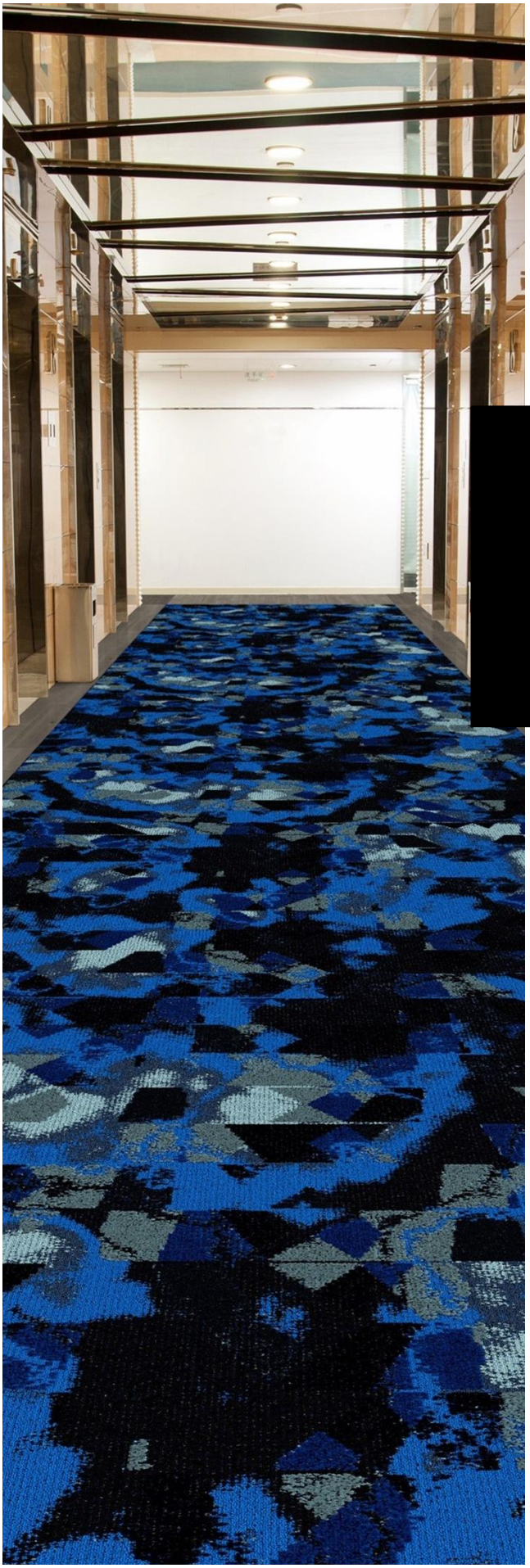

ENVIRONMENTAL PRODUCT DECLARATION

BROADLOOM - MOISTURE-BLOC ™

North America – PrintWorks™ Technology
Nylon 6 & 6,6

Milliken's Moisture-Bloc™ attached cushion is a moisture barrier backing featuring Enhancer™ Technology which allows for easy installation and removal. Moisture-Bloc™ is a sustainable option that is available on all Milliken commercial broadloom carpets and is certified to NSF 140 Gold and is Cradle to Cradle Certified® Silver.

Milliken has a rich history of delivering innovative flooring solutions from our research center, manufacturing facilities and our creative collective of inspired problem solvers. Milliken's reliable and stylish flooring products offer great design solutions built from unique insights and an exceptional array of technical capabilities.

We believe material health is essential to enable circularity. The use of materials that don't contain harmful chemicals is a critical pathway to end-of-life product recycling. Our carpet products have 100% transparency in materials to 100ppm. This level of materials transparency and a continued focus to improving material health is core to our commitment to reduce climate change. Our carpet, resilient flooring, and entryway tile are recyclable. We will continue to invest in new technology and create flooring products that enable you to make better choices.

For More Information contact us at:
Millikenfloors.com | 800.824.2246

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

Milliken

Broadloom - Mositure-Bloc™
North America - PrintWorks™ Technology Nylon 6,6 & 6

According to ISO 14025
and ISO21930:2017

EPD Program and Program Operator Name, Address, Logo, and Website	UL Solutions www.ul.com 333 Pfingsten Rd, Northbrook IL, 60062 www.spot.ul.com
General Program Instructions and Version Number	UL Solutions Program Operator Rules v2.7 2022
Manufacturer Name and Address	Milliken, 300 Lukken Industrial Dr., LaGrange GA 30240
Declaration Number	4791117385.129.1
Declared Product & Functional Unit or Declared Unit	North America Broadloom - Mositure-Bloc™ PrintWorks™ Technology Nylon 6,6
Reference PCR and Version Number	Part A: Life Cycle Assessment Calculation Rules and Report Requirements, (UL Environment, V4.0, 2022) and Part B: Flooring EPD Requirements (UL Environment V2.0, 2018)
Description of Product Application/Use	Broadloom Moisture-Bloc™ PrintWorks™ Technology Nylon 6,6
Product RSL Description (if Appl.)	15 Years
Markets of Applicability	Americas
Date of Issue	July 30, 2025
Period of Validity	5 Years
EPD Type	Product Specific
EPD Scope	Cradle to Grave
Year(s) of Reported Primary Data	2024
LCA Software & Version Number	10.9
LCI Database(s) & Version Number	2024.2
LCIA Methodology & Version Number	TRACI 2.1, CML 2001-Jan 2016, and IPCC AR5

The PCR review was conducted by:	UL Solutions PCR Review Panel epd@ul.com
This declaration was independently verified in accordance with ISO 21930:2017 and 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:	WAP Sustainability Consulting
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine, Thrive ESG

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 This EPD meets all comparability requirements stated in ISO 21930:2017 and ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-by-case basis. Examples of variations: Different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

1. Product Definition and Information

1.1. Description of Company/Organization

Milliken & Company is an innovation company that has been exploring, discovering and creating ways to enhance people's lives since 1865. The company is a privately held for-profit corporation. The company is headquartered in Spartanburg, South Carolina, and operates flooring design and manufacturing facilities in the United States, United Kingdom, Australia and China. In 2024, Milliken was recognized as one of the world's most ethical companies by Ethisphere for the eighteenth consecutive year.

1.2. Product Description

Figure 1: Illustration of Milliken Broadloom carpet construction.

Product Identification

This EPD represents Milliken's Broadloom Moisture-Bloc™ PrintWorks™ Nylon 6,6 and Nylon 6 carpet manufactured in the US. This carpet is available using either Printworks™ Nylon 6.6or Nylon 6 face fiber. Within this EPD, details and results concerning the Nylon 6.6 variant are presented. These are conservative and cover the Nylon 6 variant as well. Milliken's Moisture-Bloc™ attached cushion is a moisture barrier backing featuring Enhancer™ Technology which allows for easy installation and removal. Moisture-Bloc™ is a sustainable option that is available on all Milliken commercial broadloom carpets and is certified to NSF 140 Gold and Cradle to Cradle Silver.

Product Specification

The product is described using the specifications outlined in Table 2 Additionally, the product has performance characteristics outlined in Table 1

Table 1: Carpet Performance Testing

Name	Value	Unit
Static Electricity (AATCC 134)	≤ 3.5	kV
Flammability (ASTM E 648)	≥0.45 (Class I)	-
Smoke Density (ASTM E 662)	≤450	-
Methenamine Pill Test (CPSC FF-1-70 or ASTM D 2859)	Self-Extinguishing	-

Flow Diagram

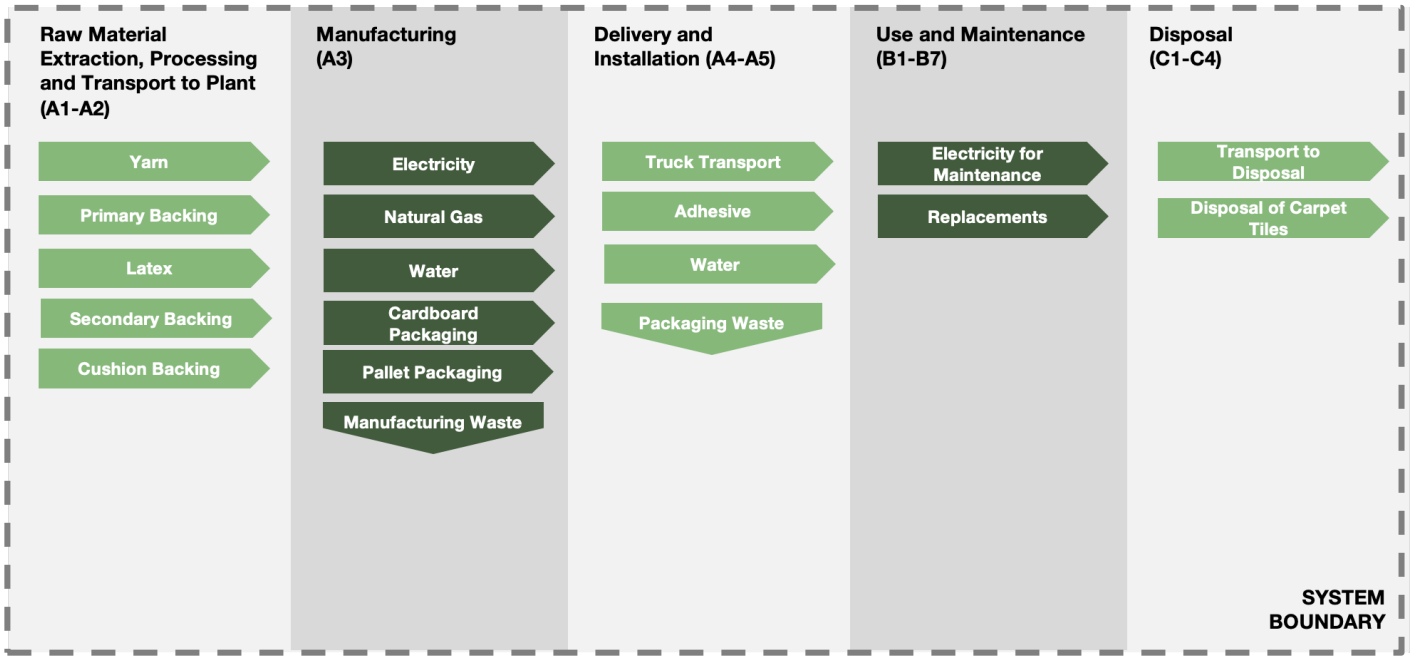

Figure 2: Flows included in the System boundary.

1.3. Application

Milliken & Company's floor coverings are quiet, healthy and provide a desired aesthetic for any office, hotel, school, home, or commercial environment around the world.

1.4. Declaration of Methodological Framework

This LCA is a cradle-to-grave study. A summary of the life cycle stages can be found in Table 18.

The reference service life is outlined in Table 8 and is only applicable if all manufacturing guidelines are followed regarding site-selection and installation.

The cut-off criteria are described in Section 2.4 and allocation procedures are described in Section 2.8. No known flows are deliberately excluded from this EPD.

1.5. Technical Requirements

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

Table 2: Carpet Technical Data

NAME	VALUE	UNIT
Product Form	Broadloom	-
Type of Manufacturing	Tufted Nylon 6,6 on coated backing printed	-
Yarn Type	Nylon 6,6	-
Primary Backing Type	Polyester, Nylon 6	-
Backing	Moisture-Bloc™	-
Product Weight	2.14-3.1	kg/m^2
Surface Pile Thickness	7.9-14.7	mm
Surface Pile Weight	0.45-1.42	kg/m^2
*This product family covers a range of face fiber weights. The results presented in this EPD represent an average face weight of 26 oz/m^2 (0.737 kg/m^2). Scenarios for additional face weights are presented in Section 8.		

1.6. Properties of Declared Product as Delivered

The products declared in this document complies with the following codes or regulations:

- ASTM E 648-17 Radiant Panel
- ASTM E 662-17a Smoke Density
- ASTM D2859 Pill Test
- AATCC 134-2011 GSA Static
- ASTM D5848 Pile weight
- ASTM D5848 Pile Density
- ASTM D6859 Pile Thickness
- ASTM D5793 Stitches
- ASTM D5793 Gauge
- ASTM D7570 AACHEN/ISO 2551 Aachen
- ASTM D1335 Tuft Bind
- AATCC 16.3 Lightfastness

1.7. Material Composition

The materials that make up the flooring product are indicated in Table 3.

Table 3: Material Composition

COMPONENT	MATERIAL	MASS %
Face fiber	Nylon 6,6	21-46%
Primary backing	Polypropylene	4-6%
Latex and Skipcoat	VAE, Limestone	17-24%
Secondary Backing	VAE, Calcium Carbonate	4-5%
Cushioning Backing	Polypropylene	26-37%
Topical	Water, Proprietary materials	0-1%

The product does not contain hazardous substances per the applicable regional-specific legislation, as indicated in Section 2.8.6 of *Part A: Life Cycle Assessment Calculation Rules and Report Requirements* from UL Environment.

1.8. Manufacturing

Broadloom Mositure-Bloc™, PrintWorks™ Technology are manufactured at Duncan Stewart, Alma, and Live Oak facilities in the US. The nylon 6,6 fiber is printed in-house. Tufting is the process of affixing face fiber to a primary backing system. Latex is applied to the tufted farbic and a secondary backing is adhered using another layer of latex. Finally, a polyrethane cushion is attached to the secondary backing layer. The carpet is then cut and packaged for shipping.

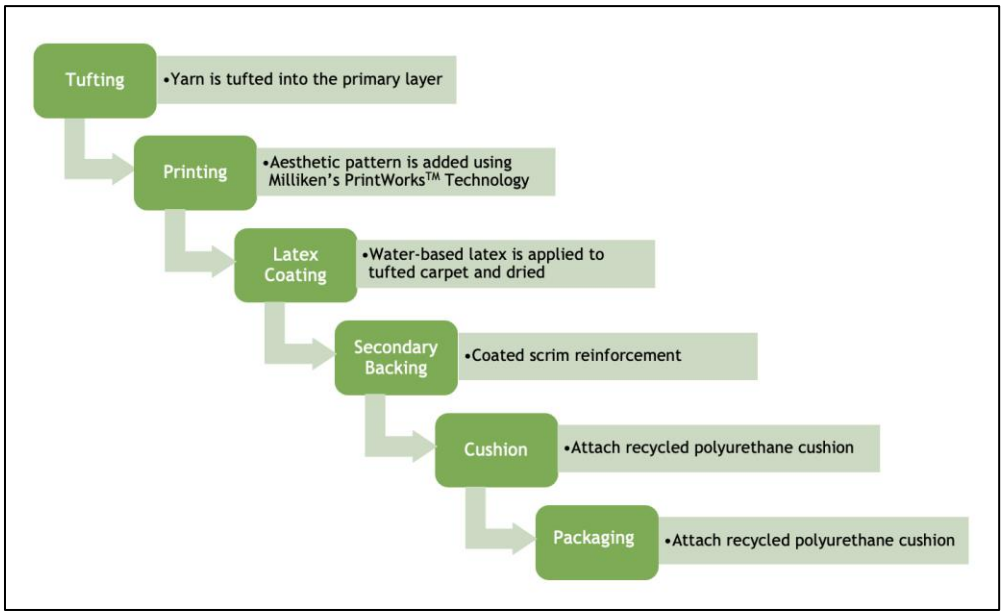

Figure 3: Production process for Milliken Broadloom Carpet

1.9. Packaging

Packaging utilized in the shipment of the product is described in Table 4.

Table 4: Packaging

Packaging Type	Material	Amount (kg)	Disposal Pathway
Tube	Corrugated Cardboard	0.035	Landfill, incineration, recycle
Plastic Wrap	plastic	0.009	recycle

1.10. Transportation

In the LCA model underlying this EPD, it is assumed that all raw materials are distributed by truck. A distance of 800 km was used to model all raw material transporation and in the model as guided by Section 3.5 of the UL Part B Flooring PCR. This same assumption was used in the modeling distribution to customers.

1.11. Product Installation

While installation equipment is required to install the flooring product, it is not included in the study as these are multi-use tools and the impacts per declared unit is considered negligible. All waste generated during installation, including packaging waste, is disposed of according to the tables found in Section 2.8.5 of *Part A: Life Cycle Assessment Calculation Rules and Report Requirements* from UL Environment.

Except where exceeded or modified by Milliken Carpet Installation Instructions, Milliken recognizes the CRI Carpet Installation Standard 2011 as the minimum acceptable standard for the installation of its carpet products, for more information, visit our website, www.millikencarpet.com.

1.12. Use

The method of maintenance is using a vacuum cleaner to remove dust and debris from carpet with occasional deep cleaning. Vacuuming was assummed to occur five days a week during working weeks. Deep cleaning, which consumes electricity, detergent, and water, was modeled as occuring twice per year.

Table 5: Use Phase Assumptions

Type	Value	Unit
Vacuuming	250	#
Deep Cleaning	2	#

Detailed maintenance instructions are provided online at Milliken Flooring Covering's technical documentation webpage.

1.13. Reference Service Life and Estimated Building Service Life

The reference service life of the product is 15 years. For a building's estimated service life of 75 years, the carpet will be replaced four times, meaning 5 m^2 of tile is needed over the full life of the building. The reference service life assumes the product was installed according to the manufacturer's recommendations.

1.14. Reuse, Recycling, and Energy Recovery

Milliken's broadloom carpet are 100% recyclable. Keeping unnecessary waste out of landfill is a key part of Milliken's environmental commitment. Milliken's N/XT Life™ Circularity Program provides non-landfill disposal solutions and ensures that used carpet is recovered and managed in the most environmentally, socially, and financially responsible way. In other cases, carpet is downcycled into construction products and plastic composites.

1.15. Disposal

Disposal pathways in the EPD are modeled in accordance with disposal routes and waste classification referenced in Sections 2.8.5 and 2.8.6 of *Part A: Life Cycle Assessment Calculation Rules and Report Requirements* from UL Environment. For North American products not made out of metal, this dictates an End-of-Life scenario of 100% landfilling.

2. Life Cycle Assessment Background Information

2.1. Functional Unit

The functional unit of the flooring product is one (1) m^2 of floor covering, as indicated in Table 6. Values in Table 6 represent finished broadloom, installation materials, packaging and the mass of the product lost during installation for 1 m^2 of broadloom.

Table 6: Functional Unit

Name	Value	Unit
Functional Unit	1 m^2	
Mass	2.59	kg

2.2. System Boundary

The type of EPD is cradle-to-grave. All LCA modules are included and are summarized in Figure 3 and Table 7

Table 7: System Boundary

Module Name	Description	Analysis Period	Summary of Included Elements
A1	Product Stage: Raw Material Supply	2024	Raw Material sourcing and processing as defined by secondary data.
A2	Product Stage: Transport	2024	Shipping from supplier to manufacturing site. Fuel use requirements estimated based on product weights and estimated distance.
A3	Product Stage: Manufacturing	2024	Energy, water and material inputs required for manufacturing products from raw materials. Packaging materials and manufacturing waste are included as well.
A4	Construction Process Stage: Transport	2024	Shipping from manufacturing site to project site. Fuel use requirements estimated based on product weights and mapped distance.
A5	Construction Process Stage: Installation	2024	Installation adhesives, installation waste and packaging material waste.
B1	Use Stage: Use	2024	Use of the product.
B2	Use Stage: Maintenance	2024	Cleaning energy, water, and materials, including refinishing the product.
B3	Use Stage: Repair	2024	Materials and energy required to repair the product.
B4	Use Stage: Replacement	2024	Total materials and energy required to manufacture a replacement.
B5	Use Stage: Refurbishment	2024	Materials and energy required to refurbish the product.
B6	Operational Energy Use	2024	Operational Energy Use of Building Integrated System During Product Use
B7	Operational Water Use	2024	Operational Water Use of Building Integrated System During Product Use
C1	EOL: Deconstruction	2024	No inputs required for deconstruction.
C2	EOL: Transport	2024	Shipping from project site to landfill. Fuel use requirements estimated based on product weight and mapped distance.
C3	EOL: Waste Processing	2024	Waste processing not required. All waste can be processed as is.
C4	EOL: Disposal	2024	Assumes all products are sent to landfill. Landfill impacts modeled based on secondary data.
D	Benefits beyond system	2024	Module not declared

2.3. Estimates and Assumptions

All estimates and assumptions are within the requirements of ISO 14040/44. The majority of the estimations are within the primary data. The primary data was collected as annual totals including all utility usage and production information. For the LCA, the usage information was divided by the production to create an energy and water use per square meter. Another assumption is that the installation tools are used enough times that the per square meter impacts are negligible.

2.4. Cut-off Criteria

All known inputs in which data was available were included. Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the functional unit. The excluded materials include:

- Spot cleaning chemicals are not included due to the infrequency of the activity during use phase
- VOC emissions from adhesive curing were excluded from this model. This was justified based on Milliken's installation instructions explicitly calling for the use of a low VOC adhesive.
- No other known flows were excluded in the modeling of this product. Background datasets (from Sphera's Managed LCA Content database) may inherently exclude some flows which were unknown to practioners creating this model.

2.5. Data Sources

Primary data were collected by facility personnel and from utility bills and was used for all manufacturing processes. When primary data did not exist, secondary data for raw material production was utilized from Sphera's Managed LCA Content (MLC) version 2024.2 (formerly GaBi Database).

2.6. Data Quality

The geographical scope of the manufacturing portion of the life cycle is Duncan Stewart, Alma, and Live Oak facilities in the US. All primary data were collected from the manufacturer. The geographic coverage of primary data is considered excellent. The primary data provided by the manufacturer represent all information for calendar year 2024. Using this data meets the PCR requirements. Time coverage of this data is considered very good. Primary data provided by the manufacturer is specific to the technology that Milliken uses in manufacturing their product. It is site-specific and considered of good quality. It is worth noting that the energy and water used in manufacturing the product includes overhead energy such as lighting, heating and sanitary use of water. Sub-metering would improve the technological coverage of data quality. Data necessary to model cradle-to-gate unit processes was sourced from MLC datasets. Improved life cycle data from suppliers would improve technological coverage.

2.7. Period under Review

The period under review is calendar year 2024.

2.8. Allocation

General principles of allocation were based on ISO 14040/44. Where possible, allocation was avoided. When allocation was necessary it was done on using area. Allocation by area was deemed appropriate for the type of production used at Milliken & Company facilities as consumption of manufacturing inputs and production of waste outputs is more closely tied to the area of carpet produced than it is to the mass produced. Allocation was also prevalent in the secondary MLC datasets used to represent upstream processes. As a default, MLC datasets use a physical mass basis for allocation.

3. Life Cycle Assessment Scenarios

Table 8. Reference Service Life

Name	Value
Product Reference Service Life (RSL)	15 years
Building Estimated Service Life (ESL)	75 Years
Declared product properties (at the gate) and finishes, etc.	See Table 1
Design application parameters	Per recommendation by manufacturer
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Accepted industry standard
Indoor environment (if relevant for indoor applications)	Normal building operating conditions
Use conditions, e.g. frequency of use, mechanical exposure	Normal building operating conditions

Table 9. Transport to the building site (A4)

Name	Value	Unit
Fuel type	Diesel	-
Liters of fuel	38.8	l/100km
Vehicle type	Truck - Trailer, basic enclosed/ 45,000 lb payload	-
Transport distance	800	km
Capacity utilization	0.67	%
Gross density of products transported	370	kg/m^3
Capacity utilization volume factor	0.85	-

Table 10. Installation into the building (A5)

Name	Value	Unit
Adhesive	0.097	kg
Product loss per functional unit	0.0484	kg
Waste materials at the construction site before waste processing, generated by product installation	0.092	kg
Output materials resulting from on-site waste processing	0	kg
Biogenic carbon contained in cardboard packaging	0.129	kg CO2
Direct emissions to ambient air, soil, and water	-	kg
VOC content of flooring[1]	<0.5	µg/m3

Table 11. Maintenance (B2)

Name	Value	Unit
Maintenance process information	Manufacturer recommended	-
Vacuuming Maintenance cycle	3,750	Number/ RSL
Vacuuming Maintenance cycle	18,750	Number/ ESL
Electricity for vacuuming	0.95	kWh/m^2 floor/yr
Power output of vacuum	1.465	kW
Deep Cleaning Maintenance Cycle	30	Number/ RSL
Deep Cleaning Maintenance Cycle	150	Number/ ESL
Electricity for Deep Cleaning	0.05	kWh/m^2 floor/yr
Power Output of Equipment	1.4	kW
Water for Deep Cleaning	1.9	Kg/m^2/y
Detergent for Deep Cleaning	0.1	Kg/m^2/y

Table 12. Repair (B3)

Name	
Repair process information	Product typically not repaired during use

Table 13. Replacement (B4)

Name	Value	Unit
Replacement cycle	0	Number/ RSL
Replacement cycle	4	Number/ ESL
Energy input, specified by activity, type and amount	0	kWh
Net freshwater consumption specified by water source and fate	0	m^3
Adhesive	0.097	kg/ replacement
Direct emissions to ambient air, soil, and water	-	kg
Further assumptions for scenario development, e.g. frequency and time period of use		As appropriate

[1] Milliken Carpet products are certified to GRI Green Label Plus which adheres to the Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers- version 1.2 CA Specification 01350.

Table 14. Refurbishment (B5)

NAME	VALUE
Refurbishment process description	Product typically not refurbished during use

Table 15. Operational Energy & Water Use (B6) & (B7)

NAME	VALUE
Operational Energy/Water Description	Product does not use energy or water

Table 16. End of Life (C1-C4)

NAME		VALUE	UNIT
Assumptions for scenario development		Product is either disposed of with the underlying floor or manually removed via scraping	
Collection process	Collected separately	0	kg
	Collected with mixed construction waste	2.52	kg
Recovery	Reuse	0	kg
	Recycling	0	kg
	Landfill	2.52	kg
	Incineration	0	kg
	Incineration with energy recovery	0	kg
	Energy conversion efficiency rate	84-94	%
Disposal	Product or material for final deposition	2.52	kg
*Includes weight of product and adhesive			

Table 17. Reuse, recovery and/or recycling potentials (D), relevant scenario information.

NAME	VALUE
Module Not Declared	

4. Life Cycle Assessment Results

Table 18: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	Assembly/ Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use	Building Operational Water 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	MND

Note: Modules B1, B5-B7 and C1 and C3 are included in the scope of this study; however, as illustrated in Section 3 these modules do not have any inputs or outputs in this product system. As such, their environmental impacts are 0.00 and to conserve space, they have been excluded from the results tables presented below.

4.1. Life Cycle Impact Assessment Results

Table 19: North American Impact Assessment Results

	A1-A3	A4	A5	B2	B4	C2	C4
IPCC AR5 Impacts							
GWPe 100 [kg CO_2 eq]	2.32E+01	1.81E-01	5.67E-01	3.83E+01	9.60E+01	2.29E-02	6.60E-02
GWPi 100 [kg CO_2 eq]	2.31E+01	1.81E-01	5.54E-01	3.83E+01	9.58E+01	2.28E-02	6.57E-02
TRACI 2.1 Impacts							
ODP [kg CFC-11 eq]	2.11E-06	5.26E-16	4.23E-08	4.13E-12	8.62E-06	6.68E-17	3.09E-15
AP [kg SO_2 eq]	3.25E-02	8.89E-04	8.50E-04	4.69E-02	1.38E-01	6.87E-05	3.34E-04
EP [kg N eq]	4.47E-03	7.75E-05	1.30E-04	5.38E-03	2.04E-02	7.01E-06	4.09E-04
Resources [MJ, LHV]	4.96E+01	3.35E-01	1.27E+00	4.23E+01	2.05E+02	4.26E-02	1.27E-01
POCP [kg O_3 eq]	7.49E-01	2.04E-02	1.85E-02	6.91E-01	3.18E+00	1.55E-03	5.97E-03

Table 20: EU Impact Assessment Results

	A1-A3	A4	A5	B2	B4	C2	C4
CML 2001 (v4.2) Impacts							
GWP 100 [kg CO2 eq]	2.23E+01	1.77E-01	5.33E-01	3.72E+01	9.22E+01	2.25E-02	6.35E-02
ODP [kg CFC-11 eq]	2.11E-06	3.10E-14	4.22E-08	2.44E-10	8.62E-06	3.93E-15	1.82E-13
AP [kg SO2 eq]	2.63E-02	6.47E-04	6.90E-04	4.44E-02	1.12E-01	5.08E-05	3.14E-04
EP [kg PO4-3 eq]	6.16E-03	1.71E-04	1.75E-04	5.76E-03	2.82E-02	1.34E-05	5.20E-04
POCP [kg ethene eq]	4.05E-03	-2.55E-04	9.61E-05	4.37E-03	1.56E-02	-1.85E-05	2.46E-05
ADPelement [kg Sb-eq]	1.20E-05	2.49E-08	3.26E-07	5.38E-06	4.95E-05	3.15E-09	2.07E-08
ADPfossil [MJ, LHV]	3.63E+02	2.34E+00	9.22E+00	4.61E+02	1.50E+03	2.97E-01	9.47E-01

*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.

4.2. Life Cycle Inventory Results

Table 21: Resource Use

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
RPRE [MJ, LHV]	2.69E+01	1.04E-01	9.93E-01	1.55E+02	1.13E+02	1.32E-02	1.21E-01
RPRM [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPRT [MJ, LHV]	2.69E+01	1.04E-01	9.93E-01	1.55E+02	1.13E+02	1.32E-02	1.21E-01
NRPRE [MJ, LHV]	3.22E+02	2.36E+00	8.45E+00	6.29E+02	1.33E+03	2.99E-01	9.76E-01
NRPRM [MJ, LHV]	7.27E+01	0.00E+00	1.45E+00	0.00E+00	2.97E+02	0.00E+00	0.00E+00
NRPRT [MJ, LHV]	3.94E+02	2.36E+00	9.90E+00	6.29E+02	1.63E+03	2.99E-01	9.76E-01
SM [kg]	1.09E+00	0.00E+00	2.19E-02	0.00E+00	4.46E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m3]	5.81E-02	3.47E-04	1.55E-03	2.31E-01	2.40E-01	4.40E-05	1.26E-04

Table 22: Output Flows and Waste Categories

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
HWD [kg]	8.55E-06	3.18E-10	7.46E-07	3.53E-07	3.72E-05	4.03E-11	2.41E-10
NHWD [kg]	4.92E-01	2.35E-04	8.48E-02	3.88E-01	1.42E+01	2.98E-05	2.97E+00
HLRW [kg]	1.30E-05	8.42E-09	2.81E-07	7.17E-05	5.31E-05	1.07E-09	1.16E-08
ILLRW [kg]	1.12E-02	7.10E-06	2.47E-04	5.99E-02	4.60E-02	9.01E-07	1.04E-05
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	3.07E-01	0.00E+00	7.12E-02	0.00E+00	1.51E+00	0.00E+00	0.00E+00
MER [kg]	2.39E-01	0.00E+00	8.60E-03	0.00E+00	9.89E-01	0.00E+00	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	1.44E-02	0.00E+00	5.76E-02	0.00E+00	0.00E+00
EET [MJ, LHV]	0.00E+00	0.00E+00	5.13E-03	0.00E+00	2.05E-02	0.00E+00	0.00E+00

Table 23: Carbon Emissions and Removals

PARAMETER	A1-A3	A4	A5	B2	B4	C2	C4
BCRP [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK [kg CO_2]	1.29E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK [kg CO_2]	0.00E+00	0.00E+00	1.29E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO_2]	4.37E-01	0.00E+00	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00

4.3. Global Warming Potential (GWP) stage A1-A3 for additional product yarn weights

Today, all Milliken carpet, resilient flooring and entryway carpet tile products are part of M/PACT™, our carbon offset program. Milliken offests the raw materials and manufacturing carbon footprint (cradle-to-gate, including biogenic carbon) of these products using third-party Verified Carbon Standard Credits that support renewable energy and carbon reduction technologies to help fight climate change.

Milliken Flooring can produce the reference product with a variety of different yarn weights.Table 29 shows the embodied carbon value for different versions of this product (e.g. the embodied carbon of the reference product with different face weights as produced by Milliken Flooring). Embodied carbon in this EPD refers to A1-A3 (cradle-to-gate) GWP impacts. This value reflects the GWP associated with upstream material extraction and processing, material transportation to Milliken Flooring facilities, and the Milliken Flooring production process. Embodied carbon is presented both including and excluding biogenic carbon.

Table 24: Embodied Carbon with Face Weights

Yarn Weight (oz/yd2)	Yarn Weight (g/m2)	Embodied Carbon (kg/m2 co2e Excluding biogenic carbon)	Embodied Carbon (kg/m2 co2e Including biogenic carbon)	GWP After M/PACT™ (kg/m2 co2)
16	542	19.5	19.5	0.00
17	576	19.9	19.8	0.00
18	610	20.3	20.2	0.00
19	644	20.6	20.6	0.00
20	678	21.0	20.9	0.00
21	712	21.3	21.3	0.00
22	746	21.7	21.7	0.00
23	780	22.1	22.0	0.00
24	814	22.4	22.4	0.00
25	848	22.8	22.8	0.00
26	882	23.2	23.1	0.00
27	915	23.5	23.5	0.00
28	949	23.9	23.8	0.00
29	983	24.2	24.2	0.00
30	1017	24.6	24.6	0.00
31	1051	25.0	24.9	0.00
32	1085	25.3	25.3	0.00
33	1119	25.7	25.7	0.00
34	1153	26.1	26.0	0.00
35	1187	26.4	26.4	0.00
36	1221	26.8	26.8	0.00
37	1255	27.2	27.1	0.00
38	1288	27.5	27.5	0.00
39	1322	27.9	27.9	0.00
40	1356	28.2	28.2	0.00
41	1390	28.6	28.6	0.00
42	1424	29.0	28.9	0.00

Yarn Weight (oz/yd2)	Yarn Weight (g/m2)	Embodied Carbon (kg/m2 co2e Excluding biogenic carbon)	Embodied Carbon (kg/m2 co2e Including biogenic carbon)	GWP After M/PACT™ (kg/m2 co2)
43	1458	29.3	29.3	0.00
44	1492	29.7	29.7	0.00
45	1526	30.1	30.0	0.00
46	1560	30.4	30.3	0.00
47	1594	30.8	30.8	0.00
48	1627	31.2	31.1	0.00
49	1661	31.5	31.5	0.00
50	1695	31.9	31.9	0.00

5. LCA Interpretation

Overall for Milliken's Printworks™ Nylon 6,6 Yarn broadloom with Mositure-Bloc backing the majority of cradle-to-grave impacts come from the B4 lifecycle module, which covers the replacement of Milliken Flooring products over the estimated service life (ESL) of an average building. The second largest contributor to most impact categories is the B2 lifecycle module, which encompasses maintenance of the product over the ESL of the building in which it is installed.

In the sourcing, extraction, and manufacturing stages (A1-A3) yarn is the single largest contributor to global warming potential (GWP) impacts with natural gas consumption as the second largest contributor. While most impact categories follow similar trends, A1-A3 eutrophication potential (EP) impacts are slightly different with manufacturing waste accounting for the majority of impact.

6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

Information on Milliken's sustainability programs, "No Carpet to Landfill" pledge and other sustainability resources can be found Milliken Floor Covering's sustainability website.

6.2. Environment and Health During Installation

All recommended personal protective equipment (PPE) should be utilized during installation, as indicated on the SDS and installation guidelines, found online.

6.3. Extraordinary Effects

Fire

The product's fire performance can be found in the technical specifications found in Table 1.

Water

Should the product become flooded, the water should be removed through means of extraction and drying and the product should behave as originally intended. There are no environmental impacts associated with the product being flooded.

Mechanical Destruction

If the product is mechanically destroyed, it should be disposed of using standard procedures and replaced in a timely manner.

6.4. Environmental Activities and Certifications

Milliken has published third-party verified Red List Free Declare labels for all Milliken Carpet products. Additionally, Milliken Carpet products globally are Cradle to Cradle Certified® Silver. All environmental certifications can be found on Milliken Floor Covering's sustainability website. Select certifications are also presented on mindful Materials. Milliken & Company is the first flooring company and one of the first 50 companies in the world to have our net-zero targets verified by Science Based Targets initiative (SBTi).

7. Supporting Documentation

The full text of the acronyms found in Section 4 are found in Table 25.

Table 25: Acronym key

Acronym	Text	Acronym	Text
LCA Indicators			
ADP-elements	Abiotic depletion potential for non-fossil resources	GWP	Global warming potential
ADP-fossil	Abiotic depletion potential for fossil resources	OPD	Depletion of stratospheric ozone layer
AP	Acidification potential of soil and water	POCP	Photochemical ozone creation potential
EP	Eutrophication potential	Resources	Depletion of non-renewable fossil fuels
LCI Indicators			
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	CRU	Components for reuse
PERM	Use of renewable primary energy resources used as raw materials	PENRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	SM	Use of secondary materials
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	RSF	Use of renewable secondary fuels
PENRM	Use of non-renewable primary energy resources used as raw materials	NRSF	Use of non-renewable secondary fuels
HWD	Disposed-of-hazardous waste	FW	Net use of fresh water
NHWD	Disposed-of non-hazardous waste	MFR	Materials for recycling
HLRW	Disposed-of High-Level Radioactive waste	MET	Materials for energy recovery
ILLRW	Disposed-of Intermediate and Low-Level Radioactive waste	EE	Exported energy

8. Appendix

To adhere to Sections 2.5.2 Part A: Life Cycle Assessment Calculation Rules and Report Requirements from UL Environment, additional results for face weights of 16, 26, and 36oz/yd^2 are provided in the following appendix. These additional results ensure all values in Section 4 differ by no more than +/-10% from at least one of the full results tables in this EPD. Similarly to the results presented in Section 4, modules with zero environmental impact have been excluded from these tables but were accounted for in the scope of this study.

8.1 Additional Results

Milliken PrintWorks™ Technology Nylon 6,6: 36 oz Face Weight Results

Table 26: North American Impact Assessment Results per 1 m2 of installed flooring

	A1-A3	A4	A5	B2	B4	C2	C4
IPCC AR5 Impacts							
GWPe 100 [kg CO_2 eq]	2.68E+01	2.02E-01	6.40E-01	3.83E+01	1.11E+02	2.55E-02	7.35E-02
GWPi 100 [kg CO_2 eq]	2.68E+01	2.02E-01	6.28E-01	3.83E+01	1.11E+02	2.54E-02	7.32E-02
TRACI 2.1 Impacts							
ODP [kg CFC-11 eq]	2.11E-06	5.87E-16	4.23E-08	4.13E-12	8.62E-06	7.44E-17	3.44E-15
AP [kg SO_2 eq]	3.91E-02	9.91E-04	9.87E-04	4.69E-02	1.66E-01	7.65E-05	3.72E-04
EP [kg N eq]	5.03E-03	8.64E-05	1.42E-04	5.38E-03	2.29E-02	7.81E-06	4.70E-04
Resources [MJ, LHV]	5.76E+01	3.74E-01	1.43E+00	4.23E+01	2.38E+02	4.74E-02	1.41E-01
POCP [kg O_3 eq]	9.21E-01	2.28E-02	2.20E-02	6.91E-01	3.90E+00	1.73E-03	6.65E-03

Table 27: Resource Use per 1 m2 of installed flooring

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
RPRE [MJ, LHV]	2.95E+01	1.16E-01	1.05E+00	1.55E+02	1.23E+02	1.47E-02	1.35E-01
RPRM [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPRT [MJ, LHV]	2.95E+01	1.16E-01	1.05E+00	1.55E+02	1.23E+02	1.47E-02	1.35E-01
NRPRE [MJ, LHV]	3.71E+02	2.63E+00	9.44E+00	6.29E+02	1.54E+03	3.33E-01	1.09E+00
NRPRM [MJ, LHV]	8.38E+01	0.00E+00	1.68E+00	0.00E+00	3.42E+02	0.00E+00	0.00E+00
NRPRT [MJ, LHV]	4.55E+02	2.63E+00	1.11E+01	6.29E+02	1.88E+03	3.33E-01	1.09E+00
SM [kg]	1.07E+00	0.00E+00	2.15E-02	0.00E+00	4.39E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m3]	6.82E-02	3.87E-04	1.75E-03	2.31E-01	2.82E-01	4.90E-05	1.40E-04

Table 28: Output Flows and Waste categories per 1 m2 of Installed flooring

PARAMETER	A1-A3	A4	A5	B2	B4	C2	C4
HWD [kg]	8.39E-06	3.54E-10	7.42E-07	3.53E-07	3.65E-05	4.49E-11	2.68E-10
NHWD [kg]	5.39E-01	2.62E-04	9.25E-02	3.88E-01	1.58E+01	3.32E-05	3.31E+00
HLRW [kg]	1.41E-05	9.40E-09	3.04E-07	7.17E-05	5.78E-05	1.19E-09	1.29E-08
ILLRW [kg]	1.22E-02	7.92E-06	2.66E-04	5.99E-02	4.99E-02	1.00E-06	1.15E-05
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	3.05E-01	0.00E+00	7.12E-02	0.00E+00	1.50E+00	0.00E+00	0.00E+00
MER [kg]	2.38E-01	0.00E+00	8.59E-03	0.00E+00	9.87E-01	0.00E+00	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	1.44E-02	0.00E+00	5.76E-02	0.00E+00	0.00E+00
EET [MJ, LHV]	0.00E+00	0.00E+00	5.13E-03	0.00E+00	2.05E-02	0.00E+00	0.00E+00

Table 29: Carbon emissions and removals per 1 m2 of installed flooring

PARAMETER	A1-A3	A4	A5	B2	B4	C2	C4
BCRP [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK [kg CO_2]	1.29E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK [kg CO_2]	0.00E+00	0.00E+00	1.29E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO_2]	4.37E-01	0.00E+00	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00

Milliken PrintWorks™ Technology Nylon 6,6: 46 oz Face Weight Results

Table 30: North American Impact Assessment Results per 1 m2 of installed flooring

	A1-A3	A4	A5	B2	B4	C2	C4
IPCC AR5 Impacts							
GWPe 100 [kg CO_2 eq]	3.04E+01	2.23E-01	7.12E-01	3.83E+01	1.26E+02	2.81E-02	8.11E-02
GWPi 100 [kg CO_2 eq]	3.03E+01	2.22E-01	7.00E-01	3.83E+01	1.26E+02	2.80E-02	8.07E-02
TRACI 2.1 Impacts							
ODP [kg CFC-11 eq]	2.11E-06	6.47E-16	4.23E-08	4.13E-12	8.62E-06	8.20E-17	3.79E-15
AP [kg SO_2 eq]	4.57E-02	1.09E-03	1.12E-03	4.69E-02	1.94E-01	8.43E-05	4.10E-04
EP [kg N eq]	5.58E-03	9.54E-05	1.55E-04	5.38E-03	2.55E-02	8.60E-06	5.30E-04
Resources [MJ, LHV]	6.55E+01	4.13E-01	1.59E+00	4.23E+01	2.71E+02	5.22E-02	1.55E-01
POCP [kg O_3 eq]	1.09E+00	2.51E-02	2.55E-02	6.91E-01	4.60E+00	1.91E-03	7.33E-03

Table 31: Resource Use per 1 m2 of installed flooring

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
RPRE [MJ, LHV]	3.21E+01	1.28E-01	1.10E+00	1.55E+02	1.34E+02	1.63E-02	1.48E-01
RPRM [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPRT [MJ, LHV]	3.21E+01	1.28E-01	1.10E+00	1.55E+02	1.34E+02	1.63E-02	1.48E-01
NRPRE [MJ, LHV]	4.19E+02	2.90E+00	1.04E+01	6.29E+02	1.74E+03	3.67E-01	1.20E+00
NRPRM [MJ, LHV]	9.48E+01	0.00E+00	1.90E+00	0.00E+00	3.87E+02	0.00E+00	0.00E+00
NRPRT [MJ, LHV]	5.14E+02	2.90E+00	1.23E+01	6.29E+02	2.12E+03	3.67E-01	1.20E+00
SM [kg]	1.06E+00	0.00E+00	2.12E-02	0.00E+00	4.33E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m3]	7.83E-02	4.27E-04	1.95E-03	2.31E-01	3.23E-01	5.40E-05	1.55E-04

Table 32: Output Flows and Waste Categories per 1 m2 of installed flooring

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
HWD [kg]	8.27E-06	3.91E-10	7.40E-07	3.53E-07	3.60E-05	4.95E-11	2.96E-10
NHWD [kg]	5.86E-01	2.89E-04	1.00E-01	3.88E-01	1.73E+01	3.66E-05	3.64E+00
HLRW [kg]	1.53E-05	1.04E-08	3.27E-07	7.17E-05	6.25E-05	1.31E-09	1.42E-08
ILLRW [kg]	1.31E-02	8.74E-06	2.85E-04	5.99E-02	5.38E-02	1.11E-06	1.27E-05
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	3.03E-01	0.00E+00	7.12E-02	0.00E+00	1.50E+00	0.00E+00	0.00E+00
MER [kg]	2.38E-01	0.00E+00	8.58E-03	0.00E+00	9.86E-01	0.00E+00	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	1.44E-02	0.00E+00	5.76E-02	0.00E+00	0.00E+00
EET [MJ, LHV]	0.00E+00	0.00E+00	5.13E-03	0.00E+00	2.05E-02	0.00E+00	0.00E+00

Table 33: Carbon emissions and removals per 1 m2 of installed flooring

PARAMETER	A1-A3	A4	A5	B2	B4	C2	C4
BCRP [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK [kg CO_2]	1.29E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK [kg CO_2]	0.00E+00	0.00E+00	1.29E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO_2]	4.37E-01	0.00E+00	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00

9. References

1. Life Cycle Assessment, LCA Report for Milliken & Company. WAP Sustainability Consulting. July 2025
2. Product Category Rule (PCR) for Building-Related Products and Services, Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL 10010. Version 4.0, March, 2022.
3. Part B: Flooring EPD Requirements. UL Environment V2.0, 2018.
4. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
5. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
6. ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.