC
hydrofluorocarbons (HFCs)	Various	kg CO_2e/kg HFC

The Carbon Footprint results for the Nydree flooring products are presented below. Results are presented for cradle-to-grave, cradle-to-gate and gate-to-gate in units of kg CO_2e per declared unit.

Table 21. *Global warming potential results for the Nydree Flooring products per square meter of flooring.*

Product	GWP 100 (AR6) kg CO_2e/m^2		
	Cradle-to-Gate	Gate-to-Gate	Cradle-to-Grave
7/16" Flooring	43.0	16.8	130
7/16" Flooring with iron film backing	52.0	17.1	183
9/16" Flooring	39.9	14.8	124

Greenhouse gas emissions for the flooring products are summarized by category in Table 22 and displayed graphically in Figure 2, including emissions and removals of biogenic CO_2, emissions from land use/land use change (LULC) and net fossil CO_2 emissions. There are no aircraft emissions associated with the product systems.

Table 22. *Greenhouse gas emissions for the Nydree Flooring products per square meter of flooring.*

Source	Unit	7/16" Flooring	7/16" Flooring with iron film backing	9/16" Flooring
Biogenic Emissions	kg CO_2e	18.8	21.8	14.0
Biogenic Removals	kg CO_2e	-157	-158	-177
Net Fossil CO_2	kg CO_2e	111	161	110
LULC	kg CO_2e	0.149	0.179	0.168

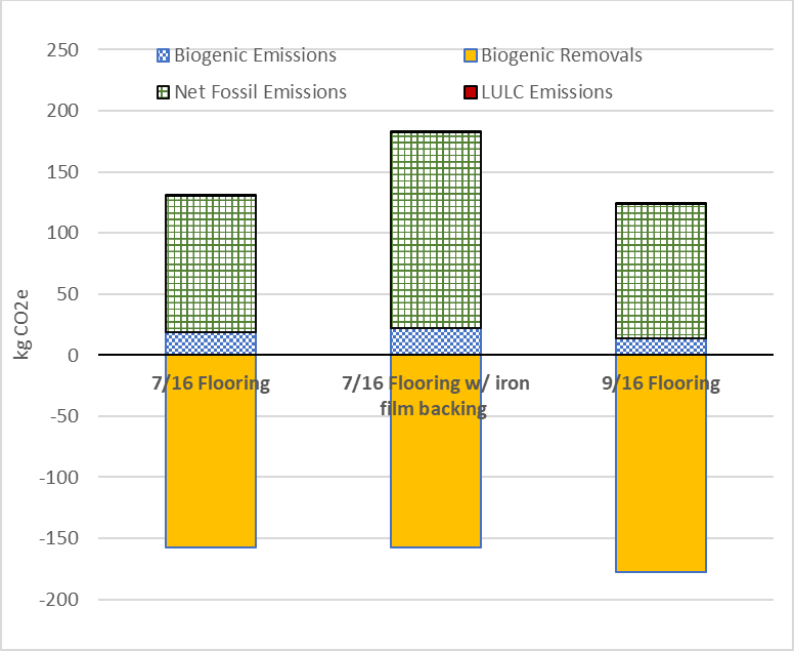


Figure 2. *CFP results for the Nydree flooring products by source component.*

Biogenic Carbon Emissions and Removals

The acrylic infused hardwood flooring products include biogenic material, thus biogenic carbon emissions and removals are reported in line with the PCR and ISO 21930 standard. Per ISO 21930, biogenic carbon entering the product system is accounted as removal and presented as negative carbon emission. Biogenic carbon leaving the product system as a product, co-products or combustion emission are accounted as positive emissions. Biogenic carbon emissions and removals for flooring products analyzed are presented Table 23 through Table 26.

Emissions and removals reported are listed below:

- Biogenic carbon removed through hardwood lumber input to the product system is reported in module A1,
- Biogenic carbon associated with the packaging materials and product wastes are reported in module A3,
- Combustion of biomass fuel in the boiler that is used in the manufacturing process are reported in module A3,
- Biogenic carbon associated with the disposal of packaging waste materials during installation is reported in module A5,
- Biogenic carbon leaving the product system through disposal are reported as emissions in module C4.

Table 23. *Indicators describing biogenic carbon emissions and removals.*

Parameter	Parameter	Unit
Biogenic Carbon Removal from Product	BCRP	kg CO_2
Biogenic Carbon Emission from Product	BCEP	kg CO_2
Biogenic Carbon Removal from Packaging	BCRK	kg CO_2
Biogenic Carbon Emission from Packaging	BCEK	kg CO_2
Biogenic Carbon Emission from Combustion of Waste Used in Production	BCEW	kg CO_2

Table 24. *Biogenic carbon emissions and removals for the **7/16" Flooring** product.*

Parameter	Unit	A1	A2	A3	A4	A5	B2	B4	C2	C4
BCRP	kg CO_2	-29.6	N/A	0.00	N/A	0.00	N/A	-44.4	N/A	0.00
BCEP	kg CO_2	0.00	N/A	14.8	N/A	0.00	N/A	44.4	N/A	14.8
BCRK	kg CO_2	0.00	N/A	-0.749	N/A	0.00	N/A	-1.12	N/A	0.00
BCEK	kg CO_2	0.00	N/A	0.00	N/A	0.749	N/A	1.12	N/A	0.00
BCEW	kg CO_2	0.00	N/A	11.3	N/A	0.00	N/A	16.9	N/A	0.00

Table 25. *Biogenic carbon emissions and removals for the **7/16" Flooring with iron film backing** product.*

Parameter	Unit	A1	A2	A3	A4	A5	B2	B4	C2	C4
BCRP	kg CO_2	-29.6	N/A	0.00	N/A	0.00	N/A	-44.4	N/A	0.00
BCEP	kg CO_2	0.00	N/A	14.8	N/A	0.00	N/A	44.4	N/A	14.8
BCRK	kg CO_2	0.00	N/A	-0.749	N/A	0.00	N/A	-1.12	N/A	0.00
BCEK	kg CO_2	0.00	N/A	0.00	N/A	0.749	N/A	1.12	N/A	0.00
BCEW	kg CO_2	0.00	N/A	11.3	N/A	0.00	N/A	16.9	N/A	0.00

Table 26. *Biogenic carbon emissions and removals for the **9/16" Flooring** product.*

Parameter	Unit	A1	A2	A3	A4	A5	B2	B4	C2	C4
BCRP	kg CO_2	-24.8	N/A	0.00	N/A	0.00	N/A	-37.1	N/A	0.00
BCEP	kg CO_2	0.00	N/A	8.87	N/A	0.00	N/A	37.1	N/A	15.9
BCRK	kg CO_2	0.00	N/A	-0.877	N/A	0.00	N/A	-1.32	N/A	0.00
BCEK	kg CO_2	0.00	N/A	0.00	N/A	0.877	N/A	1.32	N/A	0.00
BCEW	kg CO_2	0.00	N/A	11.3	N/A	0.00	N/A	16.9	N/A	0.00

6. LCA: Interpretation

The contributions to total impact indicator results are dominated by the product replacement phase of the assessment. The contributions to total impact indicator results are dominated by the product replacement phase of the assessment. With few exceptions, of the remaining life cycle phases, the product maintenance phase is the highest contributor followed by raw material extraction and processing, product manufacture and downstream processes.

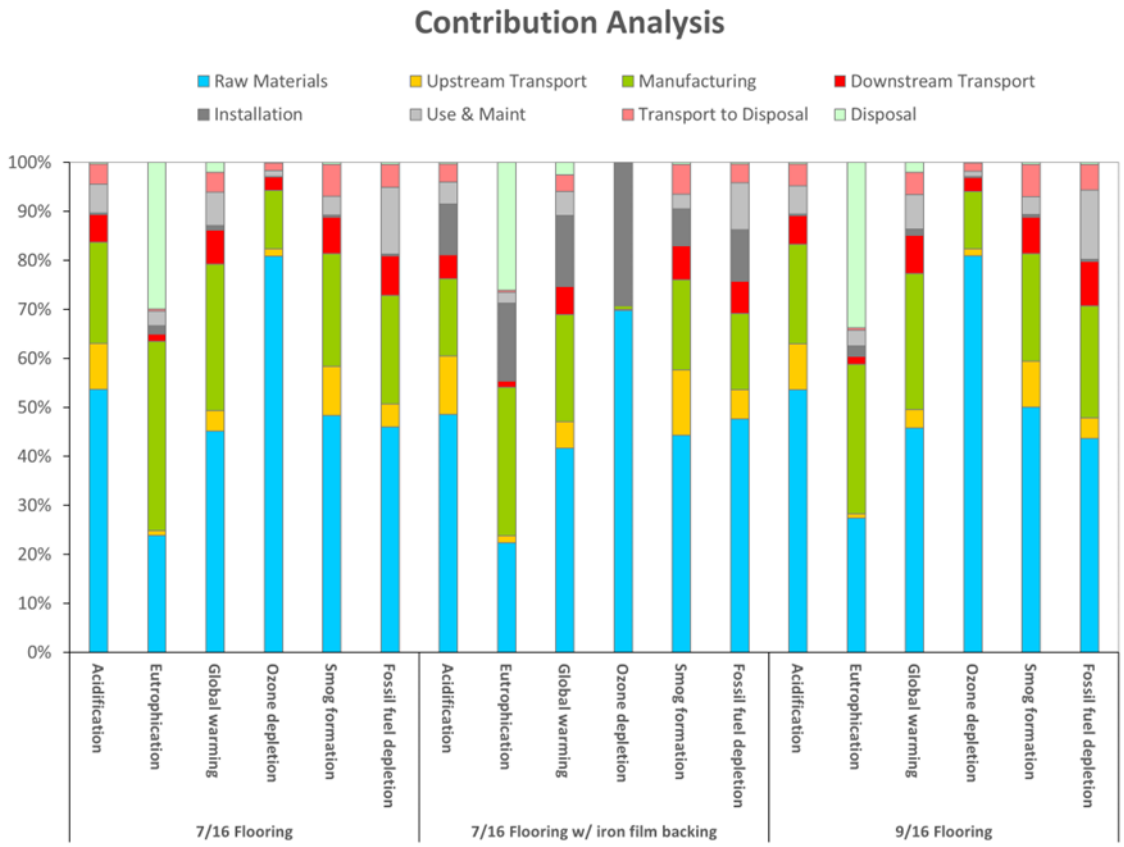


Figure 2. *Contribution results for the flooring products – TRACI 2.1 (excluding product replacements)*

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