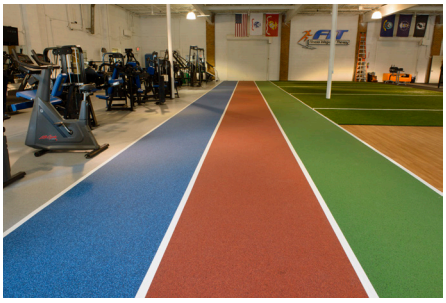
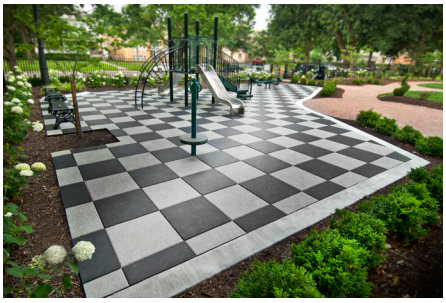




ENVIRONMENTAL PRODUCT DECLARATION

ecore™

PRODUCTS:

ECOsurfaces
UltraTile/ECOmax
QT Sound Control/ECOsilence
Performance/ECOrx/ECOfit
PlayGuard
Everlast

ECORE's mission is to transform reclaimed waste into surfaces that aim to help improve people's lives via a wide range of flooring applications. ECORE's rubber tile and rolled goods products, manufactured at its Pennsylvania facilities, contain recycled styrene butadiene (SBR) and ethylene propylene diene monomer (EPDM) rubber to reduce waste, with many of its products having earned third-party certifications for conformance with environmental standards.

FUNCTIONAL UNIT:

1 m^2 of floor covering provided and maintained for a period of 60 years.

EPD NUMBER AND PERIOD OF VALIDITY:

SCS-EPD-03576 • • • April 1, 2015 - March 31, 2020

PRODUCT CATEGORY RULE:

Product Category Rule (PCR) for preparing an Environmental Product Declaration (EPD) for Flooring: Carpet, Resilient, Laminate, Ceramic, Wood. NSF International. Version 2. 2014.

PROGRAM OPERATOR:

SCSglobal SERVICES

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

VERIFIED by SCS GLOBAL SERVICES™
ENVIRONMENTAL PRODUCT DECLARATION
BASED ON LCA

Table of Contents

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

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 and may include error factors up to a million-fold.*

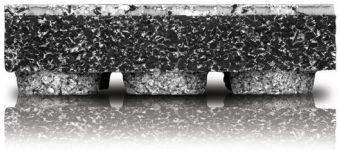
Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of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

PCR review, was conducted by	Jack Geibig, EcoForm
Approved April 1, 2015. Valid until March 31, 2020.	
Independent verification of the declaration and data, according to ISO 14025:2006 and ISO 21930:2007.	☐ internal ☑ external
Third party verifier	FKommonen Fjalar Kommonen, FFK Ltd.

PRODUCT DESCRIPTION:

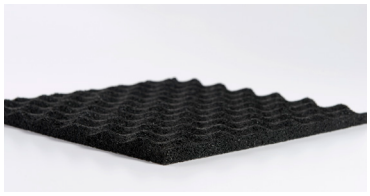
ECOsurfaces high quality recycled rubber flooring offers personalized designs for a multitude of markets. ECOsurfaces flooring uses recycled material resources and is FloorScore® certified for use in high performance schools and office buildings. This product has the potential to contribute towards earning points for LEED certification.

UltraTile is a durable product that can be placed over existing flooring and does not require adhesive. A dowel rod fastening system allows for quick replacement or movement of tiles. UltraTile can withstand constant dropping of weights and pounding, is noise absorbent, slip resistant wet or dry, and can contribute toward earning LEED points.

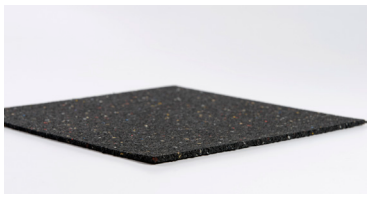


ECOmax is versatile for applications ranging from rooftops and patios to weight rooms. ECOmax is sound and shock absorbent, slip resistant wet or dry, meets ADA standards, and provides drainage application.

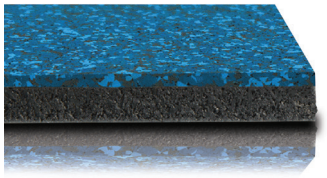
QT sound control underlayment (scu) is a flat, resilient rubber underlayment used directly under most floor finishes, yielding exceptional results even under hard surface flooring and over concrete and wood joist construction. QT resilient base mat (rbm) is a dimpled, resilient base mat that can be applied under gypsum or full weight concrete to produce some of the thinnest sound rated systems in the industry.



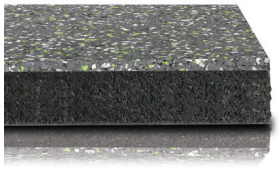
ECOsilence is a flat, resilient underlayment that is compatible with most floor finishes. ECOsilence is made from recycled rubber, holds a lifetime warranty, adheres to indoor air quality (IAQ) standards and building codes, and exceeds Impact Insulation Class (IIC) requirements.



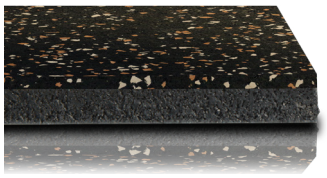
Performance is a sports flooring product ideal for multi-purpose areas, indoor tracks, gymnasiums, aerobic centers, and court surfaces. The multi-layer product provides high performance and durability. Performance is created by fusing the flooring's wear layer to backing comprised of up to 91% post-consumer recycled rubber.



ECOrx delivers cushioned relief without the need for an onsite underlayment application, which reduces the time and cost of the installation process. Factory preparation of ECOrx includes the fusion of the backing to the wear layer and the application of ECOguard, a water-based polymeric maintenance coating that is applied on-site at ECORE™, which eliminates the need for initial on-site sealant and protects the floor from dirt and scuffs.

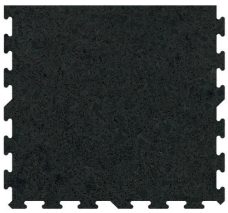


ECOfit is designed for bodies in motion. Whether it's a traditional health and fitness application or a very active work environment, ECOfit provides ample sound and shock absorption and comfort underfoot with a focus on dynamic energy return. This engineered floor provides enhanced performance, while mitigating fatigue and the risk of injury.



PlayGuard playground tiles are designed exclusively to reduce the risk of serious injury associated with falls from playground equipment. It features easy installation and maintenance, bold color choices, and the industry's only 15-year warranty. In addition to playground application, PlayGuard can be used for aquariums, outdoor venues, rooftops, and patios. This product complies with the requirements of ASTM F1292-04 standard specification for impact attenuation of surface system under and around playground equipment.

Everlast fitness flooring is made from high quality recycled rubber, colorful EPDM flecks, and pre and post-consumer Nike Grind rubber. This product is meant for fitness areas, including weight rooms, cardio areas, etc.



PRODUCT PERFORMANCE:

Table 1. *Product performance test results for ECOsurfaces.*

F3041-Standard Specification for Bonded Rubber Crumb Floor Coverings	Tests Required	
Characteristic	**ASTM Test Method**	**Test Results**
Abrasion Resistance	D3389	Pass
Flexibility	F137	Pass
Static Load Limit	F970	< 0.005 in, Pass
Dimensional Stability	F2199	Pass
Resistance to Heat	F1514	Pass
Chemical Resistance	F925	No change
Roll Thickness	F386	Pass
Tile Thickness	F386	Pass
Tile Size	F2055	Pass
Tile Squareness	F2055	Pass
Other Tests		
Characteristic	**Test Method**	**Test Results**
Sound Transmission Coefficient	ASTM 413	51 min
Impact Insulation Class	ASTM E492	49 min
Coefficient of Friction	ASTM 2047	≥0.9
Ambient Noise Reduction	ASTM C423	0.10 sabin/ft^2
Tensile Strength	ASTM D412	200 lb/in^2

Table 2. *Product performance test results for Everlast.*

F3041-Standard Specification for Bonded Rubber Crumb Floor Coverings	Tests Required	
Characteristic	**ASTM Test Method**	**Test Results**
Abrasion Resistance	D3389	Pass
Flexibility	F137	Pass
Static Load Limit	F970	less than 0.020 in, Pass
Dimensional Stability	F2199	Pass
Resistance to Heat	F1514	Pass
Chemical Resistance	F925	No change
Roll Thickness	F386	Pass
Tile Thickness	F386	Pass
Tile Size	F2055	Pass
Tile Squareness	F2055	Pass
Other Tests		
Characteristic	**Test Method**	**Test Results**
Ball Rebound	EN12235	Pass
Force Reduction	ASTM F2569 / EN14808	Class 1
Sound Transmission Coefficien	ASTM 413	45 min
Impact Insulation Class	ASTM E492	45 min
Coefficient of Friction	ASTM 2047	≥0.9
Ambient Noise Reduction	ASTM C423	0.10 sabin/ft^2
Tensile Strength	ASTM D412	200 lb/in^2

Table 3. *Product performance test results for QT/ECOsilence.*

F3041-Standard Specification for Bonded Rubber Crumb Floor Coverings	Tests Required	
Characteristic	**ASTM Test Method**	**Test Results**
Flexibility	F137	Pass
Other Tests		
Characteristic	**Test Method**	**Test Results**
Coefficient of Friction	ASTM D1894	1.2
Tensile Strength	ASTM D412	80 psi, min.
Crack Resistance	ANSI 118.12 5.4	High Performance
Compression @ 100 psi recovery	ASTM F36	20-30%, 85%, min.

Table 4. *Product performance test results for UltraTile/ECOmax.*

F3041-Standard Specification for Bonded Rubber Crumb Floor Coverings	Tests Required	
Characteristic	**ASTM Test Method**	**Test Results**
Abrasion Resistance	D3389	Pass
Flexibility	F137	Pass
Static Load Limit	F970	<0.005 in, Pass
Dimensional Stability	F2199	Pass
Resistance to Heat	F1514	Pass
Chemical Resistance	F925	No change
Roll Thickness	F386	Pass
Tile Thickness	F386	Pass
Tile Size	F2055	Pass
Tile Squareness	F2055	Pass
Other Tests		
Characteristic	**Test Method**	**Test Results**
Force Reduction	ASTM F2569 / EN14808	Class 1
Sound Transmission Coefficient	ASTM 413	51 min
Impact Insulation Class	ASTM E492	49 min
Coefficient of Friction	ASTM D2047	≥0.9
Ambient Noise Reduction	ASTM C423	0.10 sabin/ft^2
Tensile Strength	ASTM D412	200 lb/in^2

Table 5. *Product performance test results for Performance/ECOrx/ECOfit.*

F3041-Standard Specification for Bonded Rubber Crumb Floor Coverings	Tests Required	
Characteristic	**ASTM Test Method**	**Test Results**
Abrasion Resistance	D3389	Pass
Flexibility	F137	Pass
Static Load Limit	F970	Pass
Dimensional Stability	F2199	Pass
Resistance to Heat	F1514	Pass
Chemical Resistance	F925	No change
Roll Thickness	F386	Pass
Tile Thickness	F386	Pass
Tile Size	F2055	Pass
Tile Squareness	F2055	Pass
Other Tests		
Characteristic	**Test Method**	**Test Results**
Tensile Strength	ASTM D 412	> 200 PSI
Thermal Conductivity	ASTM C 518	> 0.4
Coefficient of Friction	ASTM D 2047	> 0.9
Standard Vertical Deformation	DIN 18032-2	0.7 mm
Deformation Trough W100	DIN 18032-2	0.0 mm
Rolling Load Limit	DIN 18032-2	1000 N
Ball Rebound	DIN 18032-2	99%
Impact Resistance	DIN 18032-2	15 Nm
Remaining Indentation	DIN 18032-2	0.12 mm

Table 6. *Product performance test results for PlayGuard.*

F3041-Standard Specification for Bonded Rubber Crumb Floor Coverings	Tests Required	
Characteristic	**ASTM Test Method**	**Test Results**
Abrasion Resistance	D3389	Pass
Flexibility	F137	Pass
Static Load Limit	F970	Pass
Dimensional Stability	F2199	Pass
Resistance to Heat	F1514	Pass
Chemical Resistance	F925	No change
Roll Thickness	F386	Pass
Tile Thickness	F386	Pass
Tile Size	F2055	Pass
Tile Squareness	F2055	Pass

PRODUCT APPLICATIONS:

Table 7. *Application of ECORE rubber flooring products.*

Product	Applications
ECOsurfaces	Education, offices, retail, hospitality, healthcare, airports, restaurants, daycare, nursing homes
UltraTile/ECOmax	Weight rooms, recreation, workout areas, aerobic areas, cardio areas, rooftops, patios
QT/ECOsilence	Underlayments for condos, high rise, education, retail, healthcare, nursing homes, restaurants, weight rooms, offices, recreation, fitness, airports, daycare, industrial
Performance/ECOrx/ECOfit	Training areas, aerobic areas, workout areas, education, daycare, nursing homes, retail, healthcare, tracks, pharmacies
PlayGuard	Playgrounds, rooftops, patios
Everlast	Weight rooms, aerobic areas, workout areas, cardio areas, recreation

MATERIAL CONTENT:

Table 8. *Origin and availability of the ECORE rubber flooring products.*

Component	Materials	Origin of Raw Materials	Availability		
			Renewable	Non-Renewable	Recycled
Stabilizer	Antioxidant	Global		Fossil resource, limited	
Filler	Calcium carbonate	Global		Mineral resource, abundant	
	Clay	Global		Mineral resource, abundant	
Coloring	Pigment	Global		Mineral Resource, abundant	
Modifier	Process Oil	Global		Fossil resource, limited	
Adhesive	Hot Melt Adhesive	Global		Fossil resource, limited	
Adhesive	Polymer Binder	Global		Fossil resource, limited	
Layer	Rubber, EPDM	Global		Fossil resource, limited	
Layer	Rubber, SBR, Crumb	US			Fossil resource, limited
Layer	Rubber, SBR, Recycled	US			Fossil resource, limited
Additive	Water	US	Region dependent		

Table 9. *Material content of the ECORE rubber flooring products.*

Component	Materials	Percentage of product on a mass basis					
		ECOsurfaces	UltraTile/ ECOmax	QT/ ECOsilence	Performance/ ECOrx / ECOfit	PlayGuard	Everlast
Filler	Calcium Carbonate	4.1 – 41 %	0.00 – 7.9 %	0.00 %	16 – 19 %	0.00 – 2.00 %	0.00 – 29 %
	Clay	1.4 – 14 %	0.00 – 2.64%	0.00 %	5.2 – 6.2 %	0.00 – 0.67 %	0.00 – 9.6 %
Coloring	Pigment	0.15 – 4.1 %	0.00 – 0.37 %	0.00 %	0.44 – 1.8 %	0.00 – 2.4 %	0.00 – 0.82 %
Modifier	Process Oil	0.9 – 8.9 %	0.00 – 1.7%	0.00 %	3.4 – 4.1 %	0.00 – 0.42 %	0.00 – 6.3 %
Adhesive	Hot Melt Adhesive	0.00 %	0.00 %	0.00 %	0.56 – 1.5 %	0.00 %	0.00 %
Adhesive	Polymer Binder	7.8 – 8.9 %	7.4 – 7.6 %	6.3 – 6.8 %	6.9 – 7.9 %	7.1 – 9.0 %	7.8 – 8.8 %
Layer	Rubber, EPDM	1.7 – 17 %	0.00 – 3.3 %	0.00 %	6.6 – 7.9 %	0.00 – 1.3 %	0.00 – 12 %
Layer	Rubber, SBR, Crumb	4.6 – 82 %	75 – 92 %	73– 93 %	41 – 55 %	86 – 92 %	32 – 90 %
Layer	Rubber, SBR, Recycled	0.00 %	0.00 – 0.12 %	0.00 – 20 %	0.00 – 10 %	0.00 %	0.00 %
Additive	Water	0.79 %	0.86 – 0.93 %	0.64 – 0.68 %	0.69 – 4.5 %	0.93 – 1.3 %	0.37 – 0.79 %

The following regulated hazardous chemicals may be present based on a review of Material Safety Data Sheets for the product component materials:

- 2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane (000078-6307)
- 4,4'-Diphenylmethane Diisocyanate (MDI) (101-68-8)
- Aluminum hydroxide (13463-67-7)
- Antimony Nickel Titanium oxide (8007-18-9)
- Black pigment (1317-61-9)
- Calcium carbonate (000471-34-1)
- Calcium silicate (1344-95-2)
- Carbon Black (1333-86-4)
- Chrome (III) oxide (1308-38-9)
- Di(tert-butylperoxyisopropyl)benzene (025155-25-3)
- Diisocyanates (9016-87-9; 26447-40-5)
- Ethylbenzene (100-41-4)
- Iron (III) oxide (1309-37-1)
- Magnesium silicate (14807-96-8)
- Manganese (7439-96-5)
- Methylene Bisphenyl Isocyanate (101-68-8)
- Polyisocyanate pre-polymer (proprietary)
- Silica (amorphous) (112926-00-8; 7631-86-9)
- Silica (crystalline) (14808-60-8)
- Silicon dioxide (007631-86-9)
- Titanium dioxide (21645-51-2)
- Xylene (1330-20-7)

PRODUCTION OF MAIN MATERIALS:

Calcium Carbonate:

An abundant mineral found worldwide and is a common substance found in rocks. It can be ground into varying particle sizes.

Clay:

A naturally occurring material composed primarily of fine-grained minerals and will harden when dried or fired. It is primarily made up of inorganic materials with some organic materials that impart plasticity.

Pigment:

Powdered organic, inorganic, metal-based, or biological substance that is mixed with a liquid in which it is relatively insoluble and used to impart color to a substrate.

Hot Melt Adhesive:

Used to fuse the wear layer to the backing and derived from petrochemicals.

Polymer Binder:

A chemical compound derived from petrochemicals used to cross link polymers.

Process Oil:

Lube base stock that receives additional processing to impart a very specific hydrocarbon composition for use as a chemical component in the manufacturing of rubber, plastics, and other polymeric materials.

Rubber, EPDM:

A synthetic elastomer produced as a copolymer of ethylene and propylene, with small amounts of a cross-linking agent.

Rubber SBR, Crumb:

Derived from two monomers, styrene and butadiene, forming styrene-butadiene. Crumb is typically recovered from scrap tires and processed with a granulator, cracker mill, cryogenics, or other mechanical means to reduce the size.

Rubber SBR, Recycled:

Derived from two monomers, styrene and butadiene, forming styrene-butadiene. Re-grind is made from post-industrial ECORE scrap.

Water:

The most widely used of all solvents. It is a natural resource that may be delivered from a public or private supplier, or be self-supplied.

PRODUCT CHARACTERISTICS:

Table 10. *Product characteristics for ECOsurfaces.*

Characteristics			Average Value	Unit	Maximum Value	Minimum Value
Product Thickness:			5.7 (0.23)	mm (in)	8 (0.32)	3.2 (0.13)
Wear Layer Thickness:			NA	mm (in)	NA	NA
Product Weight:			7,476 (25)	g/m² (oz/ft²)	10,741 (35)	4,394 (14)
Product Form:	Rolls	Width:	1,257 (50)	mm (in)	1,295 (51)	1,219 (48)
		Length:	Customer specified	mm (in)	NA	NA
	Tiles	Length x Width:	609x609 (24x24)	mm (in)	NA	NA
VOC Emissions Test Method:			FloorScore®			
Sustainable Certifications:			FloorScore®			

Table 11. *Product characteristics for UltraTile/ECOmax.*

Characteristics		Average Value	Unit	Maximum Value	Minimum Value
Product Thickness:		25 (1)	mm (in)	NA	NA
Wear Layer Thickness:		2.5 (0.10)	mm (in)	NA	NA
Product Weight:		19,529 (64)	g/m² (oz/ft²)	NA	NA
Product Form:	Tiles, Length x Width:	609x609 (24x24)	mm (in)	NA	NA
VOC Emissions Test Method:		FloorScore®			
Sustainable Certifications:		FloorScore®			

Table 12. *Product characteristics for QT/ECOsilence.*

Characteristics			Average Value	Unit	Maximum Value	Minimum Value
Product Thickness:			14 (0.53)	mm (in)	25 (0.98)	2 (0.08)
Wear Layer Thickness:			NA	mm (in)	NA	NA
Product Weight:			6,103 (20)	g/m² (oz/ft²)	10,741 (35)	1,464 (4.8)
Product Form:	Rolls	Width:	1,219 (48)	mm (in)	N/A	N/A
		Length:	6.1 (20)	m (ft)	7.6 (25)	4.6 (15)
VOC Emissions Test Method:			FloorScore®			
Sustainable Certifications:			FloorScore®			

Table 13. *Product characteristics for Performance/ECOrx/ECOfit.*

Characteristics			Average Value	Unit	Maximum Value	Minimum Value
Product Thickness:			11 (0.43)	mm (in)	15 (0.59)	7 (0.28)
Wear Layer Thickness:			3 (0.118)	mm (in)	N/A	N/A
Product Weight:			9,520 (31)	g/m² (oz/ft²)	11,717 (38)	7,323 (24)
Product Form:	Rolls	Width:	48 (1.9)	mm (in)	N/A	N/A
		Length:	Customer specified	m (ft)	N/A	7.62 (25)
VOC Emissions Test Method:			FloorScore®			
Sustainable Certifications:			FloorScore®			

Table 14. *Product characteristics for PlayGuard.*

Characteristics		Average Value	Unit	Maximum Value	Minimum Value
Product Thickness:		67 (2.6)	mm (in)	109 (4.3)	2.5 (1.0)
Wear Layer Thickness:		2.5 (0.10)	mm (in)	N/A	N/A
Product Weight:		32,956 (108)	g/m² (oz/ft²)	46,383 (152)	19,530 (64)
Product Form:	Tiles, Length x Width	609x609 (24x24)	mm (in)	N/A	N/A
VOC Emissions Test Method:		FloorScore®			
Sustainable Certifications:		FloorScore®			

Table 15. *Product characteristics for Everlast.*

Characteristics			Average Value	Unit	Maximum Value	Minimum Value
Product Thickness:			8 (0.32)	mm (in)	9 (0.35)	6 (0.24)
Wear Layer Thickness:			NA	mm (in)	NA	NA
Product Weight:			8,398 (28)	g/m² (oz/ft²)	9,521 (31)	6,298 (21)
Product Form:	Rolls	Width:	1,219 (48)	mm (in)	N/A	N/A
		Length:	Customer specified	m (ft)	N/A	7.6 (25)
	Tiles	Length x Width:	584x584 (23x23)	mm (in)	609x609 (24x24)	584x583 (23x23)
VOC Emissions Test Method:			FloorScore®			
Sustainable Certifications:			FloorScore®			

ADDITIONAL ENVIRONMENTAL INFORMATION:

ECORE™ is a member of the U.S. Green Building Council (USGBC), a third-party organization that provides independent oversight of professional credentialing and project certification programs related to green building.

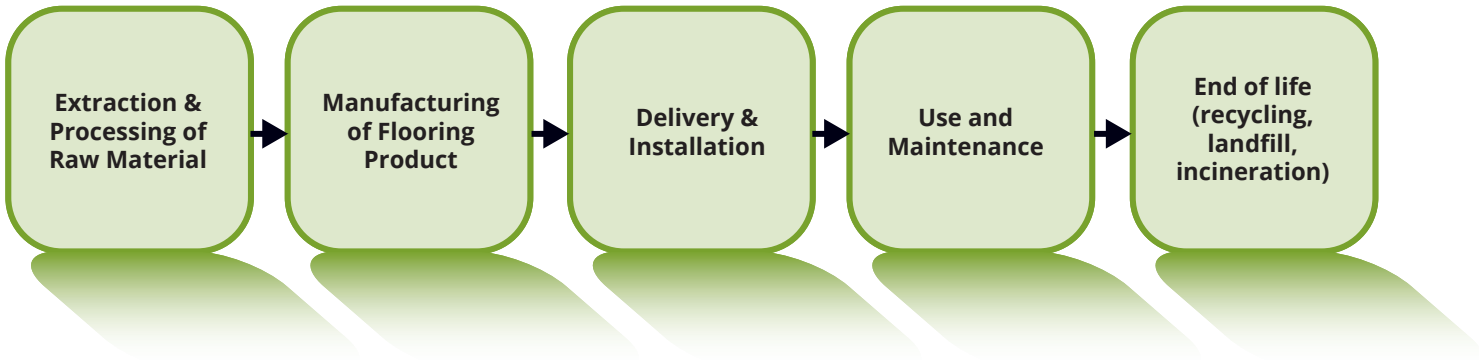
All ECORE™ salvages, overages, and old material can be packaged and shipped back at the owner's expense to ECORE's Redeux Reclamation Program in Lancaster, Pennsylvania. Materials accepted into the Redeux program will be sorted, shredded, cleaned, and ground for the next generation of recycled rubber flooring, underlayment, and industrial products. For more information regarding ECORE's Redeux program, visit http://www.ecoreintl.com/redeux.php. Similarly, all of ECORE's rubber manufacturing scrap is collected and reground to be used in future flooring.

All ECORE™ rubber tile and rolled goods in this EPD have earned FloorScore® certification, which tests and certifies flooring and flooring adhesive products, and certifies production facilities for compliance with rigorous indoor air quality emission requirements. For more information regarding ECORE's FloorScore® certification, visit http://ecorecommercialflooring.com/floorscore.php.

ECORE's E-Cleaner, the recommended cleaner used for daily cleaning and maintenance for ECORE™ rubber tile and rolled goods, is Green Seal™ GS-37 certified. For more information regarding E-Cleaner, visit http://www.ecorecommercialflooring.com/ecore_accessories.php.

LIFE CYCLE ASSESSMENT:

A cradle to grave life cycle assessment (LCA) was completed for this product group in accordance with ISO 14040, ISO 14044, and Product Category Rule for Environmental Product Declarations Flooring: Carpet, Resilient, Laminate, Ceramic, Wood (Version 2).



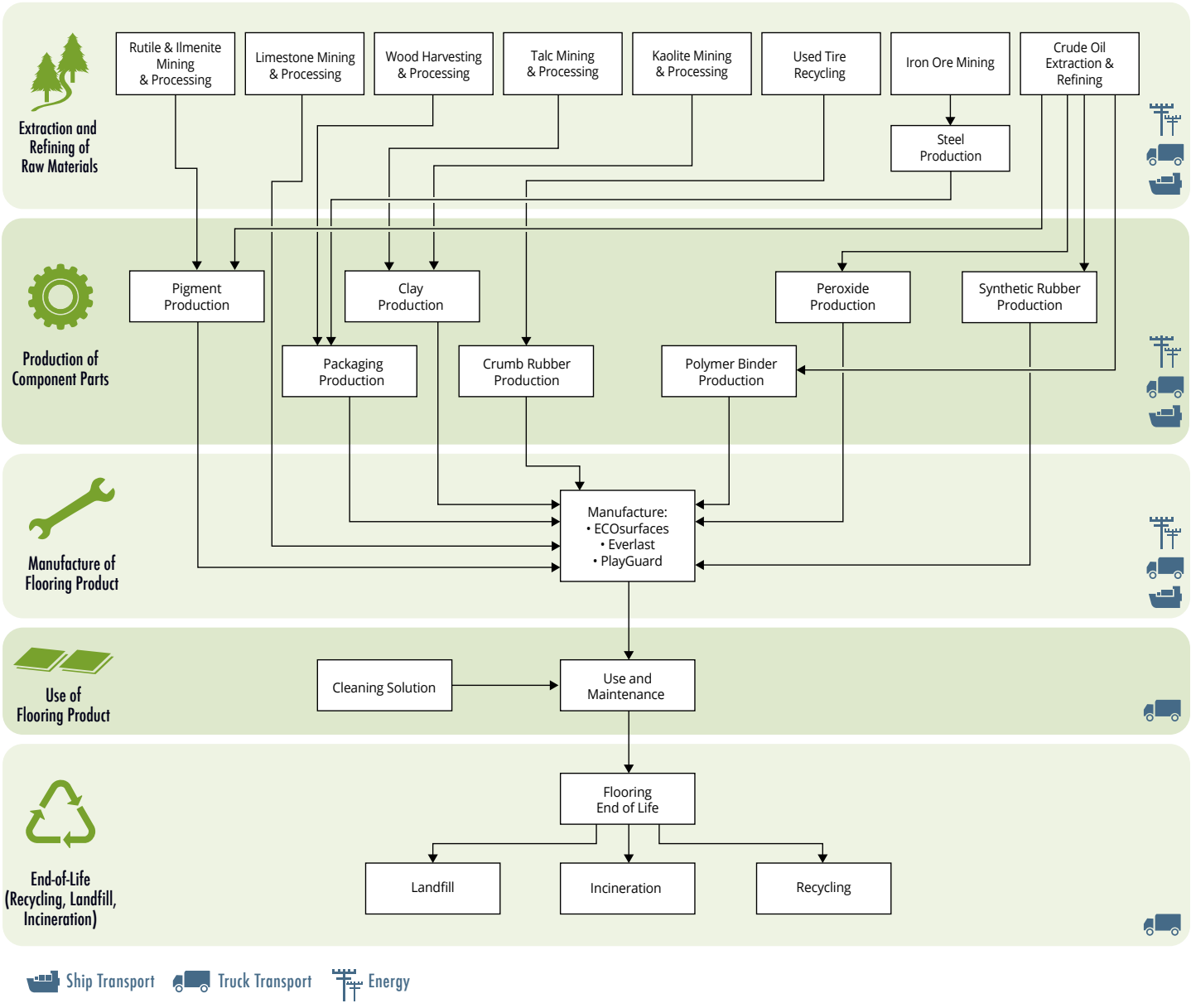
FUNCTIONAL UNIT:

The functional unit is according to the PCR the total impact for the expected life of the building (60 years). But the service life is depending on the product, varying between 10 and 60 years in this case. The PCR consequently requires separate reporting of LCA results: A) for 1 m^2 of floor covering - extraction/processing, manufacturing, delivery & installation and end of life; and B) the average 1-year use stage; and C) for the 60 year life of the building as combined using A) and B), calculated from the reference service life RSL of the product.

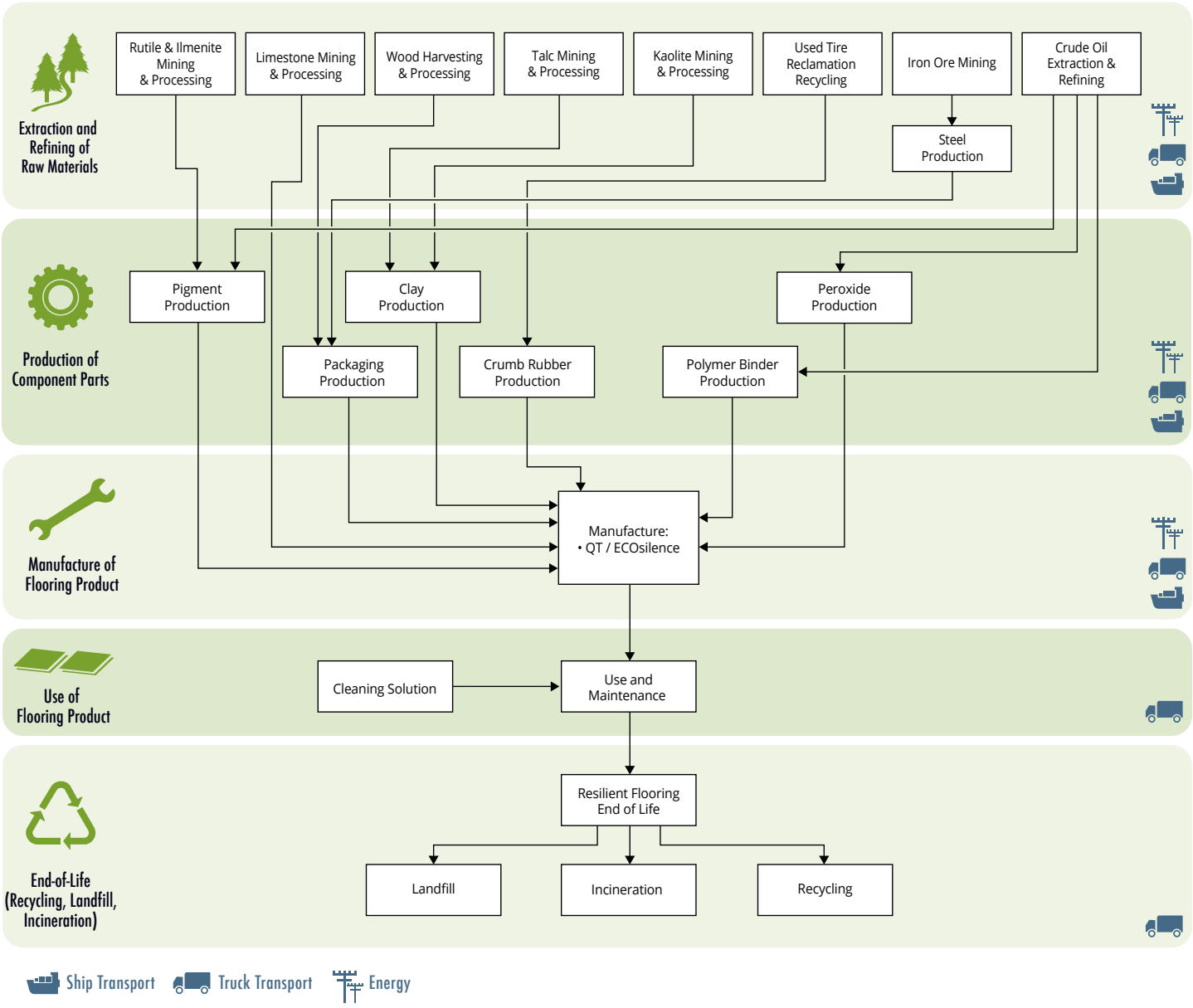
PRODUCT LIFE CYCLE FLOW DIAGRAM:

The diagrams below are a representation of the most significant contributions to the life cycle of the ECORE rubber tile and rolled goods. This includes resource extraction and processing, product manufacturer, use and maintenance, and end-of-life.

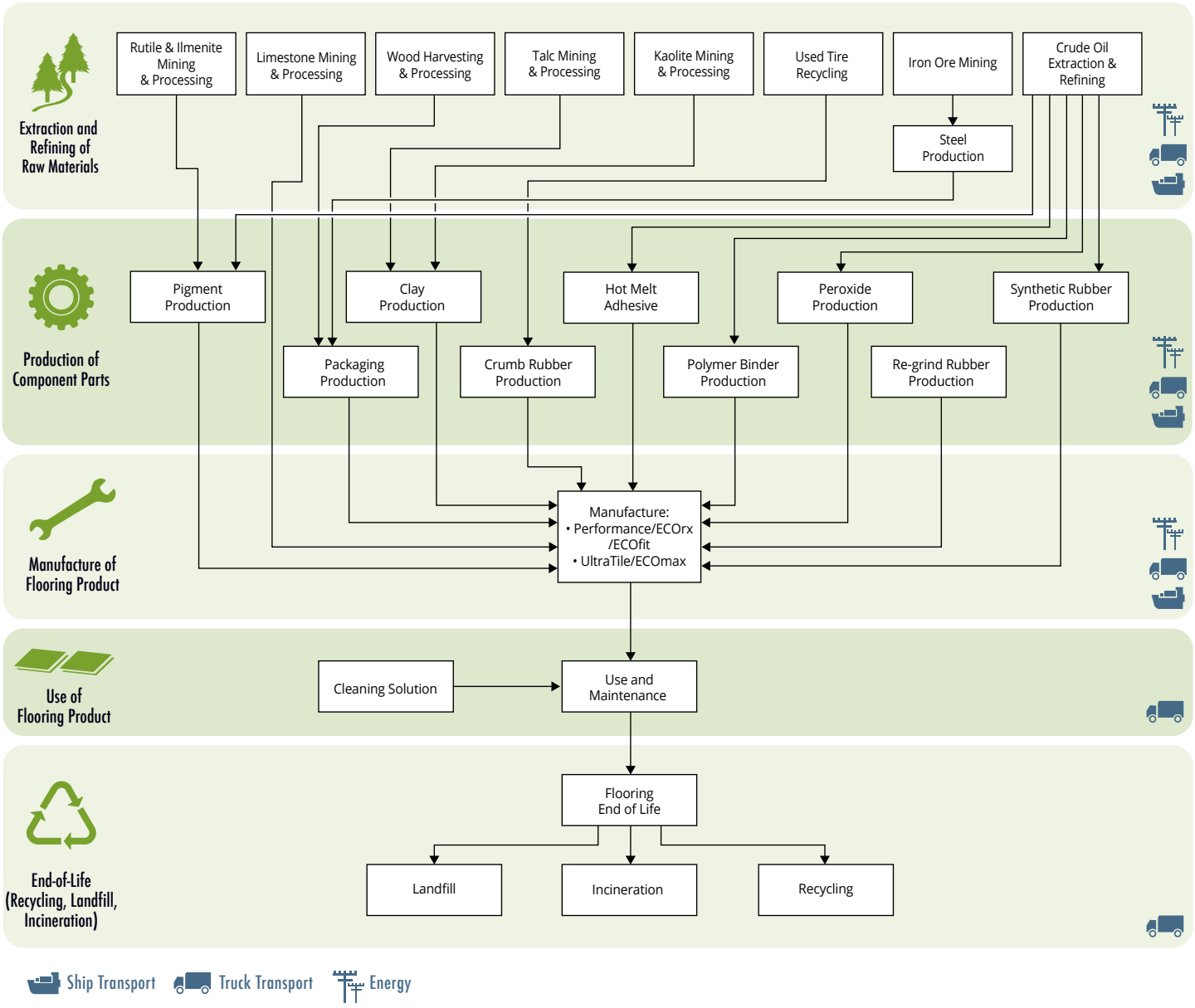
Product Life Cycle Flow Diagram for ECORE's ECOsurfaces, Everlast, and PlayGuard:



Product Life Cycle Flow Diagram for ECORE's QT/ECOsilence:



Product Life Cycle Flow Diagram for Performance/ECOrx/ECOfit and UltraTile/ECOmax:



LIFE CYCLE ASSESSMENT STAGES AND REPORTED EPD INFORMATION:

Raw Material Extraction and Processing Stage:

This stage includes extraction of virgin materials and reclamation of non-virgin feedstock. This includes the extraction of all raw materials, including the transport to the manufacturing site. Resource use and emissions associated with both the extraction of the raw materials used in the products, as well as those associated with the processing of raw materials are included. Impacts associated with the transport of the materials to manufacturing facilities (upstream transport) are also included in this stage.

Manufacturing Stage:

This stage includes all the relevant manufacturing processes and flows, excluding production of capital goods, infrastructure, production of manufacturing equipment, and personnel-related activities are not included. This stage includes the impacts from energy use and emissions associated with the processes occurring at the Lancaster and York, Pennsylvania facilities. This stage also includes the production and disposal (including transport) of the product packaging materials.

Delivery and Installation Stage:

Delivery

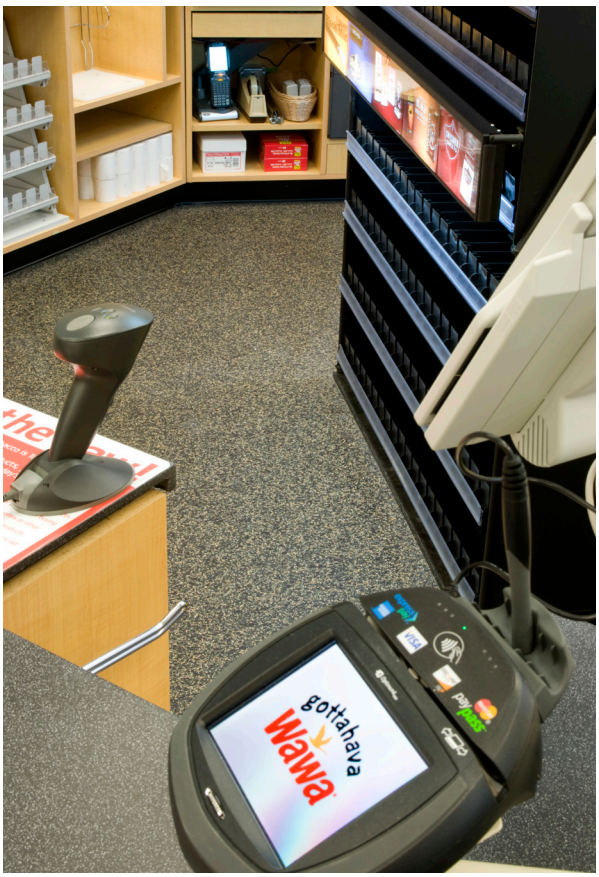
This stage includes the delivery of the flooring product to the point of installation. Modeling used in the life cycle assessment assumed product distribution as 2,700 miles (4,370 km) by diesel truck and 153 miles (246 km) by ocean freighter.

Installation

The ECORE flooring products are available as rolls, straight-edge tiles, and interlocking tiles. Interlocking tiles may be installed without an adhesive, while rolls and straight-edge tiles are installed with an adhesive. The manufacturer recommends use of E-Grip III, a zero-VOC, low odor, one-component urethane adhesive. The recommended application rate is 0.011 gal/ft^2.

Waste

Waste generated during product installation can be disposed of in a landfill or incinerated.



Packaging

Table 16. *Packaging material for ECORE rubber tile and rolled goods. Shown per square meter of flooring.*

Material	ECOsurfaces kg (lb)	UltraTile/ ECOmax kg (lb)	QT/ ECOsilence kg (lb)	ECOrx/ Performance/ ECOfit kg (lb)	PlayGuard kg (lb)	Everlast kg (lb)
Cardboard	0.01 (0.02)	-	$6.8x10^{-3}$ (0.02)	0.01 (0.02)	-	0.01 (0.02)
Plastic	0.03 (0.06)	$2.0x10^{-4}$ ($4.0x10^{-4}$)	0.03 (0.06)	0.03 (0.06)	$1.4x10^{-3}$ ($3.0x10^{-3}$)	0.03 (0.06)
Steel	-	$9.0x10^{-4}$ ($2.0x10^{-3}$)	-	-	-	-
Wood	0.01 (0.03)	0.06 (0.13)	0.07 (0.16)	-	0.07 (0.15)	0.01 (0.03)
Total	0.05 (0.11)	0.06 (0.13)	0.11 (0.24)	0.04 (0.08)	0.07 (0.15)	0.05 (0.11)

Use Stage:

Cleaning and maintenance

Table 17. *Cleaning and maintenance for ECORE rubber tile and rolled goods.*

Cleaning Process and Frequency	Recommeded Cleaner	Dilution	Coverage (diluted)
Initial Cleaning	ECORE's E-Cleaner (1-5% detergent blend) • Use with damp mopping, scrubbing, spray and wipe cleaning, or with a hand bucket and cloth.	10 oz/gal water	2,000 ft^2/gal.
Daily Cleaning	ECORE's E-Cleaner (1-5% detergent blend) • First sweep, dust mop, or vacuum floor. Damp mop with a microfiber mop or auto scrub with a soft nylon brush or microfiber mop.	2-4 oz/gal water	6,000 ft^2/gal.
Heavy Soil and Restorative Cleaning (once per product lifetime)	ECORE's E-Strip (1-5% amino alcohol) • First sweep, dust mop, or vacuum floor. Use a soft nylon brucsh, buffer, or auto scrubber. Finish with damp mop and wet vacuum.	16 oz/gal water	1,200 ft^2/gal.

End-of-Life Stage:

Recycling, reuse, or repurpose

Data for estimation of recycling rates for the product and packaging are based on data prepared by the US Environmental Protection Agency's Municipal Solid Waste Report. These data provide statistics on US disposal, including recycling rates.

Disposal

For materials not recycled, it is assumed that 20% are incinerated, and 80% go to a landfill, based on the US EPA data. Transportation of waste materials at end of life assumes a 20 mile average distance to disposal, consistent with assumptions used in the US EPA WARM model.

LIFE CYCLE INVENTORY:

In accordance with ISO 21930, the following aggregated inventory flows are included in the EPD:

- Use of renewable material resources
- Consumption of freshwater
- Hazardous wastes
- Non-hazardous wastes

All results are calculated using the SimaPro 8.0 model using primary and secondary inventory data. Classification for Use of Renewable Material Resources is based on review of elementary flows and resources considered renewable on a human time scale. Elementary flows related to use of wood, minerals, and land occupation were not included. Water consumption is not included, as it is reported separately. Based on this classification process, the use of renewable material resources for the product system is considered to be negligible.

Table 18. *Results for aggregated inventory flows, shown per 1 m^2 of flooring maintained for 60 years.*

Parameter	Unit	ECOsurfaces	UltraTile/ ECOmax	QT/ ECOsilence	Performance/ ECOrx/ECOfit	PlayGuard	Everlast
Consumption of Freshwater	kg	46,000	70,000	20,000	49,000	82,000	36,000
Hazardous Waste	kg	$1.3x10^{-3}$	$9.9x10^{-4}$	$8.8x10^{-5}$	$1.7x10^{-3}$	$1.9x10^{-3}$	$1.0x10^{-3}$
Non-hazardous Waste	kg	21	46	6.9	45	88	27

LIFE CYCLE IMPACT ASSESSMENT:

Life cycle impact assessment is the process of converting the life cycle inventory results into a representation of environmental and human health impacts. For example, emissions such as carbon dioxide, methane, and nitrous oxide (inventory) together contribute to climate change (impact assessment). The impact assessment for the EPD is conducted in accordance with requirements of the PCR. Impact category indicators were estimated using the CML 2001 (Oct 2013) characterization method. Aggregated inventory flows for energy use and wastes were also calculated. The LCIA and inventory flow results were calculated using SimaPro 8.0.2 software.

The ECORE products are available in a range of thicknesses and colors. For each product line, at least two versions of the product, representing an upper and lower extreme for the product line, were included in the LCA model. Table 19 shows the range in life cycle impact assessment results for each product line. Table 20 through Table 25 show results for 1 m^2 of flooring, including extraction of raw materials through installation and end of life. Table 26 shows the average use stage impacts for 1 m^2 of flooring over 1 year. Table 27 lists the assumptions used for product maintenance. Table 28 through Table 33 show the life cycle impact assessment results for 1 m^2 of flooring over a 60 year period.

Table 19. *Range in life cycle impact assessment results for 1 m^2 of flooring covering maintained for 60 years.*

Impact Category		ECOsurfaces	UltraTile/ ECOmax	QT/ECOsilence	Performance/ ECOrx/ECOfit	PlayGuard	Everlast
Global warming 100a (kg CO_2 eq)	Min	180	170	21	150	390	110
	Max	300	250	22	250	560	140
Acidification (kg SO_2 eq)	Min	1.3	0.94	$7.9x10^{-2}$	0.99	2.6	0.59
	Max	2.4	1.6	$9.4x10^{-2}$	1.3	3.5	0.9
Ozone depletion potential (kg CFC-11 eq)	Min	$5.9x10^{-7}$	$3.7x10^{-7}$	$6.5x10^{-8}$	$1.9x10^{-6}$	$5.0x10^{-7}$	$3.2x10^{-7}$
	Max	$2.7x10^{-6}$	$1.8x10^{-6}$	$6.6x10^{-8}$	$4.2x10^{-6}$	$2.1x10^{-6}$	$3.1x10^{-6}$
Photochemical oxidation (kg C_2H_4)	Min	$6.0x10^{-2}$	$4.7x10^{-2}$	$4.4x10^{-3}$	$4.6x10^{-2}$	0.12	$3.0x10^{-2}$
	Max	0.10	$7.5x10^{-2}$	$5.1x10^{-3}$	$6.8x10^{-2}$	0.17	$4.4x10^{-2}$
Eutrophication (kg PO_4--- eq)	Min	0.12	0.18	$2.6x10^{-2}$	0.13	0.30	0.11
	Max	0.17	0.22	$2.6x10^{-2}$	0.28	0.46	0.14
Abiotic depletion, elements (kg Sb eq)	Min	1.2	0.96	0.11	1.0	2.2	0.68
	Max	2.1	1.5	0.12	1.6	3.2	1.1
Abiotic depletion, fossil fuels (MJ)	Min	2,400	1,900	230	2,000	4,400	1,300
	Max	4,000	3,000	240	3,200	6,300	2,100

Table 20. *Cradle to install and end of life potential impacts for an average 1 m^2 ECOsurfaces. (Table A of the PCR)*

Impact Category	Extraction & Processing	Manufacturing	Delivery & Installation	Disposal	Total
Global warming 100a (kg CO_2 eq)	2.9	30	4.3	2.4	39
Acidification (kg SO_2 eq)	0.020	0.25	0.020	$1.0x10^{-3}$	0.29
Ozone depletion potential (kg CFC-11 eq)	$2.2x10^{-7}$	$2.1x10^{-8}$	$2.2x10^{-9}$	$1.2x10^{-8}$	$2.5x10^{-7}$
Photochemical oxidation (kg C_2H_4)	$8.4x10^{-4}$	0.010	$9.4x10^{-4}$	$3.6x10^{-4}$	0.010
Eutrophication (kg PO_4--- eq)	$2.3x10^{-3}$	0.010	$2.4x10^{-3}$	0.010	0.020
Abiotic depletion, elements (kg Sb eq)	0.030	0.19	0.040	$6.1x10^{-4}$	0.27
Abiotic depletion, fossil fuels (MJ)	69	380	73	1.2	520
Renewable Energy (MJ eq)	1.3	2.3	0.58	0.060	4.2
Non-renewable Energy (MJ eq)	80	390	83	1.6	560

Table 21. *Cradle to install and end of life potential impacts for an average 1 m² UltraTile/ECOmax. (Table A of the PCR)*

Impact Category	Extraction & Processing	Manufacturing	Delivery & Installation	Disposal	Total
Global warming 100a (kg CO_2 eq)	10	32	11	16	68
Acidification (kg SO_2 eq)	0.060	0.28	0.050	0.010	0.39
Ozone depletion potential (kg CFC-11 eq)	$2.4x10^{-7}$	$1.3x10^{-8}$	$7.4x10^{-9}$	$6.7x10^{-8}$	$3.3x10^{-7}$
Photochemical oxidation (kg C_2H_4)	$2.7x10^{-3}$	0.010	$2.5x10^{-3}$	$1.9x10^{-3}$	0.020
Eutrophication (kg PO_4--- eq)	0.010	0.010	0.010	0.040	0.060
Abiotic depletion, elements (kg Sb eq)	0.10	0.20	0.08	$3.3x10^{-3}$	0.38
Abiotic depletion, fossil fuels (MJ)	190	400	160	6.8	760
Renewable Energy (MJ eq)	2.2	13	0.59	0.37	17
Non-renewable Energy (MJ eq)	220	410	180	8.8	820

Table 22. *Cradle to install and end of life potential impacts for an average 1 m² QT/ECOsilence. (Table A of the PCR)*

Impact Category	Extraction & Processing	Manufacturing	Delivery & Installation	Disposal	Total
Global warming 100a (kg CO_2 eq)	3.3	4.5	6.4	7.0	21
Acidification (kg SO_2 eq)	0.020	0.040	0.030	2.4x10-3	0.090
Ozone depletion potential (kg CFC-11 eq)	$1.9x10^{-9}$	$3.1x10^{-8}$	$3.8x10^{-9}$	$2.9x10^{-8}$	$6.5x10^{-8}$
Photochemical oxidation (kg C_2H_4)	$8.7x10^{-4}$	$1.6x10^{-3}$	$1.4x10^{-3}$	$8.2x10^{-4}$	0.00
Eutrophication (kg PO_4--- eq)	$1.5x10^{-3}$	$4.5x10^{-3}$	$4.3x10^{-3}$	0.020	0.030
Abiotic depletion, elements (kg Sb eq)	0.030	0.040	0.050	$1.4x10^{-3}$	0.12
Abiotic depletion, fossil fuels (MJ)	59	71	100	2.9	230
Renewable Energy (MJ eq)	0.46	19	0.58	0.16	20
Non-renewable Energy (MJ eq)	67	78	110	3.8	260

Table 23. *Cradle to install and end of life potential impacts for an average 1 m² Performance/ECOrx/ECOfit. (Table A of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Disposal	Total
Global warming 100a (kg CO_2 eq)	11	20	8.7	9.7	49
Acidification (kg SO_2 eq)	$6.4x10^{-2}$	0.16	$4.2x10^{-2}$	$4.0x10^{-3}$	0.27
Ozone depletion potential (kg CFC-11 eq)	$6.7x10^{-7}$	$2.2x10^{-8}$	$5.5x10^{-9}$	$4.7x10^{-8}$	$7.4x10^{-7}$
Photochemical oxidation (kg C_2H_4)	$2.9x10^{-3}$	$7.0x10^{-3}$	$2.0x10^{-3}$	$1.4x10^{-3}$	$1.3x10^{-2}$
Eutrophication (kg PO_4--- eq)	$7.7x10^{-3}$	$8.1x10^{-3}$	$6.3x10^{-3}$	$2.8x10^{-2}$	$5.0x10^{-2}$
Abiotic depletion, elements (kg Sb eq)	0.12	0.13	$6.3x10^{-2}$	$2.4x10^{-3}$	0.31
Abiotic depletion, fossil fuels (MJ)	240	250	130	4.8	620
Renewable Energy (MJ eq)	3.9	2.2	0.58	0.25	6.9
Non-renewable Energy (MJ eq)	270	260	140	6.2	680

Table 24. *Cradle to install and end of life potential impacts for an average 1 m² PlayGuard. (Table A of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Disposal	Total
Global warming 100a (kg CO_2 eq)	19	90	19	31	160
Acidification (kg SO_2 eq)	0.13	0.78	0.090	0.010	1.02
Ozone depletion potential (kg CFC-11 eq)	$9.2x10^{-8}$	$1.9x10^{-8}$	$1.3x10^{-8}$	$1.3x10^{-7}$	$2.5x10^{-7}$
Photochemical oxidation (kg C_2H_4)	$4.8x10^{-3}$	0.030	$4.3x10^{-3}$	$3.6x10^{-3}$	0.050
Eutrophication (kg PO_4--- eq)	0.010	0.030	0.020	0.070	0.13
Abiotic depletion, elements (kg Sb eq)	0.17	0.58	0.13	0.010	0.88
Abiotic depletion, fossil fuels (MJ)	340	1,100	260	13	1,700
Renewable Energy (MJ eq)	3.0	16	0.60	0.71	20
Non-renewable Energy (MJ eq)	390	1,200	290	17	1,800

Table 25. *Cradle to install and end of life potential impacts for an average 1 m^2 Everlast. (Table A of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Disposal	Total
Global warming 100a (kg CO_2 eq)	5.9	12	6.4	6.1	31
Acidification (kg SO_2 eq)	0.030	0.10	0.030	2.4x10-3	0.17
Ozone depletion potential (kg CFC-11 eq)	$3.5x10^{-7}$	$1.9x10^{-8}$	$3.8x10^{-9}$	$2.8x10^{-8}$	$4.0x10^{-7}$
Photochemical oxidation (kg C_2H_4)	$1.6x10^{-3}$	$4.3x10^{-3}$	$1.4x10^{-3}$	$8.4x10^{-4}$	0.010
Eutrophication (kg PO_4--- eq)	$4.1x10^{-3}$	0.010	$4.3x10^{-3}$	0.020	0.030
Abiotic depletion, elements (kg Sb eq)	0.070	0.080	0.050	$1.4x10^{-3}$	0.20
Abiotic depletion, fossil fuels (MJ)	130	160	99	2.9	390
Renewable Energy (MJ eq)	2.1	2.4	0.58	0.15	5.2
Non-renewable Energy (MJ eq)	150	170	110	3.8	430

Table 26. *Average 1 year use stage potential impacts for an average 1 m^2 flooring. (Table B of the PCR)*

Impact Category	Use & Maintenance					
	ECOsurfaces	UltraTile/ ECOmax	QT/ ECOsilence	Performance/ ECOrx/ECOfit	PlayGuard	Everlast
Global warming 100a (kg CO_2 eq)	0.060	0.060	-	0.060	0.060	0.060
Acidification (kg SO_2 eq)	$1.2x10^{-3}$	$1.2x10^{-3}$	-	$1.2x10^{-3}$	$1.2x10^{-3}$	$1.2x10^{-3}$
Ozone depletion potential (kg CFC-11 eq)	$1.8x10^{-9}$	$1.8x10^{-9}$	-	$1.8x10^{-9}$	$1.8x10^{-9}$	$1.8x10^{-9}$
Photochemical oxidation (kg C_2H_4)	$6.8x10^{-5}$	$6.8x10^{-5}$	-	$6.8x10^{-5}$	$6.8x10^{-5}$	$6.8x10^{-5}$
Eutrophication (kg PO_4--- eq)	$1.1x10^{-4}$	$1.1x10^{-4}$	-	$1.1x10^{-4}$	$1.1x10^{-4}$	$1.1x10^{-4}$
Abiotic depletion, elements (kg Sb eq)	$1.3x10^{-3}$	$1.3x10^{-3}$	-	$1.3x10^{-3}$	$1.3x10^{-3}$	$1.3x10^{-3}$
Abiotic depletion, fossil fuels (MJ)	2.4	2.4	-	2.4	2.4	2.4
Renewable Energy (MJ eq)	0.34	0.34	-	0.34	0.34	0.34
Non-renewable Energy (MJ eq)	2.7	2.7	-	2.7	0.06	2.7

Table 27. *List of maintenance activities and frequency.*

Maintenance Activity	Frequency over Reference Service Life (RSL) of product					
	ECOsurfaces	UltraTile/ ECOmax	QT/ ECOsilence	Performance/ ECOrx/ECOfit	PlayGuard	Everlast
Reference Service Life (RSL)	10 years	20 years	60 years	15 years	20 years	15 years
Initial Cleaning	Once over 10 year RSL	Once over 20 year RSL	Once over 60 year RSL	Once over 15 year RSL	Once over 20 year RSL	Once over 15 year RSL
Daily Cleaning	Up to a maximum of 3,650 times over 10 year RSL	Up to a maximum of 7,300 times over 10 year RSL	Up to a maximum of 21,900 times over 10 year RSL	Up to a maximum of 5,475 times over 10 year RSL	Up to a maximum of 7,300 times over 10 year RSL	Up to a maximum of 5,475 times over 10 year RSL
Heavy Soil and Restorative Cleaning	Once over 10 year RSL	Once over 20 year RSL	Once over 60 year RSL	Once over 15 year RSL	Once over 20 year RSL	Once over 15 year RSL

Table 28. *ECOsurfaces: Potential impacts by life cycle stage for a 60 year period. The Reference Service Life is 10 years. (Table C of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Use	End of Life	Total
Global warming 100a (kg CO_2 eq)	18	180	26	3.8	15	240
Acidification (kg SO_2 eq)	0.13	1.5	0.12	0.070	0.010	1.8
Ozone depletion potential (kg CFC-11 eq)	$1.3x10^{-6}$	$1.3x10^{-7}$	$1.3x10^{-8}$	$1.1x10^{-7}$	$7.2x10^{-8}$	$1.6x10^{-6}$
Photochemical oxidation (kg C_2H_4)	0.010	0.060	0.010	$4.1x10^{-3}$	$2.2x10^{-3}$	0.080
Eutrophication (kg PO_4--- eq)	0.010	0.070	0.010	0.010	0.040	0.15
Abiotic depletion, elements (kg Sb eq)	0.21	1.2	0.22	0.080	$3.7x10^{-3}$	1.7
Abiotic depletion, fossil fuels (MJ)	420	2,300	440	150	7.5	3,300
Renewable Energy (MJ eq)	7.7	14	3.5	21	0.39	46
Non-renewable Energy (MJ eq)	480	2,300	500	160	9.6	3,500

Table 29. *UltraTile/ECOmax: Potential impacts by life cycle stage for a 60 year period. The Reference Service Life is 20 years. (Table C of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Use	End of Life	Total
Global warming 100a (kg CO_2 eq)	30	95	34	3.8	47	210
Acidification (kg SO_2 eq)	0.17	0.83	0.16	0.070	0.020	1.3
Ozone depletion potential (kg CFC-11 eq)	$7.2x10^{-7}$	$3.9x10^{-8}$	$2.2x10^{-8}$	$1.1x10^{-7}$	$2.0x10^{-7}$	$1.1x10^{-6}$
Photochemical oxidation (kg C_2H_4)	0.010	0.040	0.010	$4.1x10^{-3}$	0.010	0.060
Eutrophication (kg PO_4--- eq)	0.020	0.040	0.030	0.010	0.11	0.20
Abiotic depletion, elements (kg Sb eq)	0.29	0.61	0.24	0.080	0.010	1.2
Abiotic depletion, fossil fuels (MJ)	580	1,200	480	150	20	2,400
Renewable Energy (MJ eq)	6.7	40	1.8	20	1.1	70
Non-renewable Energy (MJ eq)	660	1,200	530	160	26	2,600

Table 30. *QT/ECOsilence: Potential impacts by life cycle stage for a 60 year period. The Reference Service Life is 60 years. (Table C of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Use	End of Life	Total
Global warming 100a (kg CO_2 eq)	3.3	4.5	6.4	-	7.0	21
Acidification (kg SO_2 eq)	0.020	0.040	0.030	-	2.4x10-3	0.090
Ozone depletion potential (kg CFC-11 eq)	$1.9x10^{-9}$	$3.1x10^{-8}$	$3.8x10^{-9}$	-	$2.9x10^{-8}$	$6.5x10^{-8}$
Photochemical oxidation (kg C_2H_4)	$8.7x10^{-4}$	$1.6x10^{-3}$	$1.4x10^{-3}$	-	$8.2x10^{-4}$	$4.7x10^{-3}$
Eutrophication (kg PO_4--- eq)	$1.5x10^{-3}$	$4.5x10^{-3}$	$4.3x10^{-3}$	-	0.020	0.030
Abiotic depletion, elements (kg Sb eq)	0.030	0.040	0.050	-	$1.4x10^{-3}$	0.12
Abiotic depletion, fossil fuels (MJ)	59	71	100	-	2.9	230
Renewable Energy (MJ eq)	0.46	19	0.58	-	0.16	20
Non-renewable Energy (MJ eq)	67	78	110	-	3.8	260

Table 31. *Performance/ECOrx/ECOfit: Potential impacts by life cycle stage for a 60 year period. The Reference Service Life is 15 years. (Table C of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Use	End of Life	Total
Global warming 100a (kg CO_2 eq)	42	78	35	3.8	39	197
Acidification (kg SO_2 eq)	0.25	0.65	0.17	7.4x10-2	1.6x10-2	1.2
Ozone depletion potential (kg CFC-11 eq)	$2.7x10^{-6}$	$8.9x10^{-8}$	$2.2x10^{-8}$	$1.1x10^{-7}$	$1.9x10^{-7}$	$3.1x10^{-6}$
Photochemical oxidation (kg C_2H_4)	$1.1x10^{-2}$	$2.8x10^{-2}$	$7.8x10^{-3}$	$4.1x10^{-3}$	$5.5x10^{-3}$	0.06
Eutrophication (kg PO_4--- eq)	$3.0x10^{-2}$	$3.2x10^{-2}$	$2.5x10^{-2}$	$6.6x10^{-3}$	0.11	0.2
Abiotic depletion, elements (kg Sb eq)	0.47	0.52	0.25	$7.6x10^{-2}$	$9.4x10^{-3}$	1.3
Abiotic depletion, fossil fuels (MJ)	930	1,000	510	150	19	2,600
Renewable Energy (MJ eq)	16	8.8	2.3	20	1.0	49
Non-renewable Energy (MJ eq)	1,100	1,100	580	160	25	2,900

Table 32. *PlayGuard: Potential impacts by life cycle stage for a 60 year period. The Reference Service Life is 20 years. (Table C of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Use	End of Life	Total
Global warming 100a (kg CO_2 eq)	57	270	57	3.8	92	480
Acidification (kg SO_2 eq)	0.39	2.4	0.28	0.070	0.030	3.1
Ozone depletion potential (kg CFC-11 eq)	$2.8x10^{-7}$	$5.7x10^{-8}$	$4.0x10^{-8}$	$1.1x10^{-7}$	$3.9x10^{-7}$	$8.6x10^{-7}$
Photochemical oxidation (kg C_2H_4)	0.010	0.10	0.010	4.1x10-3	0.010	0.14
Eutrophication (kg PO_4--- eq)	0.030	0.090	0.050	0.010	0.21	0.39
Abiotic depletion, elements (kg Sb eq)	0.52	1.7	0.38	0.080	0.020	2.7
Abiotic depletion, fossil fuels (MJ)	1,000	3,400	770	150	39	5,300
Renewable Energy (MJ eq)	9.0	48	1.8	20	2.1	82
Non-renewable Energy (MJ eq)	1,200	3,500	850	160	51	5,700

Table 33. *Everlast: Potential impacts by life cycle stage for a 60 year period. The Reference Service Life is 15 years. (Table C of the PCR)*

Impact Category	Sourcing & Extraction	Manufacturing	Delivery & Installation	Use	End of Life	Total
Global warming 100a (kg CO_2 eq)	24	49	26	3.8	24	130
Acidification (kg SO_2 eq)	0.14	0.40	0.12	0.070	0.010	0.74
Ozone depletion potential (kg CFC-11 eq)	$1.4x10^{-6}$	$7.6x10^{-8}$	$1.5x10^{-8}$	$1.1x10^{-7}$	$1.1x10^{-7}$	$1.7x10^{-6}$
Photochemical oxidation (kg C_2H_4)	0.010	0.020	0.010	$4.1x10^{-3}$	$3.4x10^{-3}$	0.040
Eutrophication (kg PO_4--- eq)	0.020	0.020	0.020	0.010	0.070	0.13
Abiotic depletion, elements (kg Sb eq)	0.26	0.33	0.20	0.080	0.010	0.87
Abiotic depletion, fossil fuels (MJ)	530	640	400	150	12	1,700
Renewable Energy (MJ eq)	8.5	9.6	2.3	20	0.62	41
Non-renewable Energy (MJ eq)	600	670	450	160	15	1,900

SUPPORTING TECHNICAL INFORMATION:

Data Sources:

Unit processes were developed with SimaPro 8.0.2 software, drawing upon data from multiple sources. Primary data were provided by ECORE and some of its suppliers for their manufacturing processes. The primary source of secondary LCI data was from Ecoinvent.

Table 34. *Data sources used for the LCA.*

Material	Data Source	Flow Name	Date
Antioxidant	Ecoinvent data v2.2	Chemicals organic, at plant/kg/GLO	2010; 2003
Calcium Carbonate	Ecoinvent data v2.2	Limestone, milled, packed, at plant/kg/CH	2010; 2003
Clay	Ecoinvent data v2.2	Clay, at mine/kg/CH	2013; 2003
Talc	Ecoinvent data v2.2	Talc, in ground	2013
Pigment	Ecoinvent data v2.2	Titanium dioxide, production mix, at plant/kg/RER	2010; 2003
Process Oil	US LCI	White mineral oil, at plant/kg/RNA	2012; 2008
Peroxides	Ecoinvent data v2.2	Chemicals organic, at plant/kg/GLO	2010; 2003
Hot Melt Adhesive	Ecoinvent data v2.2	Nylon 6, at plant/RER	2010
Polymer Binder	Ecoinvent data v2.2	Methylene diphenyl diisocyanate, at plant/kg/RER	2010
Rubber, EPDM	Ecoinvent data v2.2	Synthetic rubber, at plant/kg/RER	2010; 2003
Rubber, SBR, Crumb	ECORE	SBR – Crumb, recycled	2013
Rubber, SBR, Recycled	ECORE	SBR – Regrind/Scrap, recycled	2013
Truck	US LCI	Transport, combination truck, diesel powered/US	2008
Ship	US LCI	Transport, transoceanic freight ship/OCE	2008

Data Quality:

Table 35. *Data quality assessment of Life Cycle Inventory.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected.	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 10 years old (typically 2003 or more recent). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on 2013 annual production.
Geographical Coverage: Geographical area from which data for unit processes is collected.	The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American or European operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing product disposal are based on US statistics.
Technology Coverage: Specific technology or technology mix.	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed.	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated.	The LCA model included all known mass and energy flows for production of the rubber 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. In total, these missing data represent less than 5% of the mass or energy flows.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest.	Data used in the assessment represent typical or average processes as currently reported from multiple data sources, and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis.	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent data where available. Different portions of the product life cycle are equally considered; however, it must be noted that final disposition of the product is based on assumptions of current average practices in the United States.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study.	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented in the LCA report.
Sources of the data: Description of primary and secondary data sources.	Data representing energy use at the ECORE Pennsylvania manufacturing facilities 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 datasets, both Ecoinvent and the US LCI data are used, with a bias towards Ecoinvent data.
Uncertainty of the information: E.g. data, models, and assumptions.	Uncertainty related to the product materials and packaging is low. Actual supplier data for upstream operations was sought but not available for all suppliers and the study relied upon use of existing representative datasets. These datasets contained relatively recent data (<10 years), but in some instances 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 and does not consider exceedances of threshold (e.g., tipping points).

Allocation:

The ECORE™ products are available in a range of thicknesses and colors – multiple versions of each product were modeled in the LCA to calculate a range of results.

Resource use at the York and Lancaster, Pennsylvania facilities (e.g., water and energy) is allocated to the product based on the unit price as a fraction of the total facility sales. Sales price data for each of the products considered in the assessment were provided by the manufacturer in addition to total annual sales and are used to allocate resource use and emissions to each of the assessed products.

The ECORE™ flooring product system includes recycled materials, which are allocated using the recycled content allocation method (also known as the 100-0 cut off method). Using the recycled content allocation approach, system inputs with recycled content do not receive any burden from the previous life cycle other than reprocessing of the waste material. At end of life, materials which are recycled leave the system boundaries with no additional burden.

Impacts from transportation, including product distribution to point of sale, are allocated based on the mass of material and distance transported.

System boundaries:

The system boundaries of the life cycle assessment for ECORE's rubber flooring products was cradle to grave. A description of the system boundaries for the LCA are as follows:

- Raw material extraction and processing stage – This stage includes extraction of virgin materials and reclamation of non-virgin feedstock. This includes the extraction and processing of all raw materials, including the transport to the manufacturing site.
- Manufacturing stage – This stage includes all the relevant manufacturing processes and flows, including packaging. Production of capital goods, infrastructure, production of manufacturing equipment, and personnel-related activities are not included.
- Delivery and installation stage – This stage includes the delivery of the rubber tile and rolled goods to the point of installation.
- Use stage – The use stage includes the cleaning and maintenance of the floor covered during its lifetime, as well as extraction, manufacturing and transport of all sundry material for maintenance and cleaning.
- End of life stage – The end of life stage includes the transport of the floor covering to end of life processes including landfill, incineration, and recycling.

Cut-off criteria:

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact must be included in the inventory. In the present study, except as noted, all known materials and processes were included in the life cycle inventory.

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