Environmental Product Declaration

Hot and Heavy II 5.0 mm

MOHAWK GROUP
5.0 MM LVT

5.0 mm LVT
Mohawk Group's LVT flooring provides performance solutions for public and private spaces.

Mohawk Group

Sustainability is a core value for Mohawk. In addition to being the largest flooring manufacturer in the world, Mohawk is unique among other flooring manufacturers in that we produce every component of the carpet: fiber, yarn, carpet cushion, and carpet backing. Our culture drives us to seek innovation and efficiency throughout the life cycle of our products, thus reducing our consumption of water, energy, and raw materials. Mohawk also has the most diverse recycling programs in the industry. Through our nation-wide network of partners, we recycle post-consumer carpet and fiber which is subsequently repurposed in the manufacture of other products. Additionally, Mohawk is the nation's largest recycler of plastic bottles which are processed and spun into carpet and backing at our own facilities. Through third-party verification, Mohawk embraces transparency for the benefit of both itself and its customer.

For more information visit:
mohawkgroup.com

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

Mohawk Group

Hot and Heavy II
5.0mm LVT

According to ISO 14025, ISO 21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Solutions 333 Pfingsten Rd, Northbrook IL, 60062 WWW.SPOT.UL.COM
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	General Program Instructions v2.7 2022
MANUFACTURER NAME AND ADDRESS	Mohawk Industries Inc, 160 Industrial Blvd, Calhoun, GA 30701
DECLARATION NUMBER	4791659022.102.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Hot and Heavy II 5.0 mm LVT
REFERENCE PCR AND VERSION NUMBER	Product Category Rules(PCR) for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements (UL 10010 Version 4.0) Product Category Rules(PCR) Guidance for Building-Related Products and Services Part B: Flooring EPD Requirements (UL 10010-7)
DESCRIPTION OF PRODUCT APPLICATION/USE	Hot and Heavy II 5.0 mm LVT
PRODUCT RSL DESCRIPTION (IF APPL.)	15 years
MARKETS OF APPLICABILITY	Global
DATE OF ISSUE	November 27th, 2024
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-Specific
RANGE OF DATASET VARIABILITY	Industry-average
EPD SCOPE	Cradle to Grave
YEAR(S) OF REPORTED PRIMARY DATA	2023
LCA SOFTWARE & VERSION NUMBER	GaBi 10
LCI DATABASE(S) & VERSION NUMBER	GaBi 10.8.0.14
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1

The PCR review was conducted by:	UL Solutions PCR Review Panel epd@ul.com
This declaration was independently verified in accordance with ISO 14025: 2006. ☐ INTERNAL ☒ EXTERNAL	Cooper McCollum, UL Solutions
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Econetwork
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Sung Mo Yeon, H.I.P. Pathway

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

Mohawk Group

Hot and Heavy II
5.0mm, LVT

According to ISO 14025,
ISO 21930:2017

1. Product Definition and Information

1.1. Description of Company/Organization

Mohawk is a leading manufacturer of carpet, wood, laminate, and luxury vinyl tile flooring that began in 1878. Mohawk is committed to growing in ways that are environmentally sound, socially responsible, and make sense for their stakeholders. Mohawk Group strives to design and manufacture innovative products with reduced environmental and social impacts. As part of the world's largest flooring manufacturer, Mohawk feels a profound sense of responsibility to advance their shared mission of a more sustainable future.

1.2. Product Description

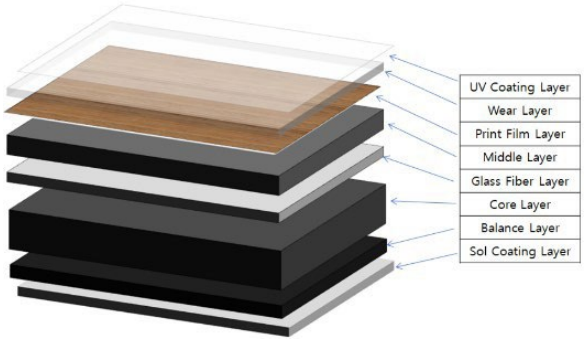
Product Identification

This Environmental Product Declaration covers all styles and patterns of Hot and Heavy II 5.0 mm modular resilient flooring, LVT(Luxury Vinyl Tile). Hot and Heavy II LVT are bold, oversized formats that have a loose lay construction. Each jumbo tile and plank is coated with a non-skid backing that together, with the substantial weight of the product, keep tiles on the floor under true commercial traffic. Hot and Heavy II LVT not only looks amazing, but works to reduce subfloor prep for a fashionable, practical commercial flooring solution.

Product Specification

There is no CSI, UNSPSC etc. code.

Flow Diagram



A1-A3 measured flows include manufactured processes, transport, and raw material inputs for each product layer and sub-layers.

Product Average

The product average of 8946 grams per square meter was based on a sales weighted average.

1.3. Application

Application of product is intended for modular installation of floor covering in commercial buildings.

1.4. Declaration of Methodological Framework

The data is retrieved from a cradle to grave LCA study. This EPD covers the entire life cycle of the product from cradle to grave (modules A1 to C) excluding modules for which there are no inputs/outputs. No known flows are deliberately excluded from this EPD.

For this product, the stated RSL is 15 years. It should be noted, however, that the service life of carpet tiles may vary depending on the amount and nature of floor traffic and the type and frequency of maintenance. The manufacturer has provided this service life on the basis of its experience of flooring manufacture and supply.

1.5. Technical Requirements

The following technical data describe the product undergoing life cycle assessment.

NAME	VALUE	UNIT
Product form	Tiles(squares)	-
Product thickness	5.0	mm
Total weight	8946	g/m^2

Hot and Heavy II complies with the international tile standards F1700 and ISO 10582. For more information, please visit the Mohawk Group website.

1.6. Properties of Declared Product as Delivered

Hot and Heavy II 5.0T flooring comes in various sizes. Among them, 250*1500(mm) is representative. The tiles are packed in 6-piece cardboard boxes. These boxes are then stacked on pallets for shipment.

1.7. Material Composition

The material that make up the product are indicated below table.

COMPONENTS	MASS(%)
Calcium Carbonate	63.7%
PVC	24.6%
DEHCH*	9.7%
Others	<1%

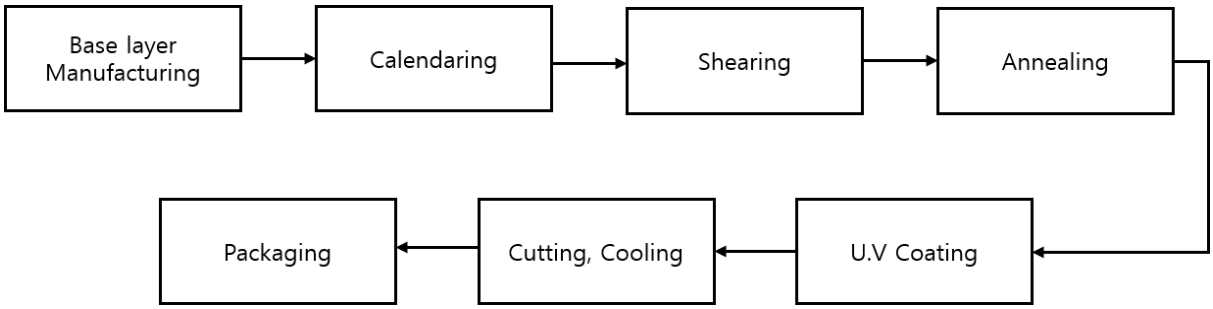
* DEHCH is an eco-friendly non-phthalate plasticizer

The product is produced through hot mixing and a continuous lamination process with a printed design layer. The product is then cut into tiles and packaged.

1.8. Manufacturing

Hot and Heavy II is manufactured in several stages begging with the mixing of some raw materials. Once thoroughly blended, the materials are fed into an extruder, and then formed into a layers These layers are combined through calendaring, and then the product surface is heat-treated through a cold/hot water bath to prevent product deformation. After applying UV coating to the surface, it is cut to the product specifications. The sheet is then placed in cardboard box packaging before transported to the supplier.

Flow Diagram



1.9. Packaging

Tiles are packaged in cardboard boxes. The material of the cardboard box is corrugated cardboard. The composition of this was assumed to be bark chips due to limitations in field data collection. Since packaging boxed are delivered in a box form that conforms to the product specifications, there is no packaging waste generated at the manufacturer.

Landfill, incineration, recycling emissions from cardboard boxes are allocated to installation(A5).

1.10. Transportation

Transportation indicates the distance from the manufacturing site to the construction site. The distance information of the suppliers can be identified, but the distance from the supplier to the construction site cannot be measured, so it was added by referring to the distance of the existing EPD case.

An average distance from manufacturer to the customer was assumed to be 907km by a truck, and 26,771km by a ship.

1.11. Product Installation

Product may be installed with adhesive. The A5 module scenario was referenced from an existing EPD case. For full installation instructions, see the Mohawk Group website, www.mohawkgroup.com.

1.12. Use

During the life of the product, it should be cleaned in accordance with the product maintenance instructions including dust and damp mop cleaning and buffing. The frequency is dependent upon the expected foot traffic and local conditions.

1.13. Reference Service Life and Estimated Building Service Life

Reference service life (RSL) is 15 years based on product warranty. Estimated Building Service Life (ESL) is 75 years.

1.14. Reuse, Recycling, and Energy Recovery

The modular aspect of the product allows for easy reuse of the product.

1.15. Disposal

When the product reaches the end of its life, it is disposed of in accordance with country waste disposal statistic presented in PCR Part A. It is assumed that the disposal is based on the waste disposal (landfill, incineration, recycling) rate of the country where the supplier is located.

2. Life Cycle Assessment Background Information

2.1. Functional or Declared Unit

Per the PCR, the functional unit is 1m^2 of floor covering over the reference service life of 15 years.

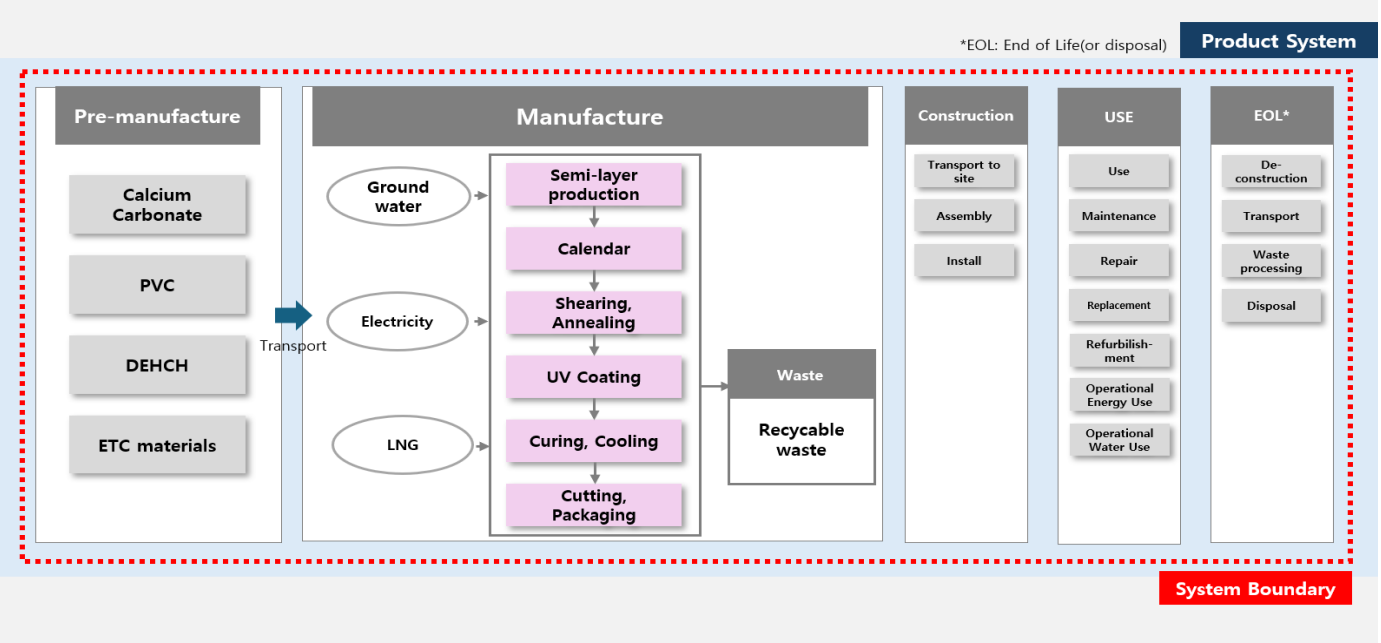
MODULAR RESILIENT FLOORING	VALUE	UNIT
Declared Unit	1	m^2
Mass*	8.95	kg/m^2

*nominal value

2.2. System Boundary

The LCA is “cradle-to-grave” for one square meter of flooring. While the warranted service life is 15 years, modules B1, B3, B4, and B5 are not declared, so the maintenance (B2) is represented for one year. Module D was also excluded from the system boundary because the environmental benefits of recycling were not considered. The system boundaries include.

- A1 Raw material extraction and processing, and processing of recycled materials
- A2 Transport to the factory
- A3 Manufacturing including materials, packaging, energy, and waste disposal or recycling
- A4 Transport to installation sites (US, and Europe)
- A5 Installation including ancillary materials required for installation and trim-waste disposal
- B2 Maintenance: Includes the energy for vacuuming, extraction cleaning, and the production and transport of cleaning agents. The treatment of the waste-water from extraction cleaning is included. This is for one year of use.
- C2 Transport of waste to local disposal
- C4 Disposal



2.3. Estimates and Assumptions

The datasets for materials upstream from manufacturing are a combination of information from KEITI, GaBi, Ecoinvent.

Inventories for all materials are not available and when unavailable, conservative proxy datasets were chosen based on similarity of material.

2.4. Cut-off Criteria

The cut-off criteria is less than 1% for energy use and less than 1% of total mass per unit process, the sum or which shall not exceed 5% or either energy or mass. If a flow met the cut-off criteria for exclusion, yet was thought to have significant environmental impact, then it was included.

2.5. Data Sources

The datasets for materials upstream from manufacturing are combination from GaBi and Ecoinvent database. Inventories for all materials are not available and when unavailable, conservative proxy datasets were chosen based on similarity of material.

- Raw material acquisition: Secondary data (Ecoinvent 3.8, Sphera 2024)
- Manufacture site: Site specific data (2023)
- Transportation: Site specific data (2023)

2.6. Data Quality

Data quality requirements were divided into time-related, geographical, technology coverage, and applied to whole system boundary in compliance with PCR Part B.

- Time related coverage: The time primary data was collected from January 2023 to December 2023. Using this data meets the PCR requirements. Time coverage of this data is considered very good quality.
- Geographical coverage: The primary data was collected from the manufacturing plant located in the Republic of Korea. The geographic coverage of primary data is considered very good quality.
- Technical coverage: The primary data flows were collected from the current process. The technical coverage of primary data is considered very good quality.

2.7. Period under Review

The data collection and the product described are and average product manufactured in 2023.

2.8. Allocation

After identifying the processes shared with other product systems, the allocation was conducted in accordance with the following step-by-step procedures.

Step 1: Allocation should be avoided where possible.

- Due to the variety of products manufactured in the workplace, it was possible to avoid allocation through the expansion of the product system. Proceed to step 2 accordingly.

Step 2: If allocation is unavoidable, the inputs and outputs of the system should be allocated in a way that based on the physical association between the product of function.

3. Life Cycle Assessment Scenarios

Table 1. Transport to the building site (A4)

NAME	VALUE	UNIT
Fuel type	Diesel	
Liters of fuel	0.040	l/100km
Vehicle type	Truck 34-40	tons
Transport distance (truck)	907	km
Transport distance (ship)	26,771	km
Capacity utilization (including empty runs, mass based	85	%
Gross density of products transported	8.95	kg/m^3
Weight of products transported (if gross density not reported)	3.2	kg
Volume of products transported (if gross density not reported)	0.001	m^3
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	=1	-

Table 2. Installation into the building (A5)

NAME	VALUE	UNIT
Ancillary materials	0.107	kg
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	-	m^3
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Product loss per functional unit	0.07	kg
Waste materials at the construction site before waste processing, generated by product installation	0.16	kg
Output materials resulting from on-site waste processing (specified by route; e.g. for recycling, energy recovery and/or disposal)	-	kg
Biogenic carbon contained in packaging	0.15	kg CO_2
Direct emissions to ambient air, soil and water	-	kg
VOC content	-	$\mu g/m^3$

Table 3. Reference Service Life

NAME	VALUE	UNIT
RSL	**15**	years

Table 4. Maintenance (B2)

NAME	VALUE	UNIT
Maintenance process information (cite source in report)		-
Maintenance cycle	15	cycle(s)/ RSL
Maintenance cycle	75	cycle(s)/ ESL
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	0.0058	m^3/year
Ancillary materials specified by type (e.g. cleaning agent)	0.119	kg/year
Energy input, specified by activity, type and amount	0.565	MJ/year
Other energy carriers specified by type	-	kWh
Power output of equipment	9.42	kW/year
Waste materials from maintenance (specify materials)	-	kg
Direct emissions to ambient air, soil and water	-	kg
Further assumptions for scenario development (e.g. frequency and time period of use, number of occupants);	-	-

Maintenance cycle for B2 stage is measured for 1 year per the functional unit.

Table 5. End of life (C1-C4)

NAME		VALUE	UNIT
Assumptions for scenario development	Product disposed of either with underlying floor or manually removed via scraping		
Collection process (specified by type)	Collected separately	-	kg
	Collected with mixed construction waste	8.95	kg
Recovery (specified by type)	Reuse	-	kg
	Recycling	-	kg
	Landfill	8.95	kg
	Incineration	-	kg
	Incineration with energy recovery	-	kg
	Energy conversion efficiency rate	-	
Disposal (specified by type)	Product or material for final deposition	8.95	kg
Removals of biogenic carbon (excluding packaging)		-	kg CO_2

4. Life Cycle Assessment Results

Table 5. Description of the system boundary modules

	PRODUCT STAGE			CONSTRUCT-ION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				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 supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
EPD Type	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND

4.1. Life Cycle Impact Assessment Results

Table 6. North American Impact Assessment Results

TRACI v2.1	A1-A3	A4	A5	B2	C2	C4
GWP 100 [kg CO_2 eq]	1.16E+01	2.68E+00	1.50E-01	5.33E-01	1.91E-02	6.30E+00
ODP [kg CFC-11 eq]	3.51E-06	0.00E+00	3.41E-11	4.03E-14	0.00E+00	3.35E-09
AP [kg SO_2 eq]	4.00E-02	4.70E-02	4.45E-04	8.02E-04	1.73E-04	2.63E-02
EP [kg N eq]	3.82E-02	2.57E-03	7.32E-04	6.85E-04	1.11E-05	6.99E-02
POCP [kg O_3 eq]	4.53E-01	1.38E+00	2.51E-03	1.38E-02	4.04E-03	2.77E-02
ADP_{fossil} [MJ, LHV]	2.89E+01	0.00E+00	2.84E-02	1.13E+00	0.00E+00	3.36E-02

Key	GWP 100 = Global Warming Potential; ODP = Ozone Depletion Potential; AP = Acidification Potential; EP = Eutrophication; POCP = Photochemical Ozone Creation Potential; ADP fossil = Abiotic resource Depletion Potential of non-renewable(fossil) energy resources

4.2. Life Cycle Inventory Results

Table 7. Resource Use

PARAMETER	A1-A3	A4	A5	B2	C2	C4
PERE[MJ]	1.43E+01	0.00E+00	8.90E-02	3.99E+00	0.00E+00	1.45E-01
PERT[MJ]	1.43E+01	0.00E+00	8.90E-02	3.99E+00	0.00E+00	1.45E-01
PENRE[MJ]	2.52E+02	0.00E+00	2.72E-01	1.11E+01	0.00E+00	3.30E+00
PENRT[MJ]	2.52E+02	0.00E+00	2.72E-01	1.11E+01	0.00E+00	3.30E+00
FW[m^3]	1.33E-01	0.00E+00	1.26E-04	1.77E-02	0.00E+00	2.78E-03

Key	RPRE = Use of renewable primary energy; RERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy; PENRT = Total use of non-renewable primary energy resources; FW = Use of net fresh water resources

Table 8. Output Flows and Waste Categories

PARAMETER	A1-A3	A4	A5	B2	C2	C4
HWD [kg]	8.52E-04	0.00E+00	1.16E-10	2.66E-10	0.00E+00	0.00E+00
NHWD [kg]	3.31E-02	0.00E+00	3.69E-02	1.88E-02	0.00E+00	0.00E+00
RWD [kg]	4.44E-04	0.00E+00	9.10E-06	6.00E-04	0.00E+00	0.00E+00

Key	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

5. LCA Interpretation

The analysis results represent cradle to grave environmental performance of Hot and Heavy II flooring products. The top three contributors to each impact category are shown in below Table 9.

Table 9. Highest Contributions by Impact Category

IMPACT CATEGORY	CONTRIBUTION		
	Largest	2nd	3rd
Global Warming Potential, GWP	A1-A3	C4	A4
Ozone Depletion Potential, ODP	C2	A1-A3	C4
Acidification Potential, AP	A4	A1-A3	C4
Eutrophication Potential, EP	C4	A1-A3	A4
Depletion of abiotic resources-fossil fuels, ADPf	A1-A3	B2	C4

6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

More information on the manufacturer's sustainability and environmental programs can be founded online at www.mohawkgroup.com.

6.2. Environment and Health During Installation

All recommended personal protective equipment (PPE) should be utilized during installation, as indication on the Catalog and installation guidelines, founded online at www.mohawkgroup.com.

6.3. Extraordinary Effects

Fire

TEST	VALUE
ASTM E-648	Class 1

*Test date: 2024-08-27

Water

	TEST	STANDARD	PASS
SLIP RESISTANCE	Dry	More than indicated value(DP2)	P5 (O)
	Wet	More than indicated value(WP2)	P2 (O)

Additionally, contamination tests were conducted on other living liquids (soybean oil, milk, cement paste, etc.). All items met the criteria of being free of color, gloss, and swelling.

6.4. Environmental Activities and Certifications

All environmental activities and certifications can be found at online at www.mohawkgroup.com.

7. References

GaBi 2024	Sphera Solutions; GaBi software version 10.8.0.14
ISO 14040	2006 Environmental management – Life cycle assessment – principles and framework
ISO 14044	2006 Environmental management – Life cycle assessment – Requirements and guidelines
ISO 21930	Sustainability in building construction-Environmental declaration of building products
ISO 14020	Environmental labels and declarations – General principles
ISO 14071	Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006
UL PCR	Product Category Rules(PCR) for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements (UL 10010 Version 4.0)
UL PCR	Product Category Rule(PCR) Guidance for Building-Related Products and Services Part B: Flooring EPD Requirements (UL 10010-7)