Declaration Owner

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Product

Katanga 2mm LVT
Katanga 3mm LVT
Katanga 5mm LVT
(UNSPSC Class Code 30161707)

Functional Unit

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

EPD Number and Period of Validity

SCS-EPD-10650
EPD Valid July 2, 2026 through July 1, 2031

Product Category Rule

PCR Guidance for Building-Related Products and Services, Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Edition 6. UL Environment. March 2022.

PCR Guidance for Building-Related Products and Services Part B: Flooring EPD Requirements. Version 2.0. UL Environment. September 2018. Valid through September 2026.

Program Operator

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Declaration Owner:	Cobalt Surfaces
Address:	10 S Hays St, Bel Air, MD, USA 21014
Declaration Number:	SCS-EPD-10650
Declaration Validity Period:	EPD Valid July 2, 2026 through July 1, 2031
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Cicy Geng, SCS Consulting Services
LCA Software and LCI database:	OpenLCA v1.10 software and the Ecoinvent v3.8 database
Product RSL:	7 years for Katanga 2mm LVT; 10 years for Katanga 3mm and 5mm LVTs
Markets of Applicability:	North America
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Grave
LCIA Method and Version:	CML-IA v4.8 and TRACI 2.1, with eutrophication indicators derived to reflect TRACI 2.2 eutrophication indicators
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. Edition 6. UL Environment. 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 Part B: Flooring EPD Requirements. Version 2.0. 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:	1. Cobalt Surfaces ..... 2 2. Product ..... 3 3. LCA: Calculation Rules ..... 7 4. LCA: Scenarios and Additional Technical Information ..... 13 5. LCA: Results ..... 16 6. LCA: Interpretation ..... 23 7. References 24

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.

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.

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1. Cobalt Surfaces

Cobalt Surfaces is a leading provider of high-performance luxury vinyl flooring solutions designed for commercial and multifamily environments. With a focus on durability, design, and value, Cobalt Surfaces delivers flooring systems that combine sophisticated aesthetics with long-lasting performance.

The company offers a complete portfolio of luxury vinyl tile (LVT) and rigid core products, featuring realistic wood and stone visuals, advanced surface coatings, and flexible installation options to meet a wide range of project needs. Engineered with innovations like Cobalt Guard™ enhanced surface protection, their products provide superior resistance to scuffs, scratches, and indentation—making them ideal for high-traffic spaces.

From new construction to renovation, Cobalt Surfaces is committed to delivering reliable, design-forward flooring solutions that balance performance, budget, and style—helping architects, designers, and contractors bring their spaces to life.

2. Product

2.1 PRODUCT DESCRIPTION

Katanga 2mm LVT is a cost-effective, high-performance flooring solution built for dependable everyday use. Featuring a durable 12mil wear layer and enhanced polyurethane Cobalt Guard finish, it delivers strong resistance to scratches, scuffs, and indentation. Designed for glue-down installation, this construction provides stability and long-lasting performance in residential and light commercial environments. With contemporary wood and tile visuals, Katanga combines modern style with practical durability—making it an ideal choice for projects where value and performance matter most. Phthalate-free and 100% recyclable, it also supports healthier, more sustainable spaces. Available in 7"x48" planks (wood visual) and 12"x24" tiles (tile visual).

Katanga 3mm LVT offers the perfect balance of durability, style, and performance for high-traffic environments. Built with a robust 20mil wear layer and protected by Cobalt Guard finish, it provides superior resistance to scratches, scuffs, and daily wear. This glue-down construction ensures long-term stability, making it ideal for both residential and commercial applications. Designed with budget and performance in mind, Katanga delivers modern, versatile visuals without compromising durability. FloorScore certified, phthalate-free, and 100% recyclable, it's a smart, sustainable flooring solution built to handle demanding spaces. Available in 7"x48" planks (wood visual) and 12"x24" tiles (tile visual).

Katanga 5mm LVT offers premium durability and versatility for high-traffic residential and commercial spaces. Featuring a 20mil wear layer and Cobalt Guard finish, it delivers superior protection against scratches, scuffs, and daily wear. This construction provides a more substantial feel underfoot while maintaining flexibility for glue-down or loose lay installation. Designed to balance performance, style, and efficiency, Katanga brings contemporary visuals and long-term reliability to any project. FloorScore® certified, phthalate-free, and 100% recyclable, it's a high-performance flooring solution built for demanding environments. Available in 7"x48" planks (wood visual) and 12"x24" tiles (tile visual).

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.

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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 LVT flooring products modeled are summarized in Table 2 through Table 4.

Table 2. *Product specifications for Katanga 2mm LVT flooring.*

Characteristic			Description			
Sustainable certifications			FloorScore® (SCS-FS-05674)			
VOC emissions test method			CDPH/EHLB Standard Method V1.2-2017			
Characteristic			**Nominal Value**	**Unit**	**Minimum Value**	**Maximum Value**
Product thickness			2.00 (0.08)	mm (in)	1.90 (0.07)	2.10 (0.08)
Wear layer thickness (where applicable)			0.30 (0.01)	mm (in)	0.10 (0.004)	0.50 (0.02)
Product weight			3.61	kg/m^2		
Product Form	Tiles and Planks	Width	177.8, 304.8	mm (in)	152 (6.0)	1,140 (44.9)
		Length	1219.2, 609.6	mm (in)	470 (18.5)	1,524 (60.0)

Table 3. *Product specifications for Katanga 3mm LVT flooring.*

Characteristic			Description			
Sustainable certifications			FloorScore® (SCS-FS-05674)			
VOC emissions test method			CDPH/EHLB Standard Method V1.2-2017			
Characteristic			**Nominal Value**	**Unit**	**Minimum Value**	**Maximum Value**
Product thickness			3.00 (0.12)	mm (in)	2.90 (0.11)	3.10 (0.12)
Wear layer thickness (where applicable)			0.30 (0.01)	mm (in)	0.10 (0.004)	0.50 (0.02)
Product weight			4.31 (14.1)	kg/m^2 (oz/ft^2)		
Product Form	Tiles and Planks	Width	177.8 (7.0)	mm (in)	152 (6.0)	1,140 (44.9)
		Length	1219 (48)	mm (in)	470 (18.5)	1,524 (60.0)

Table 4. *Product specifications for Katanga 5mm LVT flooring.*

Characteristic			Description			
Sustainable certifications			FloorScore® (SCS-FS-05674)			
VOC emissions test method			CDPH/EHLB Standard Method V1.2-2017			
Characteristic			**Nominal Value**	**Unit**	**Minimum Value**	**Maximum Value**
Product thickness			5.00 (0.20)	mm (in)	4.90 (0.19)	5.10 (0.20)
Wear layer thickness (where applicable)			0.30 (0.01)	mm (in)	0.10 (0.004)	0.50 (0.02)
Product weight			5.27 (17.3)	kg/m^2 (oz/ft^2)		
Product Form	Tiles and Planks	Width	177.8 (7.0)	mm (in)	152 (6.0)	1,140 (44.9)
		Length	1219 (48)	mm (in)	470 (18.5)	1,524 (60.0)

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2.6 MARKET PLACEMENT/APPLICATION RULES

Detailed product performance results can be found on the Cobalt Surfaces website: https://cobaltsurfaces.com/technical/

2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

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

2.8 MATERIAL COMPOSITION

The luxury vinyl flooring products are made primarily from polyvinyl chloride (PVC), calcium carbonate (mineral reinforcement), plasticizers and additives (i.e., pigments and stabilizers).

Table 5. *Material content for the LVT flooring products in kg per square meter and percent of total mass.*

Component	Katanga 2mm LVT	Katanga 3mm LVT	Katanga 5mm LVT
PVC	0.120	0.336	0.233
	3.3%	7.8%	4.4%
$CaCO_3$	1.04	1.12	1.48
	29%	26%	28%
Plasticizer	$1.50x10^{-2}$	$7.90x10^{-2}$	$4.60x10^{-2}$
	0.42%	1.8%	0.87%
Stabilizer	$1.10x10^{-2}$	$2.00x10^{-2}$	$1.60x10^{-2}$
	0.31%	0.46%	0.3%
Glass fiber	0.00	0.00	0.00
	0%	0%	0%
Wear Layer	0.480	0.729	0.729
	13%	17%	14%
Regrind	1.91	1.99	2.72
	53%	46%	52%
Other	$3.20x10^{-2}$	$3.60x10^{-2}$	$3.90x10^{-2}$
	0.89%	0.84%	0.74%
Total Product	**3.61**	**4.31**	**5.27**
	100%	**100%**	**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 Korea. 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 Ecoinvent datasets for the regional electricity grid resource mix.

The production of luxury vinyl tile flooring involves the following general manufacturing processes. The raw materials are first mixed and heated. The mixture is then calendared into a sheet to create the backing or the transparent wear layers. The sheets are cut and laminated with a print film. Finally, the product is cut into tiles or planks and packaged. Quality checks are made at each step of the production process.

2.10 PACKAGING

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

Table 6. *Material content for the flooring product packaging in kg per square meter of flooring.*

Component	Katanga 2mm LVT	Katanga 3mm LVT	Katanga 5mm LVT
Corrugated	0.121	0.120	0.163
	39%	39%	16%
Plastic	$1.72x10^{-2}$	$1.82x10^{-2}$	$2.53x10^{-2}$
	5.6%	5.9%	2.5%
Wood	0.170	0.172	0.827
	55%	55%	81%
Total Packaging	**0.308**	**0.310**	**1.01**
	100%	**100%**	**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 varies based on the Cobalt Surfaces warranted lifetime for commercial use.

2.14 RE-USE PHASE

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

2.15 DISPOSAL

At end-of-life, the product is assumed to be disposed in a landfill per PCR requirements.

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 7. For the present assessment, a reference service lifetime (RSL) corresponding to the Cobalt Surfaces warranted lifetime for commercial use 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 products in Table 7.

Table 7. *Reference flow and RSL for the LVT flooring products.*

Product	Product Thickness (mm)	Reference flow (kg/m^2)	Reference Service Life – RSL (years)	Number of replacements
Katanga 2mm LVT	2.0	3.61	7	9.8
Katanga 3mm LVT	3.0	4.31	10	6.5
Katanga 5mm LVT	5.0	5.27	10	6.5

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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 8 and illustrated in Figure 1.

Table 8. *The modules and unit processes included in the scope for the 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

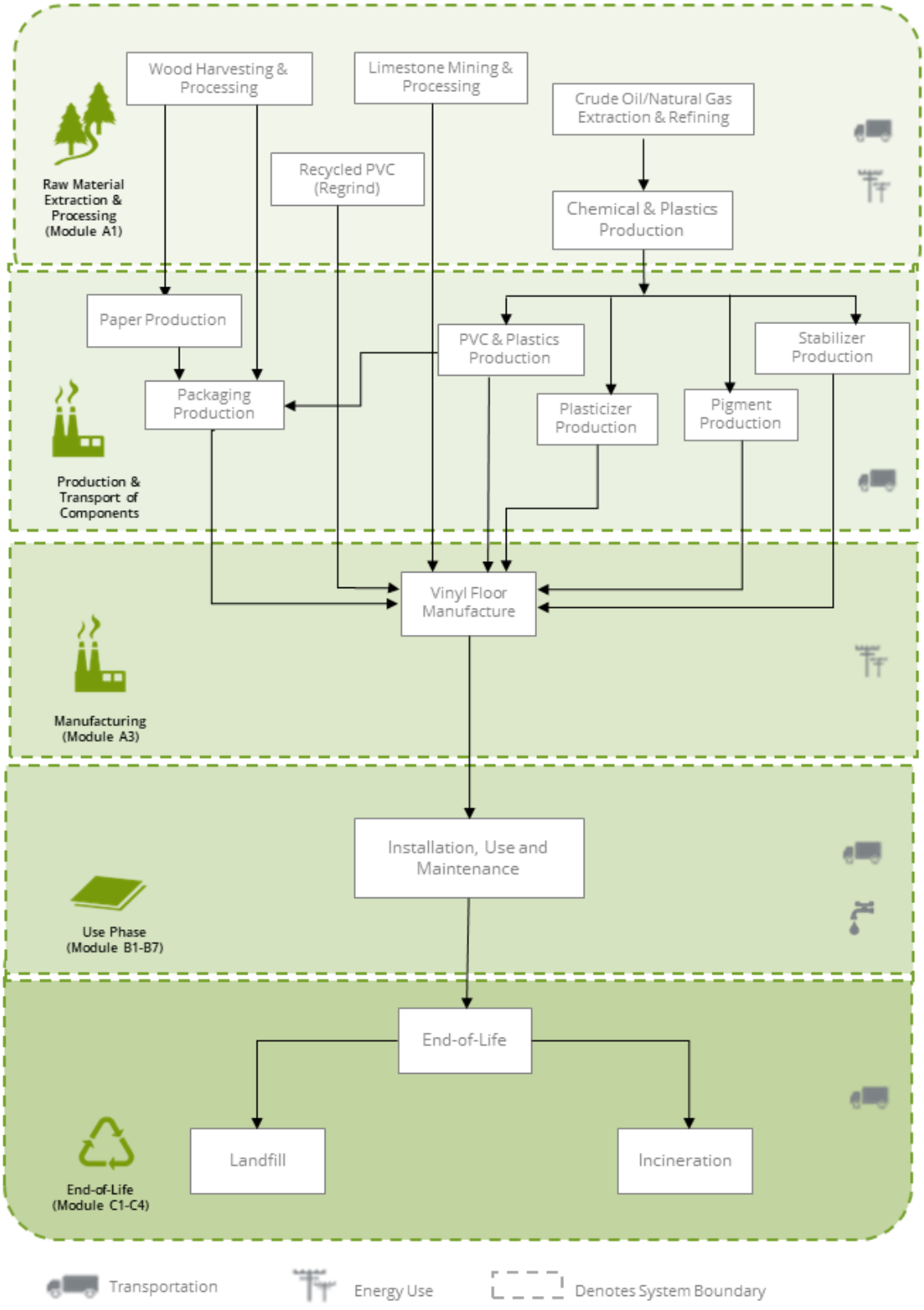

Figure 1. *Flow diagram for the life cycle of the LVT flooring products.*

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 manufacturing facility under review is located in Korea. Ecoinvent inventory datasets for the appropriate regional energy grid was used to model resource use and emissions from electricity use at the manufacturing facility.
- Life cycle inventory data for the plasticizer, dioctyl terephthalate (DOTP), were not available. Inventory data developed for diisoheptyl phthalate (DIHP) was used as a surrogate to represent DOTP in the LCA model.
- 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 Cobalt Surfaces assuming their products are installed and maintained as recommended and used for the specific application noted.
- Downstream transport was modeled based on information provided by Cobalt Surfaces representing transport for 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, disposal of product and product packaging is modeled based on the PCR guidance regarding recycling rates of product and packaging materials.
- For final disposal of the packaging material and flooring products at end-of-life, all materials are assumed to be transported 161 km by diesel truck to either a landfill or material reclamation facility (for recycling) per Part B PCR. 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 9. *Data sources for the LVT flooring products.*

Component	Dataset	Data Source	Publication data
PRODUCT			
PVC			
Polyvinyl Chloride	polyvinylchloride production, bulk polymerisation | polyvinylchloride, bulk polymerised | Cutoff, S/RoW	EI v3.8	2021
Filler			
Calcium Carbonate	limestone production, crushed, washed | limestone, crushed, washed | Cutoff, S/RoW	EI v3.8	2021
Plasticizer			
PVC Plasticizer	diisoheptyl phthalate (DIHP) {GLO} | market for | Alloc Rec U System	EI v3.8	2021
Stabilizer			
Stabilizer	market for chemical, organic | chemical, organic | Cutoff, S/GLO	EI v3.8	2021
	market for chemicals, inorganic | chemical, inorganic | Cutoff, S/GLO	EI v3.8	2021
	market for limestone, crushed, washed | limestone, crushed, washed | Cutoff, S/RoW	EI v3.8	2021
	market for zinc oxide | zinc oxide | Cutoff, S/GLO	EI v3.8	2021
Wear Layer			
Wear layer	polyvinylchloride production, bulk polymerisation | polyvinylchloride, bulk polymerised | Cutoff, S/RoW; diisoheptyl phthalate (DIHP)* {GLO} | market for | Alloc Rec U System	EI v3.8	2021
Other			
Pigments, Catalysts, Additives	acrylic dispersion production, product in 65% solution state | acrylic dispersion, without water, in 65% solution state | Cutoff, S/RoW; chemical production, organic | chemical, organic | Cutoff, S/GLO; carbon black production | carbon black | Cutoff, S/GLO; synthetic rubber production | synthetic rubber | Cutoff, S/RoW; glass fibre production | glass fibre | Cutoff, S/RoW;	EI v3.8	2021
PACKAGING			
Cardboard	containerboard production, linerboard, kraftliner | containerboard, linerboard | Cutoff, S/RoW	EI v3.8	2021
Wrapping film	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.8	2021
Plastics	polypropylene production, granulate | polypropylene, granulate | Cutoff, S/RoW; polyurethane adhesive production | polyurethane adhesive | Cutoff, S/GLO	EI v3.8	2021
Wood	market for EUR-flat pallet | EUR-flat pallet | Cutoff, S/GLO	EI v3.8	2021
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 v3.8	2021
Rail transport	transport, freight train, diesel | transport, freight train | Cutoff, S/RoW	EI v3.8	2021
Ship transport	transport, freight, sea, container ship | transport, freight, sea, container ship | Cutoff, S/GLO	EI v3.8	2021
RESOURCES			
Grid electricity	market for electricity, medium voltage | electricity, medium voltage | Cutoff, S/KR	EI v3.8	2021
Heat – natural gas	heat production, natural gas, at boiler modulating >100kW | heat, district or industrial, natural gas | Cutoff, S/RoW	EI v3.8	2021

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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 10. *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 (typically 2016). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annualized production for 2021.
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 disposal are based on US statistics.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative 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 v3.8 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 v3.8 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 products covered by this EPD remain consistent with the products represented by the 2021 production data. Distribution and product lifetime assumptions have been updated based on information provided by the declaration owner.

3.10 ALLOCATION

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

3.11 COMPARABILITY

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

4. LCA: Scenarios and Additional Technical Information

Delivery and Installation stage (A4 - A5)

Distribution of the flooring products to the point of installation is included in the assessment based on information provided by Cobalt Surfaces. Transportation parameters for modeling transport to consumer markets are summarized in Table 11.

Table 11. *Product distribution parameters by transport mode and consumer market.*

Parameter	Value			
Diesel truck – Fuel utilization (L/100 km)	18.7			
Diesel truck – Capacity utilization (%)	76%			
Diesel rail – Fuel utilization (g/tkm)	10			
Diesel rail – Capacity utilization (%)	76%			
Ocean freighter – Fuel utilization (g/tkm)	2.5			
Ocean freighter – Capacity utilization (%)	65%			
Product	Transport distance (km)			
	Truck	Rail	Ship	Mass (kg)
Katanga 2mm LVT	831	0	15815	3.91
Katanga 3mm LVT	831	0	15815	4.62
Katanga 5mm LVT	831	0	15815	6.28

Installation of the product is accomplished using hand tools with no associated emissions and negligible impacts. The impacts associated with packaging disposal are included with the installation phase as per PCR requirements.

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Table 12. *Installation parameters for the LVT flooring products, per 1 m^2 (A5).*

Parameter	Value			
Ancillary materials	-			
Net freshwater consumption (m^3)	-			
Electricity consumption (kWh)	-			
Product loss per functional unit (kg)	negligible			
Waste materials generated by product installation (kg)	negligible			
Output materials resulting from on-site waste processing (kg)	na			
Direct emissions (kg)	-			
Product	Mass of packaging waste (kg)			Biogenic carbon in packaging (kg CO_2)
	Plastic	Corrugate	Wood	
Katanga 2mm LVT	$1.72x10^{-2}$	0.121	0.170	0.534
Katanga 3mm LVT	$1.82x10^{-2}$	0.120	0.172	0.535
Katanga 5mm LVT	$2.53x10^{-2}$	0.163	0.827	1.81

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

Table 13. *Maintenance parameters for the flooring products, per 1 m^2.*

Parameter	Unit	Value
Maintenance process	-	Damp mopping
Net freshwater consumption	$m^3/m^2/yr$	0.0058
Cleaning agent	$kg/m^2/yr$	0.0119
Maintenance process	-	Spray buffing
Electricity	$kWh/m^2/yr$	0.022
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.

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*). For the LVT 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 distance to disposal, consistent with the Part B PCR. The recycling rates used for the product packaging are based on national waste disposal statistics regarding recycling rates for North America as specified in the PCR. No recycling of the product materials is assumed at end-of-life. The relevant disposal statistics used for the packaging are summarized in Table 15.

Table 14. *Recycling rates for packaging materials at end-of-life.*

Material	North America
Packaging	
Paper & Pulp	78%
Wood	26%
Plastics	15%
Disposal of Non-recyclables	
Landfill	80%
Incineration	20%

Table 15. *End-of-life disposal scenario parameters for the flooring product.*

Product	Scenario assumptions	Collection process		Recovery	Disposal			Removals of biogenic carbon
		Collected separately	Collected with mixed waste		Recycling	Landfill	Incineration	
Katanga 2mm LVT	100% Landfill	-	3.91	n/a	0.0	3.91	0.0	n/a
Katanga 3mm LVT	100% Landfill	-	4.62	n/a	0.0	4.62	0.0	n/a
Katanga 5mm LVT	100% Landfill	-	6.28	n/a	0.0	6.28	0.0	n/a

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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 and CML-IA.

CMLI-A Impact Category	Unit	TRACI 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: freshwater (EP-freshwater)*	kg P eq
Photochemical Oxidant Creation Potential **(POCP)**	kg C_2H_4 eq	Eutrophication Potential: marine (EP-marine)*	kg N eq
Abiotic depletion potential **(ADP-elements)** for non-fossil resources	kg Sb eq	Smog Formation Potential **(SFP)**	kg O_3 eq
Abiotic depletion potential **(ADP-fossil fuels)** for fossil resources	MJ, LHV		

*TRACI 2.1 reports eutrophication as a single indicator in kg N-eq. The freshwater and marine eutrophication indicators shown here are derived from the TRACI 2.1 eutrophication result using Smart EPD's errata guidance. Marine eutrophication was assigned 10% of the result and reported in kg N-eq. Freshwater eutrophication was assigned 90% of the result and converted to kg P-eq using the 7.23 conversion factor.

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, module C1 is likewise not associated with any impact as the floor is manually deconstructed. Additionally, as the LVT flooring products do not typically contain significant amounts of bio-based materials, biogenic carbon emissions and removals are not declared. Module D is not declared. In the interest of space and table readability, these modules are not included in the results presented below.

Table 16. *Life Cycle Impact Assessment (LCIA) results for the* **Katanga 2mm LVT** *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. Commercial use.*

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML-IA									
GWP (kg CO_2 eq)	1.91	$5.67x10^{-2}$	2.04	1.13	0.112	9.21	69.1	0.735	1.12
	2.2%	0.066%	2.4%	1.3%	0.13%	11%	81%	0.86%	1.3%
AP (kg SO_2 eq)	$7.85x10^{-3}$	$2.21x10^{-4}$	$4.35x10^{-3}$	$1.73x10^{-2}$	$3.10x10^{-4}$	$4.33x10^{-2}$	0.329	$3.43x10^{-3}$	$3.62x10^{-4}$
	1.9%	0.054%	1.1%	4.3%	0.076%	11%	81%	0.84%	0.089%
EP (kg $(PO_4)^{3-}$ eq)	$2.29x10^{-3}$	$5.11x10^{-5}$	$5.13x10^{-3}$	$2.18x10^{-3}$	$4.37x10^{-4}$	$1.61x10^{-2}$	0.201	$7.34x10^{-4}$	$9.84x10^{-3}$
	0.96%	0.022%	2.2%	0.92%	0.18%	6.8%	85%	0.31%	4.1%
POCP (kg C_2H_4 eq)	$4.55x10^{-4}$	$7.53x10^{-6}$	$2.61x10^{-4}$	$4.63x10^{-4}$	$1.89x10^{-5}$	$2.80x10^{-3}$	$1.51x10^{-2}$	$1.13x10^{-4}$	$2.37x10^{-4}$
	2.3%	0.039%	1.3%	2.4%	0.097%	14%	78%	0.58%	1.2%
ODP (kg CFC-11 eq)	$6.72x10^{-7}$	$9.85x10^{-9}$	$6.55x10^{-8}$	$1.88x10^{-7}$	$1.13x10^{-8}$	$4.41x10^{-7}$	$1.05x10^{-5}$	$1.27x10^{-7}$	$9.53x10^{-9}$
	5.6%	0.082%	0.54%	1.6%	0.093%	3.7%	87%	1.1%	0.079%
ADPE (kg Sb eq)	$2.42x10^{-5}$	$1.97x10^{-7}$	$2.87x10^{-6}$	$2.72x10^{-6}$	$6.26x10^{-8}$	$1.84x10^{-4}$	$3.00x10^{-4}$	$6.47x10^{-7}$	$1.81x10^{-7}$
	4.7%	0.038%	0.56%	0.53%	0.012%	36%	58%	0.13%	0.035%
ADPF (MJ eq)	43.6	0.840	21.2	15.6	0.901	197	905	10.1	0.993
	3.6%	0.07%	1.8%	1.3%	0.075%	17%	76%	0.84%	0.083%
TRACI									
GWP (kg CO_2 eq)	1.89	$5.66x10^{-2}$	1.96	1.13	0.104	9.12	66.1	0.735	0.922
	2.3%	0.069%	2.4%	1.4%	0.13%	11%	81%	0.9%	1.1%
AP (kg SO_2 eq)	$7.97x10^{-3}$	$2.58x10^{-4}$	$5.02x10^{-3}$	$1.86x10^{-2}$	$3.83x10^{-4}$	$4.43x10^{-2}$	0.361	$4.24x10^{-3}$	$7.52x10^{-4}$
	1.8%	0.058%	1.1%	4.2%	0.087%	10%	82%	0.96%	0.17%
EP-freshwater (kg P eq)	$5.45x10^{-4}$	$7.70x10^{-6}$	$1.44x10^{-3}$	$1.81x10^{-4}$	$1.34x10^{-4}$	$3.96x10^{-3}$	$5.55x10^{-2}$	$6.71x10^{-5}$	$3.34x10^{-3}$
	0.8%	0.01%	2.2%	0.28%	0.21%	6.1%	85%	0.10%	5.1%
EP-marine (kg N eq)	$4.38x10^{-4}$	$6.18x10^{-6}$	$1.16x10^{-3}$	$1.45x10^{-4}$	$1.07x10^{-4}$	$3.18x10^{-3}$	$4.46x10^{-2}$	$5.39x10^{-5}$	$2.68x10^{-3}$
	0.8%	0.01%	2.2%	0.28%	0.21%	6.1%	85%	0.10%	5.1%
SFP (kg O_3 eq)	$9.92x10^{-2}$	$6.20x10^{-3}$	$9.33x10^{-2}$	0.357	$1.07x10^{-2}$	0.510	6.75	0.120	$8.13x10^{-3}$
	1.2%	0.078%	1.2%	4.5%	0.13%	6.4%	85%	1.5%	0.1%
ODP (kg CFC-11 eq)	$7.02x10^{-7}$	$1.31x10^{-8}$	$9.14x10^{-8}$	$2.50x10^{-7}$	$1.50x10^{-8}$	$5.45x10^{-7}$	$1.22x10^{-5}$	$1.70x10^{-7}$	$1.27x10^{-8}$
	5%	0.094%	0.65%	1.8%	0.11%	3.9%	87%	1.2%	0.091%

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Table 17. *Resource use and waste flows for the* **Katanga 2mm LVT** *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. Commercial use.*

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	1.41	$9.59x10^{-3}$	5.10	0.143	$4.37x10^{-3}$	19.5	65.4	$3.85x10^{-2}$	$3.25x10^{-2}$
	1.5%	0.01%	5.6%	0.16%	0.0048%	21%	71%	0.042%	0.035%
RPR_M (MJ)	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%
$NRPR_E$ (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$NRPR_M$ (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SM (kg)	1.91	0.00	0.00	0.00	0.00	0.00	18.5	0.00	0.00
	9.3%	0%	0%	0%	0%	0%	91%	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)	0.132	$5.87x10^{-4}$	0.118	$8.43x10^{-3}$	$3.57x10^{-4}$	1.16	2.57	$3.18x10^{-3}$	$1.78x10^{-3}$
	3.3%	0.015%	3%	0.21%	0.0089%	29%	64%	0.08%	0.045%
Wastes									
HWD (kg)	$2.33x10^{-5}$	$2.25x10^{-6}$	$1.27x10^{-5}$	$2.89x10^{-5}$	$2.42x10^{-6}$	$1.12x10^{-4}$	$9.67x10^{-4}$	$2.74x10^{-5}$	$2.55x10^{-6}$
	2%	0.19%	1.1%	2.5%	0.2%	9.5%	82%	2.3%	0.22%
NHWD (kg)	0.215	$4.32x10^{-2}$	0.696	0.441	0.139	0.824	50.5	$5.13x10^{-2}$	3.62
	0.38%	0.076%	1.2%	0.78%	0.25%	1.5%	89%	0.091%	6.4%
HLRW (kg)	$6.92x10^{-6}$	$4.31x10^{-8}$	$3.31x10^{-5}$	$6.03x10^{-7}$	$1.90x10^{-8}$	$3.63x10^{-5}$	$3.98x10^{-4}$	$1.59x10^{-7}$	$1.71x10^{-7}$
	1.5%	0.0091%	7%	0.13%	0.004%	7.6%	84%	0.033%	0.036%
ILLRW (kg)	$5.14x10^{-5}$	$5.51x10^{-6}$	$6.57x10^{-5}$	$1.05x10^{-4}$	$6.30x10^{-6}$	$2.12x10^{-4}$	$3.02x10^{-3}$	$7.12x10^{-5}$	$5.59x10^{-6}$
	1.4%	0.16%	1.9%	3%	0.18%	6%	85%	2%	0.16%
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	0.141	0.00	1.37	0.00	0.00
	0%	0%	0%	0%	9.3%	0%	91%	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 (LCIA) results for the* **Katanga 3mm LVT** *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. Commercial use.*

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML-IA									
GWP (kg CO_2 eq)	3.49	$5.18x10^{-2}$	1.65	1.34	0.113	9.21	57.9	0.879	1.39
	4.6%	0.068%	2.2%	1.8%	0.15%	12%	76%	1.2%	1.8%
AP (kg SO_2 eq)	$1.41x10^{-2}$	$2.02x10^{-4}$	$4.28x10^{-3}$	$2.04x10^{-2}$	$3.12x10^{-4}$	$4.33x10^{-2}$	0.285	$4.10x10^{-3}$	$4.40x10^{-4}$
	3.8%	0.054%	1.1%	5.5%	0.084%	12%	77%	1.1%	0.12%
EP (kg $(PO_4)^{3-}$ eq)	$4.10x10^{-3}$	$4.66x10^{-5}$	$3.51x10^{-3}$	$2.58x10^{-3}$	$4.43x10^{-4}$	$1.61x10^{-2}$	0.151	$8.77x10^{-4}$	$1.17x10^{-2}$
	2.1%	0.024%	1.8%	1.4%	0.23%	8.4%	79%	0.46%	6.2%
POCP (kg C_2H_4 eq)	$8.08x10^{-4}$	$6.88x10^{-6}$	$1.76x10^{-4}$	$5.46x10^{-4}$	$1.90x10^{-5}$	$2.80x10^{-3}$	$1.29x10^{-2}$	$1.35x10^{-4}$	$2.96x10^{-4}$
	4.6%	0.039%	1%	3.1%	0.11%	16%	73%	0.76%	1.7%
ODP (kg CFC-11 eq)	$1.23x10^{-6}$	$9.00x10^{-9}$	$6.38x10^{-8}$	$2.22x10^{-7}$	$1.13x10^{-8}$	$4.41x10^{-7}$	$1.10x10^{-5}$	$1.52x10^{-7}$	$1.14x10^{-8}$
	9.3%	0.068%	0.48%	1.7%	0.086%	3.3%	84%	1.2%	0.086%
ADPE (kg Sb eq)	$4.34x10^{-5}$	$1.80x10^{-7}$	$2.84x10^{-6}$	$3.21x10^{-6}$	$6.30x10^{-8}$	$1.84x10^{-4}$	$3.29x10^{-4}$	$7.73x10^{-7}$	$2.20x10^{-7}$
	7.7%	0.032%	0.5%	0.57%	0.011%	33%	58%	0.14%	0.039%
ADPF (MJ eq)	80.3	0.767	21.1	18.4	0.907	197	876	12.0	1.19
	6.6%	0.064%	1.7%	1.5%	0.075%	16%	72%	1%	0.099%
TRACI									
GWP (kg CO_2 eq)	3.44	$5.17x10^{-2}$	1.65	1.34	0.105	9.12	55.9	0.879	1.14
	4.7%	0.07%	2.2%	1.8%	0.14%	12%	76%	1.2%	1.6%
AP (kg SO_2 eq)	$1.43x10^{-2}$	$2.36x10^{-4}$	$4.92x10^{-3}$	$2.19x10^{-2}$	$3.86x10^{-4}$	$4.43x10^{-2}$	0.310	$5.06x10^{-3}$	$8.93x10^{-4}$
	3.6%	0.059%	1.2%	5.4%	0.096%	11%	77%	1.3%	0.22%
EP-freshwater (kg P eq)	$9.73x10^{-4}$	$7.03x10^{-6}$	$9.06x10^{-4}$	$2.13x10^{-4}$	$1.36x10^{-4}$	$3.96x10^{-3}$	$4.09x10^{-2}$	$8.02x10^{-5}$	$3.98x10^{-3}$
	1.5%	0.01%	1.4%	0.33%	0.21%	6.1%	63%	0.12%	6.1%
EP-marine (kg N eq)	$7.82x10^{-4}$	$5.65x10^{-6}$	$7.28x10^{-4}$	$1.71x10^{-4}$	$1.09x10^{-4}$	$3.18x10^{-3}$	$3.29x10^{-2}$	$6.44x10^{-5}$	$3.20x10^{-3}$
	1.9%	0.01%	1.8%	0.42%	0.27%	7.7%	80%	0.16%	7.8%
SFP (kg O3 eq)	0.178	$5.66x10^{-3}$	$9.18x10^{-2}$	0.421	$1.08x10^{-2}$	0.510	5.59	0.143	$9.79x10^{-3}$
	2.6%	0.081%	1.3%	6%	0.16%	7.3%	80%	2.1%	0.14%
ODP (kg CFC-11 eq)	$1.28x10^{-6}$	$1.20x10^{-8}$	$8.91x10^{-8}$	$2.95x10^{-7}$	$1.51x10^{-8}$	$5.45x10^{-7}$	$1.24x10^{-5}$	$2.03x10^{-7}$	$1.52x10^{-8}$
	8.6%	0.08%	0.6%	2%	0.1%	3.7%	83%	1.4%	0.1%

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Table 19. *Resource use and waste flows for the* **Katanga 3mm LVT** *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. Commercial use.*

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	2.55	$8.76x10^{-3}$	5.14	0.169	$4.39x10^{-3}$	19.5	51.7	$4.60x10^{-2}$	$3.99x10^{-2}$
	3.2%	0.011%	6.5%	0.21%	0.0055%	25%	65%	0.058%	0.05%
RPR_M (MJ)	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%
$NRPR_E$ (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$NRPR_M$ (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SM (kg)	1.99	0.00	0.00	0.00	0.00	0.00	12.9	0.00	0.00
	13%	0%	0%	0%	0%	0%	87%	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)	0.239	$5.36x10^{-4}$	0.118	$9.95x10^{-3}$	$3.59x10^{-4}$	1.16	2.43	$3.80x10^{-3}$	$2.18x10^{-3}$
	6%	0.014%	3%	0.25%	0.0091%	29%	61%	0.096%	0.055%
Wastes									
HWD (kg)	$4.20x10^{-5}$	$2.05x10^{-6}$	$1.21x10^{-5}$	$3.41x10^{-5}$	$2.43x10^{-6}$	$1.12x10^{-4}$	$8.36x10^{-4}$	$3.28x10^{-5}$	$3.13x10^{-6}$
	3.9%	0.19%	1.1%	3.2%	0.23%	10%	78%	3%	0.29%
NHWD (kg)	0.373	$3.95x10^{-2}$	$6.36x10^{-2}$	0.520	0.141	0.824	35.9	$6.13x10^{-2}$	4.32
	0.88%	0.093%	0.15%	1.2%	0.33%	2%	85%	0.15%	10%
HLRW (kg)	$1.25x10^{-5}$	$3.93x10^{-8}$	$3.30x10^{-5}$	$7.11x10^{-7}$	$1.91x10^{-8}$	$3.63x10^{-5}$	$3.04x10^{-4}$	$1.90x10^{-7}$	$2.10x10^{-7}$
	3.2%	0.01%	8.5%	0.18%	0.0049%	9.4%	79%	0.049%	0.054%
ILLRW (kg)	$9.32x10^{-5}$	$5.04x10^{-6}$	$6.47x10^{-5}$	$1.24x10^{-4}$	$6.34x10^{-6}$	$2.12x10^{-4}$	$2.51x10^{-3}$	$8.51x10^{-5}$	$6.70x10^{-6}$
	3%	0.16%	2.1%	4%	0.2%	6.8%	81%	2.7%	0.22%
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	0.141	0.00	0.917	0.00	0.00
	0%	0%	0%	0%	13%	0%	87%	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 20. *Life Cycle Impact Assessment (LCIA) results for the* **Katanga 5mm LVT** *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. Commercial use.*

Impact Category	A1	A2	A3	A4	A5	B2	B4	C2	C4
CML-IA									
GWP (kg CO_2 eq)	2.84	$8.38x10^{-2}$	2.43	1.82	0.302	9.21	66.2	1.07	1.65
	3.3%	0.098%	2.8%	2.1%	0.35%	11%	77%	1.3%	1.9%
AP (kg SO_2 eq)	$1.16x10^{-2}$	$3.26x10^{-4}$	$5.88x10^{-3}$	$2.78x10^{-2}$	$1.02x10^{-3}$	$4.33x10^{-2}$	0.339	$5.01x10^{-3}$	$5.30x10^{-4}$
	2.7%	0.075%	1.4%	6.4%	0.24%	10%	78%	1.2%	0.12%
EP (kg $(PO_4)^{3-}$ eq)	$3.36x10^{-3}$	$7.55x10^{-5}$	$6.05x10^{-3}$	$3.50x10^{-3}$	$1.65x10^{-3}$	$1.61x10^{-2}$	0.196	$1.07x10^{-3}$	$1.44x10^{-2}$
	1.4%	0.031%	2.5%	1.4%	0.68%	6.7%	81%	0.44%	5.9%
POCP (kg C_2H_4 eq)	$6.62x10^{-4}$	$1.11x10^{-5}$	$4.09x10^{-4}$	$7.43x10^{-4}$	$5.06x10^{-5}$	$2.80x10^{-3}$	$1.55x10^{-2}$	$1.65x10^{-4}$	$3.48x10^{-4}$
	3.2%	0.054%	2%	3.6%	0.24%	14%	75%	0.8%	1.7%
ODP (kg CFC-11 eq)	$1.00x10^{-6}$	$1.46x10^{-8}$	$9.16x10^{-8}$	$3.02x10^{-7}$	$3.73x10^{-8}$	$4.41x10^{-7}$	$1.07x10^{-5}$	$1.86x10^{-7}$	$1.39x10^{-8}$
	7.8%	0.11%	0.72%	2.4%	0.29%	3.4%	84%	1.5%	0.11%
ADPE (kg Sb eq)	$3.55x10^{-5}$	$2.91x10^{-7}$	$4.95x10^{-6}$	$4.37x10^{-6}$	$2.08x10^{-7}$	$1.84x10^{-4}$	$3.02x10^{-4}$	$9.45x10^{-7}$	$2.65x10^{-7}$
	6.7%	0.055%	0.93%	0.82%	0.039%	35%	57%	0.18%	0.05%
ADPF (MJ eq)	65.2	1.24	25.7	25.1	2.99	197	886	14.7	1.45
	5.3%	0.1%	2.1%	2.1%	0.24%	16%	73%	1.2%	0.12%
TRACI									
GWP (kg CO_2 eq)	2.80	$8.37x10^{-2}$	2.32	1.82	0.287	9.12	63.3	1.07	1.35
	3.4%	0.1%	2.8%	2.2%	0.35%	11%	77%	1.3%	1.6%
AP (kg SO_2 eq)	$1.18x10^{-2}$	$3.82x10^{-4}$	$6.68x10^{-3}$	$2.98x10^{-2}$	$1.26x10^{-3}$	$4.43x10^{-2}$	0.372	$6.19x10^{-3}$	$1.10x10^{-3}$
	2.5%	0.081%	1.4%	6.3%	0.27%	9.4%	79%	1.3%	0.23%
EP-freshwater (kg P eq)	$7.97x10^{-4}$	$1.14x10^{-5}$	$1.69x10^{-3}$	$2.90x10^{-4}$	$5.15x10^{-4}$	$3.96x10^{-3}$	$5.38x10^{-2}$	$9.81x10^{-5}$	$4.88x10^{-3}$
	1.2%	0.02%	2.6%	0.45%	0.79%	6.1%	83%	0.15%	7.5%
EP-marine (kg N eq)	$6.41x10^{-4}$	$9.14x10^{-6}$	$1.35x10^{-3}$	$2.33x10^{-4}$	$4.14x10^{-4}$	$3.18x10^{-3}$	$4.32x10^{-2}$	$7.88x10^{-5}$	$3.92x10^{-3}$
	1.2%	0.02%	2.6%	0.44%	0.78%	6.0%	81%	0.15%	7.4%
SFP (kg O3 eq)	0.147	$9.16x10^{-3}$	0.124	0.573	$3.55x10^{-2}$	0.510	6.99	0.175	$1.19x10^{-2}$
	1.7%	0.11%	1.4%	6.7%	0.41%	5.9%	82%	2%	0.14%
ODP (kg CFC-11 eq)	$1.05x10^{-6}$	$1.94x10^{-8}$	$1.25x10^{-7}$	$4.02x10^{-7}$	$4.97x10^{-8}$	$5.45x10^{-7}$	$1.24x10^{-5}$	$2.48x10^{-7}$	$1.86x10^{-8}$
	7%	0.13%	0.84%	2.7%	0.33%	3.7%	83%	1.7%	0.12%

Table 21. *Resource use and waste flows for the* **Katanga 5mm LVT** *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. Commercial use.*

Parameter	A1	A2	A3	A4	A5	B2	B4	C2	C4
Resources									
RPR_E (MJ)	2.08	$1.42x10^{-2}$	22.6	0.229	$1.42x10^{-2}$	19.5	163	$5.62x10^{-2}$	$4.76x10^{-2}$
	1%	0.0068%	11%	0.11%	0.0068%	9.4%	79%	0.027%	0.023%
RPR_M (MJ)	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%
$NRPR_E$ (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$NRPR_M$ (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SM (kg)	2.72	0.00	0.00	0.00	0.00	0.00	17.7	0.00	0.00
	13%	0%	0%	0%	0%	0%	87%	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)	0.195	$8.68x10^{-4}$	0.134	$1.35x10^{-2}$	$1.16x10^{-3}$	1.16	2.28	$4.65x10^{-3}$	$2.60x10^{-3}$
	5.1%	0.023%	3.5%	0.36%	0.031%	31%	60%	0.12%	0.069%
Wastes									
HWD (kg)	$3.42x10^{-5}$	$3.32x10^{-6}$	$1.99x10^{-5}$	$4.64x10^{-5}$	$7.98x10^{-6}$	$1.12x10^{-4}$	$1.01x10^{-3}$	$4.01x10^{-5}$	$3.74x10^{-6}$
	2.7%	0.26%	1.6%	3.6%	0.62%	8.8%	79%	3.1%	0.29%
NHWD (kg)	0.308	$6.39x10^{-2}$	0.923	0.708	0.552	0.824	51.4	$7.49x10^{-2}$	5.28
	0.51%	0.11%	1.5%	1.2%	0.92%	1.4%	85%	0.12%	8.8%
HLRW (kg)	$1.02x10^{-5}$	$6.37x10^{-8}$	$3.38x10^{-5}$	$9.67x10^{-7}$	$6.11x10^{-8}$	$3.63x10^{-5}$	$2.97x10^{-4}$	$2.33x10^{-7}$	$2.50x10^{-7}$
	2.7%	0.017%	8.9%	0.26%	0.016%	9.6%	78%	0.061%	0.066%
ILLRW (kg)	$7.75x10^{-5}$	$8.15x10^{-6}$	$7.74x10^{-5}$	$1.69x10^{-4}$	$2.09x10^{-5}$	$2.12x10^{-4}$	$3.03x10^{-3}$	$1.04x10^{-4}$	$8.16x10^{-6}$
	2.1%	0.22%	2.1%	4.6%	0.56%	5.7%	82%	2.8%	0.22%
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	0.346	0.00	2.25	0.00	0.00
	0%	0%	0%	0%	13%	0%	87%	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 of the assessment. Of the remaining life cycle phases, the product maintenance and raw material extraction and processing phases are generally the largest contributors to the overall impacts, depending on the specific indicator, followed by the product distribution and disposal phases.

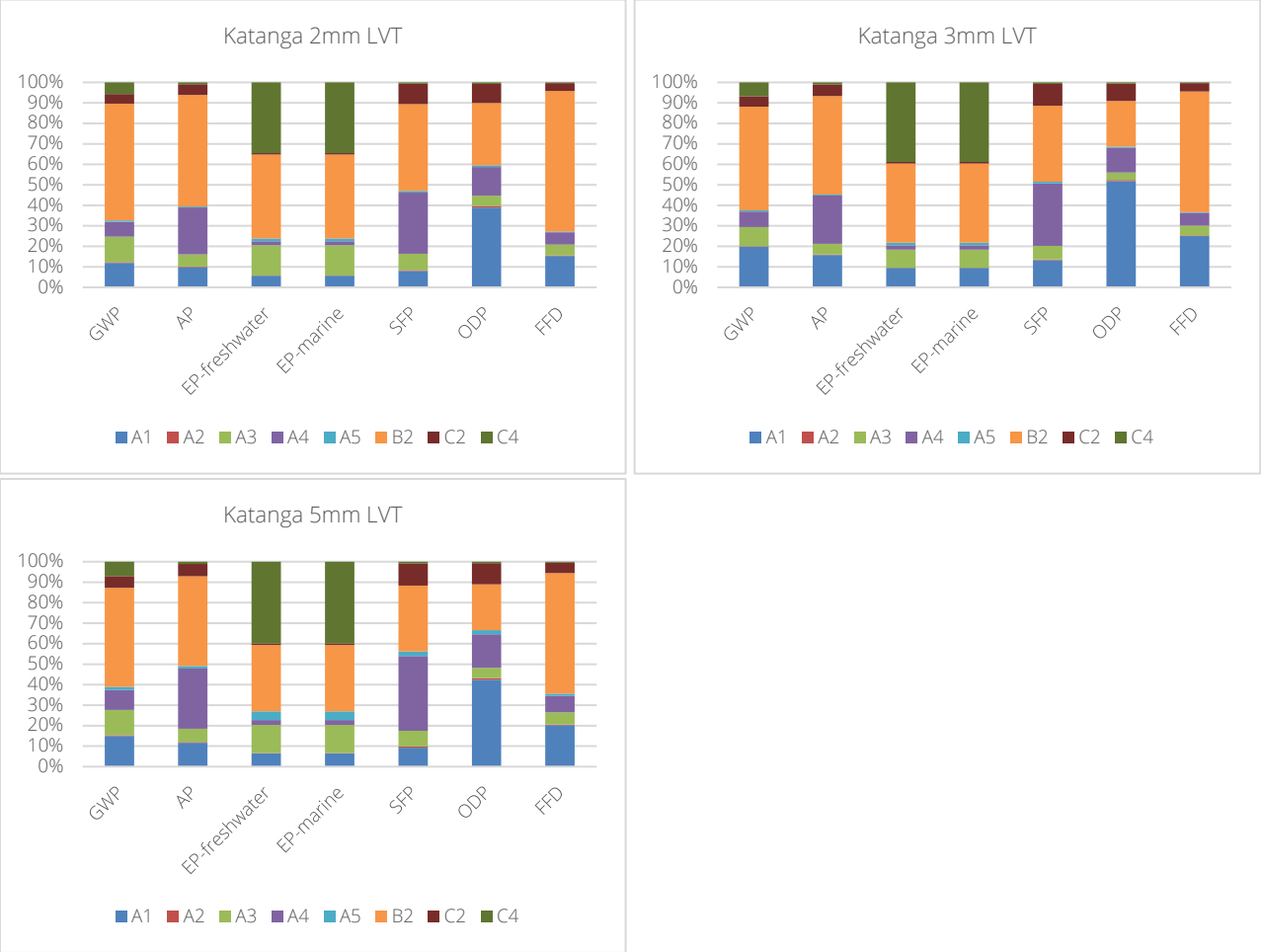

Figure 2. *Contribution results for the Katanga LVT flooring products – TRACI results (excluding product replacements).*

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