



Declaration Owner

SelectTech Inc.

45 Downing Industrial Park
Pittsfield, MA USA
+1 508 583 3200 | tricca@selecttech.com |
www.freestyleflooring.com/solutions/ecolock

Product

- *EcoLock Flooring Tiles*

(UNSPSC Class Code 30161700)
(Construction Specification Institute Code 09 65 16.43)

EPD represents delivery of product to customers in North America.

Functional Unit

The functional unit is one square meter of flooring covering installed and maintained for use over a 75-year period

EPD Number and Period of Validity

SCS-EPD-10359
EPD Valid April 11, 2025 through April 10, 2030

Product Category Rule

PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022.

PCR Guidance for Building-Related Products and Services - Flooring EPD Requirements, v.2.0,[1] validity extended to July 1, 2025.

Program Operator

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



Declaration Owner:	SelecTech Inc.														
Address:	45 Downing Industrial Park Pittsfield, MA USA														
Declaration Number:	SCS-EPD-10359														
Declaration Validity Period:	Valid April 11 2025 through April 10, 2030														
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 2.1 software and the Ecoinvent v3.10 database														
Product RSL:	30 years														
Markets of Applicability:	North America														
EPD Type:	Product-Specific														
EPD Scope:	Cradle-to-Grave														
LCIA Method and Version:	TRACI 2.1														
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	<input type="checkbox"/> internal <input checked="" type="checkbox"/> external														
LCA Reviewer:	 Lindita Bushi, PhD, Athena Sustainable Materials Institute														
Part A Product Category Rule:	PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022														
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 - Flooring EPD Requirements, v.2.0,[1] validity extended to July 1, 2025.														
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	<input type="checkbox"/> internal <input checked="" type="checkbox"/> external														
EPD Verifier:	 Lindita Bushi, PhD, Athena Sustainable Materials Institute														
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<p>Disclaimers: This EPD conforms to ISO 14025, 14040, 14044, and 21930.</p> <p>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.</p> <p>Accuracy of Results: Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.</p> <p>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.</p> <p><i>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.</i></p> <p><i>The owner of the declaration shall be liable for the underlying information and evidence; SCS shall not be liable with respect to manufacturer information, life cycle assessment data, and evidence supplied or made available to SCS.</i></p>															

1. SelecTech

SelecTech Inc. was founded in 1993 with the mission of creating valuable products from scrap plastics. SelecTech's StaticStop Flooring, FreeStyle Flooring, and Place N' Go Flooring divisions use state of the art technology and an innovative interlock design to provide environmentally friendly, durable, easy-to-install flooring options for those seeking smart flooring solutions.

SelecTech strives to make a change in the world of construction. They began as a recycling company and figured out how to make high quality, easy to install flooring – out of a material that can't always be reused. Using recycled material and adhesive free installation, their flooring systems can help save the planet, as well as their customer's time and money.

In a world of heavy consumerism, it can be difficult to effectively evaluate the effects your purchases have on the environment. SelecTech's products help make your choice an easy one. SelecTech's aim is to reduce their product production impacts. The durability of their products lead to a long useful life, which aids in decreasing their products' carbon footprint.

2. Product

2.1 PRODUCT DESCRIPTION

Product Line	Representative Thickness	Product Description
EcoLock	8.6mm	EcoLock Flooring by SelecTech is a Red List free, chlorine free, modular floor tile. Its flexible design and patented interlock system allows it to be installed with minimal floor preparation and no adhesive. The sturdy decorative bio-based wear layer is available in a variety of decors and requires no floor finish or toxic chemicals for maintenance.

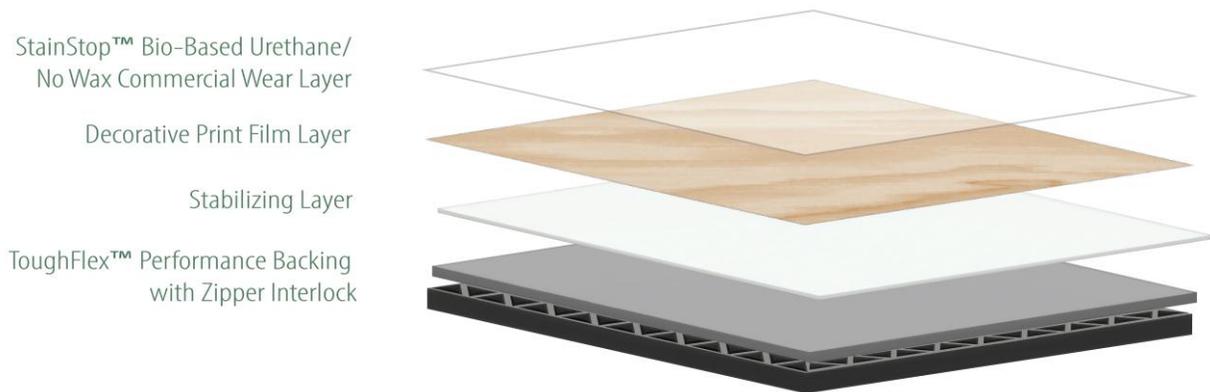


Figure 1. Tile Layer Diagram for the SelecTech EcoLock product system.

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

Flooring products provide the primary function of flooring for interior applications. The products are used in various 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. The assessment follows the attributional LCA approach.

Table 1. Life cycle phases included in the 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.

Table 2. Product specifications for the **EcoLock** flooring product.

Characteristic		Description			
Sustainable certifications		HPD Unique Identifier:1923285446656; MAS Certified Green Low VOC Emitting Materials Certificate No: MAS2300484-01			
VOC emissions test method		CDPH Standard Method (CA 01350)			
Characteristic		Average Value	Unit	Min Value	Max Value
Product thickness		8.60 (0.34)	mm (in)	n/a	n/a
Wear layer thickness (where applicable)		2.50 (0.10)	mm (in)	n/a	n/a
Product weight		11,300 (37.0)	g/m ² (oz/ft ²)	n/a	n/a
Product Form	Tiles	Width	470 (18.5)	mm (in)	469 (18.5)
		Length	470 (18.5)	mm (in)	469 (18.5)

2.6 MARKET PLACEMENT/APPLICATION RULES

Technical specifications and product performance results for the flooring products can be found on the manufacturer's website <https://freestyleflooring.com/solutions/ecolock/>.

2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

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

2.8 MATERIAL COMPOSITION

The primary materials include bio-based and petroleum-based plastics, fillers, pigments and additives. While the decorative bio-based wear layer is available in a variety of colors, the impact of different pigments is less than $\pm 10\%$.

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

Component	EcoLock	
	kg/m ²	%
Bio-based polyurethane layer	3.52	(31%)
Polyethylene	3.32	(29%)
Polypropylene	0.20	(2%)
Filler	3.58	(32%)
Pigment	3.06x10 ⁻²	(0.30%)
Additive	6.12x10 ⁻²	(1%)
Regrind	0.56	(5%)
Total Product	11.3	100%

No chemicals regulated by the Resource Conservation and Recovery Act (RCRA) were identified in the product or product components. There are no releases of such substances associated with the production, use or maintenance of the products.

2.9 MANUFACTURING

The EcoLock flooring product is produced at manufacturing facilities in Pittsfield, Massachusetts. The manufacturer provided primary data for their annual production, resource use, electricity consumption and waste generation at the facility. Solar panels at the Pittsfield manufacturing facility produce over 100% of the required annual energy needs for the

facility. Electricity consumption is modeled using Ecoinvent datasets for regional electricity production using photovoltaics. Results are also presented based on electricity consumption modeled using the regional grid max.

Material-specific scrap rates associated with product manufacture were provided and accounted for within the raw material extraction and processing and upstream transport phases of the assessment. Disposal of manufacturing scrap, via landfilling, is accounted for in the manufacturing stage.

2.10 PACKAGING

The products are packaged for shipment using corrugated cardboard.

Table 4. Material content for the flooring product packaging, in kg per square meter and percent of total mass.

Component	EcoLock	
	kg/m ²	%
Packaging		
Corrugate	0.95	100%
Total Packaging	0.95	100%

2.11 PRODUCT INSTALLATION

Installation of the product is accomplished using hand tools with negligible impacts and waste. For the current assessment, approximately 4.5% of the product mass is assumed lost as waste during product installation which is assumed landfilled. Impacts associated with the production, transport, waste processing, and disposal of installation wastage are included in this life cycle phase. 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 5 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://freestyleflooring.com/solutions/ecolock/>.

3. LCA: Calculation Rules

3.1 FUNCTIONAL UNIT

The functional unit used in the study is defined as 1 m² of floor covering installed and maintained 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) corresponding to the manufacturer's estimated 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 5.

Table 5. Reference flows and RSL for the flooring product.

Product Name	Reference Flow (kg/m ²)	Reference Service Life – RSL (years)	Replacement Cycle (ESL/RSL-1)
EcoLock	11.3	30	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 flooring products.

Module	Module Description	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 (including 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 product are assumed negligible. Impacts from the production, transport and disposal of waste material associated with installation are included in this phase in addition to impacts from packaging disposal.
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 uses 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 products are disposed of via landfilling which requires no waste processing
C4	Disposal	Disposal of flooring product
D	Reuse-recovery-recycling potential	Module Not Declared

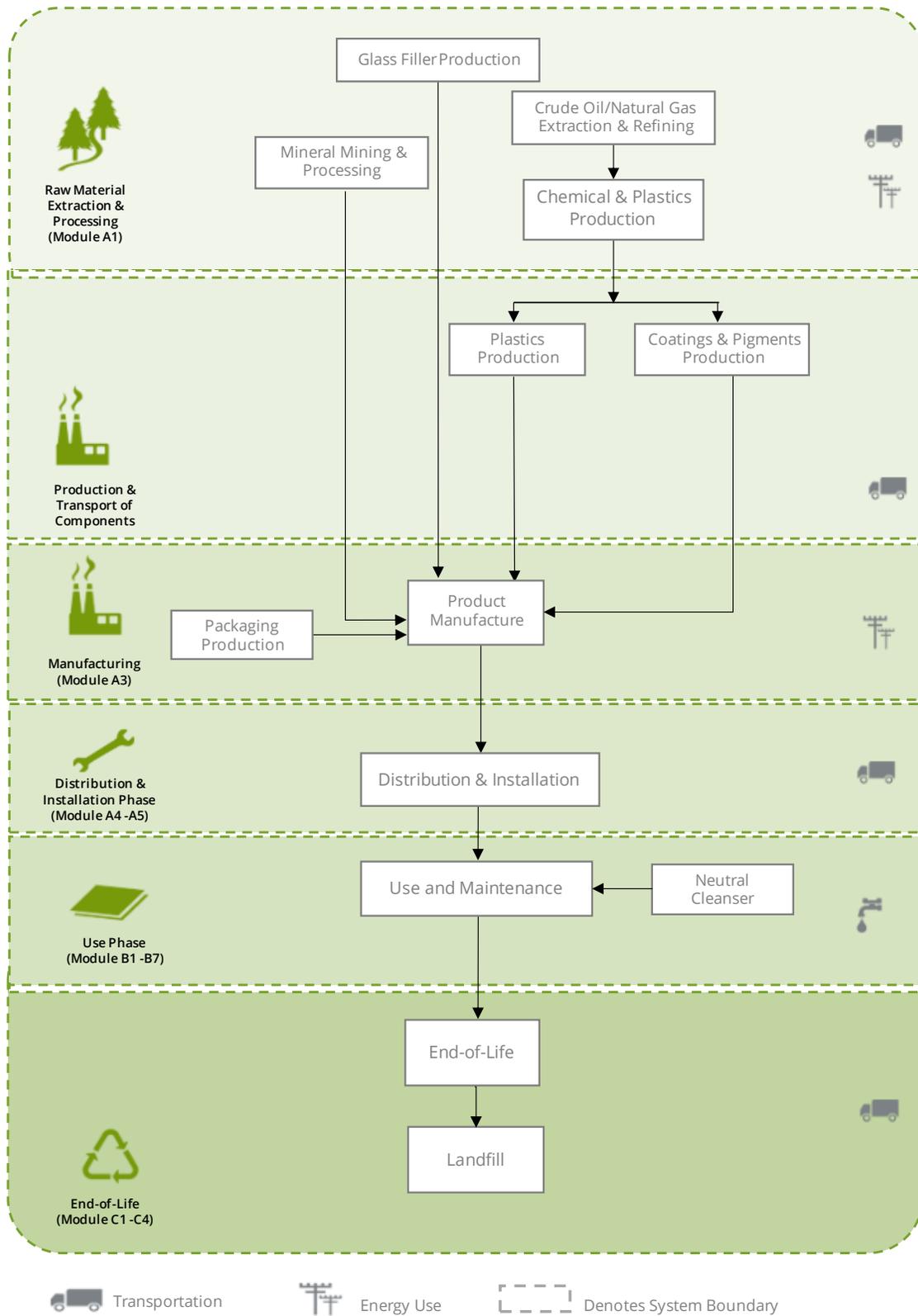


Figure 2. Flow Diagram for the life cycle of the EcoLock flooring product system.

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

- Electricity use at the manufacturing facility was allocated to the SelecTech flooring products based on the product mass as a fraction of the total production.
- SelecTech's production facility is located in Pittsfield, Massachusetts and includes on-site photovoltaic electricity generation. An Ecoinvent inventory dataset for the regional photovoltaic electricity production was used to model resource use and emissions from electricity use at the manufacturing facility. Results obtained using the regional electricity grid are also presented.
- Downstream transport was modeled based on information provided by the manufacturer representing transport and distribution in North America.
- 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.
- 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, disposal of product packaging is modeled based on the PCR guidance regarding recycling rates of packaging materials.
- For final disposal of the packaging material and flooring products at end-of-life, all materials are assumed to be transported 100 miles (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.
- 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.

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 their production facility. The sources of secondary LCI data are the Ecoinvent database.

Table 7. Data sources for the flooring product system.

Component	Dataset	Data Source	Publication Date
PRODUCT			
Plastic			
Bio-based polyurethane layer	EPD provided by supplier	Supplier EPD	2024
Polyethylene	polyethylene production, low density, granulate polyethylene, low density, granulate Cutoff, S/RoW	EI v3.10	2023
Polypropylene	polypropylene production, granulate polypropylene, granulate Cutoff, S/RoW	EI v3.10	2023
Filler			
Calcium Carbonate	limestone production, crushed, washed limestone, crushed, washed Cutoff, S/RoW	EI v3.10	2023
Pigment			
Black Color Concentrate	carbon black production carbon black Cutoff, S/GLO	EI v3.10	2023
TiO ₂	market for titanium dioxide titanium dioxide Cutoff, S/RoW	EI v3.10	2023
Other			
Additives	lubricating oil production lubricating oil Cutoff, S/RoW	EI v3.10	2023
	chemical production, organic chemical, organic Cutoff, S/GLO	EI v3.10	2023
	zeolite production, powder zeolite, powder Cutoff, S/RoW	EI v3.10	2023
	aluminium hydroxide production aluminium hydroxide Cutoff, S/RoW	EI v3.10	2023
	kaolin production kaolin Cutoff, S/RoW	EI v3.10	2023
PACKAGING			
Corrugated Cardboard	containerboard production, linerboard, kraftliner containerboard, linerboard Cutoff, S/RoW	EI v3.10	2023
TRANSPORT			
Road transport	market for transport, freight, lorry 16-32 metric ton, EURO4 transport, freight, lorry 16-32 metric ton, EURO4 Cutoff, S/RoW	EI v3.10	2023
Ship transport	transport, freight, sea, container ship transport, freight, sea, container ship Cutoff, S/GLO	EI v3.10	2023
MAINTENACE			
Neutral cleaner	ethoxylated alcohol (AE7) production, petrochemical ethoxylated alcohol (AE7) Cutoff, S/RoW; fatty acid production, from palm oil fatty acid Cutoff, S/RoW; tap water production, conventional treatment tap water Cutoff, S/RoW	EI v3.10	2023
Electricity	market for electricity, low voltage electricity, low voltage Cutoff, S/US	EI v3.10	2023
Water	tap water production, conventional treatment tap water Cutoff, S/RoW	EI v3.10	2023
WASTE DESPOSAL			
Landfill	treatment of municipal solid waste, sanitary landfill municipal solid waste Cutoff, S/RoW	EI v3.10	2023
RESOURCES			
Electricity	electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted electricity, low voltage Cutoff, S/US-NPCC; market for electricity, medium voltage electricity, medium voltage Cutoff, U - NEWE/US-NPCC	EI v3.10	2023

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
<p>Time-Related Coverage: Age of data and the minimum length of time over which data is collected</p>	<p>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 for 2023.</p>
<p>Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study</p>	<p>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 region. Data representing disposal processes are based on US statistics.</p>
<p>Technology Coverage: Specific technology or technology mix</p>	<p>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.</p>
<p>Precision: Measure of the variability of the data values for each data expressed</p>	<p>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.</p>
<p>Completeness: Percentage of flow that is measured or estimated</p>	<p>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.</p>
<p>Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest</p>	<p>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.</p>
<p>Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis</p>	<p>The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards the most recent 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.</p>
<p>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</p>	<p>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.</p>
<p>Sources of the Data: Description of all primary and secondary data sources</p>	<p>Data representing energy use at the manufacturing facilities 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 v3.10 LCI data are used.</p>
<p>Uncertainty of the Information: Uncertainty related to data, models, and assumptions</p>	<p>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.</p>

3.9 PERIOD UNDER REVIEW

The period of review is the calendar year 2023.

3.10 ALLOCATION

Manufacturing resource use was allocated to the products using a mass-based allocation approach. 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 9. Production-weighted average distances by transport mode were used to represent product distribution globally.

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

Parameter	Unit	Value	
Ground transport			
Fuel type	-	Diesel	
Liters of fuel	L/100km	18.7	
Vehicle type	-	Diesel truck	
Capacity utilization	%	76	
Ocean transport			
Fuel type	-	Fuel oil	
Liters of fuel	L/tkm	2.23	
Vehicle type	-	Ocean freighter	
Capacity utilization	%	70	
Product Name	Gross mass transported ¹ (kg)	Transport distance (km)	
		Road	Ship
EcoLock	12.2	1,650	0.00

¹ Including packaging.

Installation of the product and periodic cleaning are included in the life cycle use phase. The manufacturer provided installation and maintenance guidelines detailing the recommended installation methods and maintenance routine. For the current assessment, approximately 4.5% of the product mass is assumed lost as waste during product installation which is assumed landfilled. Impacts associated with the production, transport, waste processing, and disposal of installation wastage are included in this life cycle phase. The VOC emissions associated with the installation, use and maintenance of the products are negligible.

Table 10. *Recycling rates for packaging materials at end-of-life.*

Material	Recycling rate (%)
Recycling Rates	
Paper & Pulp	75%
Disposal of Non-recyclables	
Landfill	80%
Incineration	20%

The impacts associated with packaging disposal are included with the installation phase as per PCR requirements. The recycling rates used for the product packaging are based on the PCR guidance. The relevant disposal statistics used for the packaging are summarized in Table 10. For material not recycled, 80% are assumed landfilled and 20% incinerated.

Modeling parameters for product installation are summarized in Table 11.

Table 11. *Installation parameters for the flooring product, per 1 m².*

Parameter	EcoLock
Ancillary materials	negligible
Net freshwater consumption (m ³)	0.00
Electricity consumption (kWh)	0.00
Product loss per functional unit (kg)	0.507
Waste materials generated by product installation (kg)	1.46
Output materials resulting from on-site waste processing (kg)	n/a
Mass of packaging waste (kg)	Corrugate 0.95
Biogenic carbon contained in packaging (kg CO ₂)	1.74
Direct emissions (kg)	0.00

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 flooring products, per 1 m².*

Parameter	Unit	Value
Maintenance process	-	Damp mopping
Maintenance cycle	Cycles / RSL	1,560
Maintenance cycle	Cycles / ESL	3,900
Net freshwater consumption	m ³ /m ² /yr	0.0058
Cleaning agent	kg/m ² /yr	0.119
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 estimated service lifetime of the assessment are included in this stage. Modeling parameters for the product replacement stage are summarized in Table

13. Impacts associated with the production, transport, waste processing, and disposal of all materials required for the replacement of the product over the 75-year assessment period are included in this life cycle phase.

Table 13. Product replacement parameters for the flooring products, per 1 m².

Parameter	Unit	Value
Reference service life	Years	30
Replacement cycle	-	1.5
Energy input	kWh	0.00
Freshwater consumption	m ³	0.00
Ancillary materials	kg	Negligible
Replacement parts, including packaging	kg	18.3
Direct emissions	kg	0.00

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 (C4). 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 100 mile (~161 km) average distance to disposal, consistent with the PCR. No recycling of the product materials is assumed at end-of-life. End-of-life modeling parameters are summarized in Table 14.

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

Product	Scenario assumptions	Collection process		Recovery	Disposal			Removals of biogenic carbon ¹
		Collected separately	Collected with mixed waste		Recycling	Landfill	Incineration	
EcoLock	Landfill	0	11.3	n/a	0	11.3	0	n/a

¹ excluding packaging

Biogenic Carbon Emissions and Removals

The product system includes biogenic material in the product and packaging components and therefore biogenic carbon emissions and removals are reported in line with the PCR. Biogenic carbon entering the product system is accounted for as a removal and presented as a negative carbon emission. Biogenic carbon leaving the product system as a product, co-products or combustion emissions are accounted for as positive emissions.

Biogenic carbon emissions and removals for the flooring product analyzed are presented in Table 15.

- Biogenic carbon associated with the product materials (BCRP) is reported in module A1
- Biogenic carbon associated with the disposal of product waste materials (BCEP) is reported in module C4
- Biogenic carbon associated with the packaging materials (BCRK) is reported in module A3
- Biogenic carbon associated with the disposal of packaging waste materials during installation (BCEK) is reported in module A5

Table 15. *Biogenic carbon emissions and removals for the SelecTech product system in units of kg CO₂/m² of flooring.*

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
BCRP	-1.55	0.00	0.00	0.00	0.00	0.00	-2.33	0.00	0.00
BCEP	0.00	0.00	0.00	0.00	0.00	0.00	2.33	0.00	1.55
BCRK	0.00	0.00	-1.74	0.00	0.00	0.00	-2.61	0.00	0.00
BCEK	0.00	0.00	0.00	0.00	1.74	0.00	2.61	0.00	0.00

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.

TRACI 2.1 Impact Category	Unit
Global Warming Potential (GWP)	kg CO ₂ eq
Ozone Depletion Potential (ODP)	kg CFC 11 eq
Acidification Potential (AP)	kg SO ₂ eq
Eutrophication Potential (EP)	kg N eq
Smog Formation Potential (SFP)	kg O ₃ eq
Abiotic depletion potential (ADP-fossil fuels) for fossil resources ¹	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	kg	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, modules C1 and C3 are 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 16. Life Cycle Impact Assessment results for the **EcoLock** 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. Manufacturing impacts modeled with on-site generated photovoltaic electricity.

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
TRACI									
GWP (kg CO ₂ eq)	14.6	5.03	1.36	3.89	1.95	18.1	48.0	2.52	2.65
	15%	5.1%	1.4%	4%	2%	18%	49%	2.6%	2.7%
GWP w/ biogenic carbon (kg CO ₂ eq)	14.5	5.02	2.22	3.88	2.25	18.9	50.4	2.50	3.20
	14%	4.9%	2.2%	3.8%	2.2%	18%	49%	2.4%	3.1%
AP (kg SO ₂ eq)	7.15x10 ⁻²	2.46x10 ⁻²	6.10x10 ⁻³	1.47x10 ⁻²	7.05x10 ⁻³	6.75x10 ⁻²	0.206	1.22x10 ⁻²	1.25x10 ⁻³
	17%	6%	1.5%	3.6%	1.7%	16%	50%	3%	0.3%
EP (kg N eq)	6.52x10 ⁻²	5.23x10 ⁻³	9.64x10 ⁻³	4.01x10 ⁻³	2.05x10 ⁻²	7.93x10 ⁻²	0.829	1.25x10 ⁻³	0.447
	4.5%	0.36%	0.66%	0.27%	1.4%	5.4%	57%	0.085%	31%
SFP (kg O ₃ eq)	0.780	0.580	9.29x10 ⁻²	0.374	0.134	0.752	3.53	0.369	2.35x10 ⁻²
	12%	8.7%	1.4%	5.6%	2%	11%	53%	5.6%	0.35%
ODP (kg CFC-11 eq)	4.27x10 ⁻⁷	8.14x10 ⁻⁸	6.38x10 ⁻⁸	6.31x10 ⁻⁸	3.45x10 ⁻⁸	6.89x10 ⁻⁷	1.07x10 ⁻⁶	4.13x10 ⁻⁸	3.85x10 ⁻⁹
	17%	3.3%	2.6%	2.5%	1.4%	28%	43%	1.7%	0.16%
ADPF (MJ, LHV)	364	69.5	15.0	54.1	27.2	302	847	32.5	3.01
	21%	4.1%	0.88%	3.2%	1.6%	18%	49%	1.9%	0.18%

Table 17. Resource use and waste flows for the **EcoLock** 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. Manufacturing impacts modeled with on-site generated photovoltaic electricity.

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR _E (MJ)	24.0	0.914	22.4	0.725	0.735	41.3	25.0	0.142	6.94x10 ⁻²
	21%	0.79%	19%	0.63%	0.64%	36%	22%	0.12%	0.06%
RPR _M (MJ)	21.5	0.00	0.00	0.00	0.727	0.00	25.3	0.00	0.00
	45%	0%	0%	0%	1.5%	0%	53%	0%	0%
NRPR _E (MJ)	232	70.4	16.4	54.8	24.2	368	559	32.6	3.10
	17%	5.2%	1.2%	4%	1.8%	27%	41%	2.4%	0.23%
NRPR _M (MJ)	139	0.00	0.00	0.00	0.00	0.00	184	0.00	0.00
	43%	0%	0%	0%	0%	0%	57%	0%	0%
SM (kg)	0.585	0.00	0.00	0.00	2.54x10 ⁻²	0.00	0.883	0.00	0.00
	39%	0%	0%	0%	1.7%	0%	59%	0%	0%
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)	3.25	5.53x10 ⁻²	7.11x10 ⁻²	4.40x10 ⁻²	0.156	2.33	5.39	1.22x10 ⁻²	4.32x10 ⁻³
	29%	0.49%	0.63%	0.39%	1.4%	21%	48%	0.11%	0.038%
Wastes									
HWD (kg)	5.09x10 ⁻³	4.84x10 ⁻⁴	1.89x10 ⁻⁴	3.81x10 ⁻⁴	3.09x10 ⁻⁴	5.16x10 ⁻⁴	1.01x10 ⁻²	2.29x10 ⁻⁴	2.06x10 ⁻⁵
	29%	2.8%	1.1%	2.2%	1.8%	3%	58%	1.3%	0.12%
NHWD (kg)	0.460	3.20	0.204	2.60	1.07	1.21	28.5	0.155	11.3
	0.95%	6.6%	0.42%	5.3%	2.2%	2.5%	59%	0.32%	23%
HLRW (kg)	3.75x10 ⁻⁵	4.16x10 ⁻⁶	5.14x10 ⁻⁶	3.30x10 ⁻⁶	2.40x10 ⁻⁶	2.06x10 ⁻⁴	8.04x10 ⁻⁵	7.37x10 ⁻⁷	3.63x10 ⁻⁷
	11%	1.2%	1.5%	0.97%	0.71%	61%	24%	0.22%	0.11%
ILLRW (kg)	8.36x10 ⁻⁵	9.80x10 ⁻⁶	1.39x10 ⁻⁵	7.79x10 ⁻⁶	5.54x10 ⁻⁶	7.87x10 ⁻⁴	1.85x10 ⁻⁴	1.73x10 ⁻⁶	9.11x10 ⁻⁷
	7.6%	0.9%	1.3%	0.71%	0.51%	72%	17%	0.16%	0.083%
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	0.675	0.00	1.01	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
MER (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 18. Life Cycle Impact Assessment results for the **EcoLock** 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. Manufacturing impacts modeled with regional grid electricity.

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
TRACI									
GWP (kg CO ₂ eq)	14.6	5.03	1.85	3.89	1.97	18.1	48.7	2.52	2.65
	15%	5.1%	1.9%	3.9%	2%	18%	49%	2.5%	2.7%
GWP w/ biogenic carbon (kg CO ₂ eq)	14.5	5.02	2.83	3.88	2.27	18.9	51.3	2.50	3.20
	14%	4.8%	2.7%	3.7%	2.2%	18%	49%	2.4%	3.1%
AP (kg SO ₂ eq)	7.15x10 ⁻²	2.46x10 ⁻²	6.05x10 ⁻³	1.47x10 ⁻²	7.05x10 ⁻³	6.75x10 ⁻²	0.206	1.22x10 ⁻²	1.25x10 ⁻³
	17%	6%	1.5%	3.6%	1.7%	16%	50%	3%	0.3%
EP (kg N eq)	6.52x10 ⁻²	5.23x10 ⁻³	9.06x10 ⁻³	4.01x10 ⁻³	2.05x10 ⁻²	7.93x10 ⁻²	0.828	1.25x10 ⁻³	0.447
	4.5%	0.36%	0.62%	0.27%	1.4%	5.4%	57%	0.085%	31%
SFP (kg O ₃ eq)	0.780	0.580	9.96x10 ⁻²	0.374	0.134	0.752	3.54	0.369	2.35x10 ⁻²
	12%	8.7%	1.5%	5.6%	2%	11%	53%	5.5%	0.35%
ODP (kg CFC-11 eq)	4.27x10 ⁻⁷	8.14x10 ⁻⁸	5.99x10 ⁻⁸	6.31x10 ⁻⁸	3.43x10 ⁻⁸	6.89x10 ⁻⁷	1.07x10 ⁻⁶	4.13x10 ⁻⁸	3.85x10 ⁻⁹
	17%	3.3%	2.4%	2.6%	1.4%	28%	43%	1.7%	0.16%
ADPF (MJ, LHV)	364	69.5	22.9	54.1	27.5	302	860	32.5	3.01
	21%	4%	1.3%	3.1%	1.6%	17%	50%	1.9%	0.17%

Table 19. Resource use and waste flows for the **EcoLock** 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. Manufacturing impacts modeled with regional grid electricity.

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR _E (MJ)	24.0	0.914	15.8	0.725	0.435	41.3	14.5	0.142	6.94x10 ⁻²
	24%	0.93%	16%	0.74%	0.44%	42%	15%	0.14%	0.071%
RPR _M (MJ)	21.5	0.00	0.00	0.00	0.727	0.00	25.3	0.00	0.00
	45%	0%	0%	0%	1.5%	0%	53%	0%	0%
NRPR _E (MJ)	232	70.4	33.9	54.8	25.0	368	587	32.6	3.10
	17%	5%	2.4%	3.9%	1.8%	26%	42%	2.3%	0.22%
NRPR _M (MJ)	139	0.00	0.00	0.00	0.00	0.00	184	0.00	0.00
	43%	0%	0%	0%	0%	0%	57%	0%	0%
SM (kg)	0.585	0.00	0.00	0.00	2.54x10 ⁻²	0.00	0.883	0.00	0.00
	39%	0%	0%	0%	1.7%	0%	59%	0%	0%
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)	3.25	5.53x10 ⁻²	0.159	4.40x10 ⁻²	0.160	2.33	5.53	1.22x10 ⁻²	4.32x10 ⁻³
	28%	0.48%	1.4%	0.38%	1.4%	20%	48%	0.11%	0.037%
Wastes									
HWD (kg)	5.09x10 ⁻³	4.84x10 ⁻⁴	1.17x10 ⁻⁴	3.81x10 ⁻⁴	3.05x10 ⁻⁴	5.16x10 ⁻⁴	9.94x10 ⁻³	2.29x10 ⁻⁴	2.06x10 ⁻⁵
	30%	2.8%	0.68%	2.2%	1.8%	3%	58%	1.3%	0.12%
NHWD (kg)	0.460	3.20	0.214	2.60	1.07	1.21	28.5	0.155	11.3
	0.95%	6.6%	0.44%	5.3%	2.2%	2.5%	59%	0.32%	23%
HLRW (kg)	3.75x10 ⁻⁵	4.16x10 ⁻⁶	7.89x10 ⁻⁵	3.30x10 ⁻⁶	5.73x10 ⁻⁶	2.06x10 ⁻⁴	1.96x10 ⁻⁴	7.37x10 ⁻⁷	3.63x10 ⁻⁷
	7%	0.78%	15%	0.62%	1.1%	39%	37%	0.14%	0.068%
ILLRW (kg)	8.36x10 ⁻⁵	9.80x10 ⁻⁶	1.15x10 ⁻⁴	7.79x10 ⁻⁶	1.01x10 ⁻⁵	7.87x10 ⁻⁴	3.44x10 ⁻⁴	1.73x10 ⁻⁶	9.11x10 ⁻⁷
	6.1%	0.72%	8.5%	0.57%	0.74%	58%	25%	0.13%	0.067%
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	0.675	0.00	1.01	0.00	0.00
	0%	0%	0%	0%	40%	0%	60%	0%	0%
MER (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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, with the exception of the Eutrophication Potential impact category, the raw material extraction and processing phase is generally the largest contributor to the impact categories assessed, followed by product maintenance (B2) and product distribution (A4). The Eutrophication Potential is dominated primarily by the product disposal stage followed by the product maintenance stage and the raw material extraction and processing stage. Other life cycle phase contributions are minimal.

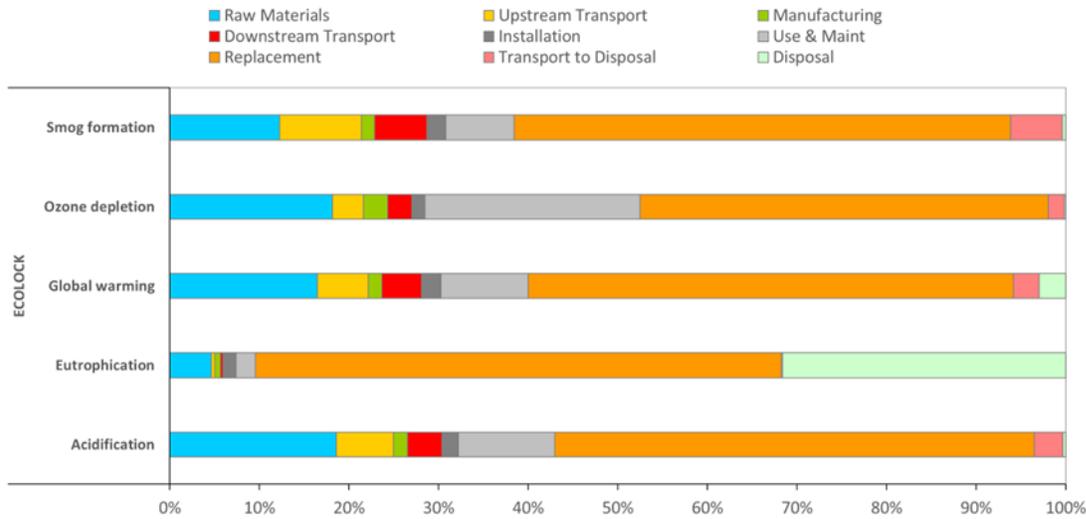


Figure 3. Contribution analysis for the flooring product over the 75-year ESL.

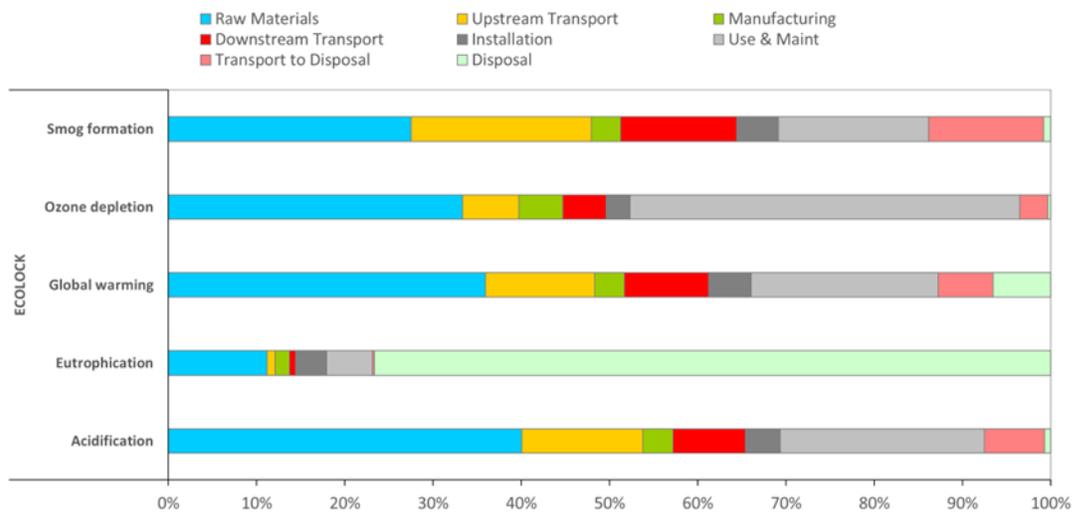


Figure 4. Contribution analysis for the flooring products over the 30-year RSL.

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For more information, contact:



SelecTech

45 Downing Industrial Park
Pittsfield, MA USA

+1 508 583 3200 | tricca@selectech.com | www.freestyleflooring.com/solutions/ecolock



SCS Global Services

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