ENVIRONMENTAL PRODUCT DECLARATION

NYLON ECOSOFT® RECYCLED CUSHION BACK CARPET TILE

CARPETS INTERNATIONAL THAILAND PUBLIC COMPANY LIMITED
COMMERCIAL CARPET TILES



Carpets Inter will recycle over 1,000,000,000 discarded plastic bottles by 2025…
Be a part of this mission!
https://carpetsinter.com/sustainability-campaign

Carpets Inter®

We create the modular carpet that does more than just make the world more beautiful; it makes it more livable. We do this with products that meet stringent indoor air-quality needs, are safe to manufacture and utilize and incorporate recycled materials wherever feasible including our unique EcoSoft® backing fabricated from millions of recycled plastic bottles. Our commitment to ecological sustainability extends beyond our product. We practice it in everything we do – from manufacturing facilities that maintain the highest environmental standards, to reducing our carbon footprint in every facet of our global business.

Carpets Inter practices prevention at the source, rather than solely purchasing carbon credits to offset its carbon footprint. Our commitment to recycle 1 billion discarded plastic bottles by 2025 is unique to the industry.

For more information, please visit us at https://carpetsinter.com/

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ENVIRONMENTAL PRODUCT DECLARATION

Carpets Inter®

Commercial Carpet Tile – Nylon EcoSoft® Recycled Cushion Back

According to ISO 14025, EN 15804, and ISO 21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Solutions 333 Pfingsten Rd, Northbrook, IL 60062 www.ul.com www.spot.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	Program Operator Rules v 2.7 2022
MANUFACTURER NAME AND ADDRESS	Carpets International Thailand Co., Ltd. 80 Moo 1 Tambol Bangkuwat, Pathumtani, Thailand 12000
DECLARATION NUMBER	4790610776.101.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Nylon EcoSoft® Recycled Cushion Back Carpet Tile
REFERENCE PCR AND VERSION NUMBER	Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL 10010 version 3.2, 2018 and Part B: Flooring EPD Requirements UL 10010-7, 2018
DESCRIPTION OF PRODUCT APPLICATION/USE	Textile carpet floor covering for a heavy wear commercial location, performs dimension stability, durability, comfort, cushion, and sound absorption.
PRODUCT RSL DESCRIPTION (IF APPL.)	15 Years
MARKETS OF APPLICABILITY	Asia-Pacific and Middle East
DATE OF ISSUE	September 1, 2023
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-specific
RANGE OF DATASET VARIABILITY	N/A
EPD SCOPE	Cradle-to-Grave
YEAR(S) OF REPORTED PRIMARY DATA	2019
LCA SOFTWARE & VERSION NUMBER	SimaPro 9.0
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent 3.5
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1 V1.02 CML-IA baseline Version 4.2

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 Cooper McCollum
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Carpets International Thailand Public Company Limited
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine, Thrive ESG James A. Mellentine

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.

1. Product Definition and Information

1.1. Description of Company/Organization

We are publicly traded on the Stock Exchange of Thailand under TCM Corporation Public Company Limited, https://www.tcm-corporation.com/en/. For over 50 years, the company has been operating steadily by adhering to the principles of good governance substantially. Starting from the establishment of the first carpet factory in Thailand, until now, we have subsidiaries throughout the world, and diversified the business by expanding into the furniture industry in the UK and are generally accepted at an international level. We intend to develop continuously in all aspects for our stability and sustainable forthcoming. TCM Corporation Plc. has expanded and grown into a truly multinational corporation that services many industries. Our businesses include TCM Surface, TCM Living, and TCM Automotive.

TCM Surface embraces our heritage and globally diverse culture, we consistently inspire and enhance distinctive design experiences by delivering integrated floor covering and acoustics solutions that respect the wellbeing of people and the planet. Our extensive range of products and reliable service make us the quintessential one-stop source for high-quality, sustainably produced carpet & acoustic surfaces. We offer two distinguished flooring brands, Royal Thai for hospitality & residential and Carpets Inter for the corporate sector. RT acoustic is our new acoustic surfaces brand.

Carpets International Thailand Public Company Limited is the largest manufacturer and distributor of a comprehensive range of carpets manufactured from various types of natural & synthetic yarns and fibers in Thailand, with fully integrated facilities.

At Carpets Inter, we aim higher. This endeavor has its foundation in the manufacturing of modular carpet products that are well-designed, durable, and comfortable underfoot; and is sustained through shared values of environmental responsibility, social accountability, and economic fairness that make a positive impact wherever our products are sold or used throughout the world. We are, above all, a multinational company with a multicultural commitment to good global citizenship. We practice an environmentally sustainable approach in every step of manufacturing under the principle of the 3Rs (Reduce, Reuse, Recycle), waste minimization, and resource conservation. That is why we are industry leaders in innovating our manufacturing processes to make better quality products and generate less waste. We do this with products that meet stringent indoor air-quality needs, are safe to manufacture, and utilize and incorporate recycled materials wherever feasible including our unique EcoSoft® cushion backing fabricated from millions of recycled plastic bottles. For more information visit: www.carpetsinter.com

Accreditation

ISO 9001 Quality Management System

ISO 14001 Environmental Management System

ISO 45001 Occupational Health and Safety Management System

ISO 50001 Energy Management

1.2. Product Description

Product Identification

The EcoSoft® recycled cushion back carpet tile with nylon face fiber is a modular floor covering system that is the perfect choice for application into commercial facilities and working environments. The surface texture will enhance the interior, with a dense cushion backing to provide underfoot comfort, sound absorption, healthy, and energy efficient workspaces. The product is practical, versatile, and hard-wearing, easy to install and maintain.

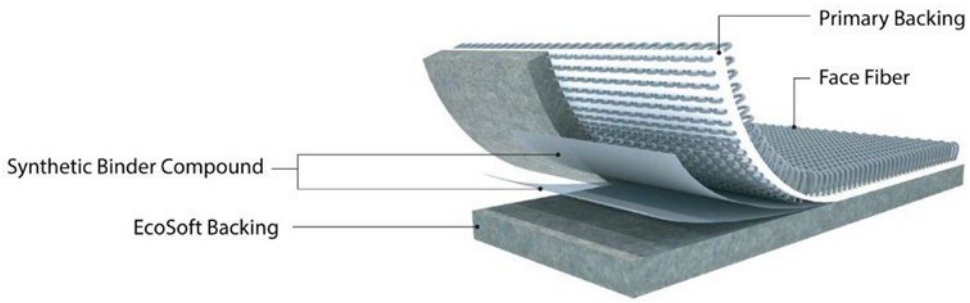


Figure 1: Product Construction

EcoSoft® recycled cushion backing is made from 80% post-consumer material re-engineered from discarded drinking water bottles plus 5% post-industrial recycled PET. The key to the high-performance attributes of EcoSoft® recycled cushion backing within its construction. Its dense fiber construction gives a good cushioning effect and is breathable. It acts as a sound absorption material, has excellent acoustical properties, and contributes thermal resistance.

Product Outstanding Features

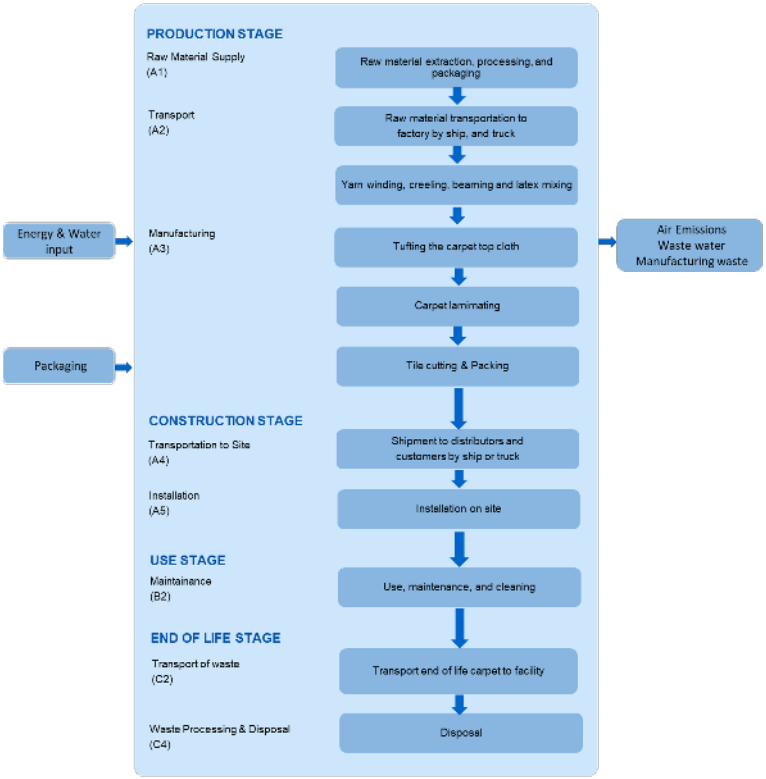
- 85% recycled content backing
- 100% recyclable
- No PVC, Bitumen or Fiberglass content
- Suitable for installation onto wet slab up to 99% RH
- Superior Acoustical Propensity
- Excellent Dimensional Stability
- Cushioning reduces wear and tear, fiber crush, and user fatigue
- Contributes up to 6 LEED points
- Contributes to the WELL Building Standard

Product Specification

UNSPSC code: 30161701 Flooring
CSI code: 096813 Tile carpeting

Flow Diagram

The diagram below is representative for the manufacturing of the Nylon EcoSoft® recycled cushion back carpet tile.



Product Average

This declaration covers all styles and colors under the product family with fiber face weights ranging from 11 to 32 oz/sq.yd. and the weighted average is 13.45 oz/sq.yd. (456 g/sq. m.) from 2019 production data. Specific products can be found on Carpets Inter website www.carpetsinter.com.

1.3. Application

The products covered by this EPD are intended for use as floor covering in a commercial area.

1.4. Declaration of Methodological Framework.

The data is retrieved from a cradle to gate LCA study of Carpets International Thailand, Co.Ltd.

1.5. Technical Requirements

Table 1. Technical Data

Parameter	Value	Unit
Yarn type	Nylon solution dyed	
Primary backing type	Non-woven polyester	
Secondary backing type	EcoSoft® recycled cushion back	
CRI-TARR rating	3.5 Severe	
Total thickness	9.40	mm.
Surface pile thickness	2.30	mm.
Surface pile weight	456 (13.45)	g/m^2 (oz/yd^2)

1.6. Properties of Declared Product as Delivered

Table 2. Performance testing for EcoSoft® recycled cushion back carpet tile

Performance Test	Result
BS EN ISO 354 Sound absorption	NRC 0.3 or higher
The Carpets & Rugs Institute's Green Label Plus: Indoor air quality testing program	GLP7543 https://services.carpet-rug.org/api/v2/GLPCertificate/7543

1.7. Material Composition

Table 3. Base materials for EcoSoft® recycled cushion back carpet tile

Component	Material	% mass
Face fiber	Nylon yarn	16.7 %
Primary backing	Pre & Post-consumer recycled polyester Nonwoven	4.6 %
Binder compound	Latex compound	49.4 %
Secondary backing	EcoSoft® recycled cushion backing	29.3 %

1.8. Manufacturing

EcoSoft® Recycled Cushion Back Carpet Tile is manufactured in Pathumtani, Thailand. The manufacturing process of the product is presented in the flow diagram above in section 1.2.

1.9. Packaging

EcoSoft® Recycled Cushion Back carpet tile was packed in cardboard boxes that contained recycled content. Packaging should be reused or taken to a local recycling facility after use.

1.10. Transportation

The distribution distance from point of purchase to the installation site is based on the assumptions in the PCR for Building-Related Products and Services of EPD. The 800 km is used to calculate environmental impacts.

1.11. Product Installation

The product is designed for installation using the recommended pressure sensitive adhesives with a recommended application method, as defined in the Carpets Inter's Installation Guidelines found on our website.

The installation scrap and packaging waste have been accounted for in the installation stage.

1.12. Use

Indoor emissions during the use stage have been evaluated via Indoor Air Quality testing (Green Label Plus). No Health-related concerns are present during the normal use of the flooring.

Data on the use phase refers to the Carpet & Rug Maintenance Guideline as per the following links : https://carpetsinter.com/carpet-maintenance and https://carpet-rug.org/resources/cleaning/

1.13. Reference Service Life and Estimated Building Service Life

The reference service lifetime of the product is 15 years according to the product warranty and the building estimated service life (ESL) is 75 years..

1.14. Reuse, Recycling, and Energy Recovery

The product is intended to be recycled through Carpets Inter Reclamation Program. For more information on the recycling of our products, please contact your local Carpets Inter's representative.

1.15. Disposal

The end-of-life management of the product and packaging, and the transportation under this study are in accordance with the Part B PCR of EPD. Product disposal is landfilled.

2. Life Cycle Assessment Background Information

2.1. Functional or Declared Unit

The functional unit is one square meter of floorcovering over the reference service life of the product; 15 years.

Table 4. Functional Unit Information

Name	Value	Unit
Functional Unit	1	m^2
Average Weight	2.731	kg

2.2. System Boundary

The system boundary of the study followed the structure in line with ISO 14044, ISO 21930, and EN 15804, covered the whole life cycle of carpet, "Cradle to Grave", which were subdivided into four life cycle stages per Table 5: Production (Modules A1-A3); Construction (Modules A4-A5); Use (Modules B2); Replacement (Module B4) and EOL (Modules C2, C4). Capital goods and infrastructure are excluded from the system boundary.

Table 5. System Boundary and Modules

Life cycle stages	Modules	Description of Module
Production	A1	Raw material extraction and processing.
	A2	Transportation of materials to manufacturing site.
	A3	Manufacturing, including energy, materials, packaging, water and waste processing.
Construction	A4	Transportation of the product from manufacturing site to building site.
	A5	Installation including ancillary materials for installation and their transportation and disposal of installation waste and material containers.
Use	B2	Maintenance includes cleaning agents, energy, and water for cleaning the product. The transportation of cleaning agents and wastewater treatment from maintenance process.
Replacement	B4	The replacements of products expected during the building ESL of 75 years.
End of life	C2	Transport of waste to local disposal sites.
	C4	Disposal processing of the used product and packaging, i.e., landfill and incineration.

2.3. Estimates and Assumptions

The upstream data for raw materials has been taken from the Ecoinvent 3.5 database in SimaPro 9.0 software. The proxy datasets were chosen based on the similarity of material, geographic site, or manufacturing technology.

Transport, installation site, and waste processing and disposal of packaging, installation waste, and end-of-life products were based on the assumptions in the PCR for Building-Related Products and Services.

2.4. Cut-off Criteria

The cut-off criteria were used as per the PCR, Part A: Life Cycle Assessment Calculation Rules and Report Requirements. These were defined as less than 1% of renewable and non-renewable primary energy usage and less than 1% of the total mass of a unit process, the sum of which shall not exceed 5% of the energy usage and mass. There are no known flows deliberately excluded from this EPD.

2.5. Data Sources

Primary data was retrieved from Carpets Inter's database of the actual recycled nylon EcoSoft® Recycled Cushion Back carpet tile production data records during the 2019 calendar year, i.e. material consumption data, energy and water consumption data, products and waste production data, including wastewater treatment data and installation data.

Secondary data came from external sources, i.e. upstream data has been taken from the Ecoinvent 3.5 database in SimaPro 9.0 software and raw materials information provided by suppliers, while that on the end-of-life management of the product and packaging referred to the product and packaging disposal assumptions of the United States.

2.6. Data Quality

The input datasets were gathered in order to assess the environmental impacts of the nylon EcoSoft® Recycled Cushion Back carpet tile throughout its entire life cycle (cradle to grave), and they were checked and verified for completeness and suitability of data before calculating emission impacts. The following criteria were taken into account:

Time-related coverage: the primary data was collected from 12 consecutive months of 2019. In the absence of actual data, generic data from the Ecoinvent V3.5 database was used.

Geographical coverage: the product was produced at the factory of Carpets International in Pathumthani, Thailand. The generic data from the Ecoinvent database will be chosen for use by taking into account the same or close to the geographical location and technology of the production site and the use site first.

Technological coverage: primary data is specific to the technology used in the preparation of the raw materials, product manufacturing, and reflects the physical reality of the declared product. The datasets are complete, conform to the system boundaries and the criteria for the exclusion of inputs and outputs and are geographical representative for the supply chain of Carpets Inter.

2.7. Period under Review

The data collection is an average product manufactured in 2019.

2.8. Allocation

The principles of allocation were based on ISO 14040/44. When allocation was necessary it was done on an mass basis. Manufacturing inputs were allocated on a per-mass basis based on quantities produced at the EcoSoft carpet tile production facility.

2.9. Comparability

Basically, a comparison or an evaluation of data is only possible if all the data sets are compared were created according to /EN 15804/ and the building context, respectively, and the product-specific characteristics are taken into account.

3. Life Cycle Assessment Scenarios

Table 6. Transport to the building site (A4)

NAME	VALUE	UNIT
Fuel type	Diesel	
Liters of fuel	0.0012	l/100km
Vehicle type	Lorry>32 metric ton	
Transport distance	800	km
Capacity utilization (including empty runs, mass based	85	%
Gross density of products transported	356.70	kg/m^3
Weight of products transported (if gross density not reported)	-	kg
Volume of products transported (if gross density not reported)	-	m^3
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	1	-

Table 7. Installation into the building (A5)

NAME	VALUE	UNIT
Ancillary materials	0.1	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	0.034	kg
Waste materials at the construction site before waste processing, generated by product installation	0.130	kg
Output materials resulting from on-site waste processing (specified by route; e.g. for recycling, energy recovery and/or disposal)	-	Kg
Mass of packaging waste specified by type	0.091	kg
Biogenic carbon contained in packaging	4.45	kg CO_2
Direct emissions to ambient air, soil and water	-	kg
VOC emissions	0.5 or less	mg/m^3

Table 8. Reference Service Life

NAME	VALUE	UNIT
RSL	15	years
Declared product properties (at the gate) and finishes, etc.	See Table 1	-
Design application parameters (if instructed by the manufacturer), including references to the appropriate practices and application codes)	Installation as per manufacturer recommendation.	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Floor covering for foot comfort, sound absorption, and decorative	-
Outdoor environment, (if relevant for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	-	-
Indoor environment, (if relevant for indoor applications), e.g. temperature, moisture, chemical exposure)	Normal building operation conditions	-
Use conditions, e.g. frequency of use, mechanical exposure.	Normal building operation conditions	-
Maintenance, e.g. required frequency, type and quality of replacement components	See Carpets Inter's Commercial Carpet Maintenance Guidelines	-

Table 9. Maintenance (B2)

NAME	VALUE	UNIT
Maintenance process information (cite source in report)	Carpets Inter's Commercial Carpet Maintenance Guidelines	-
Maintenance cycle	15	Cycles/ RSL
Maintenance cycle	75	Cycles/ ESL
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	0.0007	m^3
Ancillary materials specified by type (e.g. cleaning agent)	0.071	kg
Other resources	-	kg
Energy input, specified by activity, type and amount	0.42	kWh/m^2
Other energy carriers specified by type	-	kWh
Power output of equipment	-	kW
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)		

Table 10. Replacement (B4)

NAME	VALUE	UNIT
Replacement cycle	1	Number/ RSL
Replacement cycle	4	Number/ ESL
Energy input, specified by activity, type and amount	-	kWh
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	-	m^3
Ancillary materials specified by type (e.g., cleaning agent)	-	kg
Replacement of worn parts, specify parts/materials	-	kg
Direct emissions to ambient air, soil and water	-	kg
Further assumptions for scenario development, e.g., frequency and time period of use	-	As appropriate

Table 11. End of life (C1-C4)

NAME		VALUE	UNIT
Assumptions for scenario development (description of deconstruction, collection, recovery, disposal method and transportation)			
Collection process	Collected separately	2.731	kg
	Collected with mixed construction waste	-	kg
Recovery	Reuse	-	kg
	Recycling	-	kg
	Landfill	2.731	kg
	Incineration	-	kg
	Incineration with energy recovery	-	kg
	Energy conversion efficiency rate	-	
Disposal	Product or material for final deposition	2.731	kg
Removals of biogenic carbon (excluding packaging)		0	kg CO_2

4. Life Cycle Assessment Results

The system boundary for the EPD report is cradle to grave. Modules B1, B3, B5-B7, C1, C3, and D are excluded from the results tables because they do not have any environmental impact over the period of the service time.

Table 12. 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	MND	X	MND	X	MND	MND	MND	MND	X	MND	X	MND

4.1. Life Cycle Impact Assessment Results

Table 13. North American Impact Assessment Results

TRACI v2.1	A1-A3	A4	A5	B2	B4	C2	C4
GWP 100 [kg CO2 eq]	1.21E+01	2.13E-01	2.93E-01	3.14E+01	5.63E+01	7.52E-02	1.38E+00
ODP [kg CFC-11 eq]	1.96E-06	5.37E-08	2.34E-09	3.16E-06	8.17E-06	1.83E-08	4.75E-09
AP [kg SO_2 eq]	5.99E-02	1.01E-03	1.60E-03	1.32E-01	2.53E-01	3.54E-04	4.47E-04
EP [kg N eq]	1.77E-02	1.28E-04	1.40E-04	1.90E-01	8.71E-02	4.51E-05	3.81E-03
SFP [kg O_3-eq]	5.57E-01	2.27E-02	2.65E-02	7.05E-01	2.48E+00	8.17E-03	5.82E-03
ADPF [MJ]	3.41E+01	4.83E-01	1.26E+00	5.54E+01	1.44E+02	1.65E-01	4.42E-02

Remark: GWP 100 =Global Warming Potential, ODP = Depletion potential of the stratospheric ozone layer, AP = Acidification Potential of soil and water, EP = Eutrophication Potential, SFP = Smog Formation Potential, ADPF = Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources

Table14. EU Impact Assessment Results

CML v4.2	A1-A3	A4	A5	B2	B4	C2	C4
GWP 100 [kg CO_2 eq]	1.21E+01	2.13E-01	2.93E-01	3.16E+01	5.62E+01	7.52E-02	1.38E+00
ODP [kg CFC-11 eq]	1.49E-06	4.04E-08	1.77E-09	2.60E-06	6.19E-06	1.37E-08	3.64E-09
AP [kg SO_2 eq]	6.21E-02	8.92E-04	1.55E-03	1.35E-01	2.61E-01	3.10E-04	3.66E-04
EP [kg PO_4^{3-} eq]	1.01E-02	1.45E-04	1.78E-04	8.59E-02	4.83E-02	5.20E-05	1.63E-03
POCP [kg ethene eq]	2.87E-02	3.78E-05	5.81E-05	6.62E-03	1.17E-01	1.31E-05	3.70E-04
$ADP_{element}$ [kg Sb-eq]	3.94E-05	4.75E-07	8.15E-08	7.63E-05	1.61E-04	2.43E-07	1.02E-09
ADP_{fossil} [MJ, LHV]	2.64E+02	3.54E+00	8.76E+00	5.59E+02	1.11E+03	1.20E+00	4.52E-01

Remark: GWP 100 =Global Warming Potential, ODP = Depletion potential of the stratospheric ozone layer, AP = Acidification Potential of soil and water, EP = Eutrophication Potential, POCP = Photochemical Oxidant Creation Potential, ADP-element = Abiotic depletion potential for non-fossil resources, ADP-fossil fuels = Abiotic depletion potential for fossil resources

Additionally, the study has assessed the Global Warming Potential by using the TRACI characterization method for the product family of EcoSoft® recycled cushion back carpet tile by varying the product yarn weight of 11-32 oz./yd^2 as presented in Table 15.

Table 15. Global Warming Potential (GWP) for additional product yarn weights (ounces per square yard / grams per square meter)

The product yarn weights	TRACI						
	A1-A3	A4	A5	B2	B4	C2	C4
11 oz./yd2 (373 gsm.)	1.11E+01	2.07E-01	2.92E-01	3.14E+01	5.20E+01	7.30E-02	1.34E+00
12 oz./yd2 (407 gsm.)	1.15E+01	2.09E-01	2.93E-01	3.14E+01	5.37E+01	7.39E-02	1.36E+00
13 oz./yd2 (441 gsm.)	1.19E+01	2.12E-01	2.93E-01	3.14E+01	5.55E+01	7.48E-02	1.37E+00
14 oz./yd2 (475 gsm.)	1.23E+01	2.15E-01	2.93E-01	3.14E+01	5.72E+01	7.57E-02	1.39E+00
15 oz./yd2 (509 gsm.)	1.28E+01	2.17E-01	2.93E-01	3.14E+01	5.90E+01	7.66E-02	1.41E+00
16 oz./yd2 (543 gsm.)	1.32E+01	2.20E-01	2.94E-01	3.14E+01	6.08E+01	7.75E-02	1.42E+00
17 oz./yd2 (576 gsm.)	1.36E+01	2.23E-01	2.94E-01	3.14E+01	6.25E+01	7.84E-02	1.44E+00
18 oz./yd2 (610 gsm.)	1.40E+01	2.25E-01	2.94E-01	3.14E+01	6.43E+01	7.93E-02	1.46E+00
19 oz./yd2 (644 gsm.)	1.44E+01	2.28E-01	2.94E-01	3.14E+01	6.60E+01	8.02E-02	1.48E+00

20 oz./yd2 (678 gsm.)	1.48E+01	2.31E-01	2.94E-01	3.14E+01	6.78E+01	8.12E-02	1.49E+00
21 oz./yd2 (712 gsm.)	1.53E+01	2.33E-01	2.95E-01	3.14E+01	6.95E+01	8.21E-02	1.51E+00
22 oz./yd2 (746 gsm.)	1.57E+01	2.36E-01	2.95E-01	3.14E+01	7.13E+01	8.30E-02	1.53E+00
23 oz./yd2 (780 gsm.)	1.61E+01	2.39E-01	2.95E-01	3.14E+01	7.30E+01	8.39E-02	1.54E+00
24 oz./yd2 (814 gsm.)	1.65E+01	2.41E-01	2.95E-01	3.14E+01	7.48E+01	8.48E-02	1.56E+00
25 oz./yd2 (848 gsm.)	1.69E+01	2.44E-01	2.96E-01	3.14E+01	7.65E+01	8.57E-02	1.58E+00
26 oz./yd2 (882 gsm.)	1.74E+01	2.47E-01	2.96E-01	3.14E+01	7.83E+01	8.66E-02	1.59E+00
28 oz./yd2 (949 gsm.)	1.82E+01	2.52E-01	2.96E-01	3.14E+01	8.18E+01	8.84E-02	1.63E+00
30 oz./yd2 (1,017 gsm.)	1.90E+01	2.57E-01	2.97E-01	3.14E+01	8.53E+01	9.03E-02	1.66E+00
32 oz./yd2 (1,085 gsm.)	1.99E+01	2.62E-01	2.97E-01	3.14E+01	8.88E+01	9.21E-02	1.69E+00

4.2. Life Cycle Inventory Results

Table 16. Resource Use

PARAMETER	A1-A3	A4	A5	B2	B4	C2	C4
RPR_E [MJ, LHV]	1.25E+00	3.85E-02	5.90E-04	1.13E+01	5.28E+00	2.80E-03	2.83E-02
RPR_M [MJ, LHV]	2.73E+00	N/A	1.15E-03	1.70E+01	1.09E+01	N/A	N/A
RPR_T [MJ, LHV]	3.98E+00	3.85E-02	1.74E-03	2.83E+01	1.62E+01	2.80E-03	2.83E-02
$NRPR_E$ [MJ, LHV]	5.14E+01	2.78E+00	1.98E-02	4.04E+02	2.20E+02	2.43E-01	5.10E-01
$NRPR_M$ [MJ, LHV]	1.70E+02	N/A	8.95E+00	3.32E+02	7.15E+02	N/A	N/A
NPR_T [MJ, LHV]	2.21E+02	2.78E+00	8.97E+00	7.36E+02	9.35E+02	2.43E-01	5.10E-01
SM [kg]	1.16E+00	N/A	3.48E-02	0.00E+00	4.78E+00	N/A	N/A
RSF [MJ, LHV]	0.00E+00	N/A	0.00E+00	0.00E+00	0.00E+00	N/A	N/A
NRSF [MJ, LHV]	0.00E+00	N/A	0.00E+00	0.00E+00	0.00E+00	N/A	N/A
RE [MJ, LHV]	N/A	N/A	0.00E+00	N/A	0.00E+00	0.00E+00	0.00E+00
FW [m^3]	1.29E+00	0.00E+00	0.00E+00	5.25E-02	5.18E+00	0.00E+00	0.00E+00

Remark: RPR_E = Renewable primary resources used as an energy carrier (fuel), RPR_M = Renewable primary resources with energy content used as material, $NRPR_E$ = Non-renewable primary resources used as an energy carrier (fuel), $NRPR_M$ = Non-renewable primary resources with energy content used as material, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, FW = Use of net freshwater resources

Table 17. Output Flows and Waste Categories

PARAMETER	A1-A3	A4	A5	B2	B4	C2	C4
HWD [kg]	0.00E+00	N/A	3.01E-03	0.00E+00	1.20E-02	N/A	0.00E+00
NHWD [kg]	0.00E+00	N/A	1.09E-01	0.00E+00	8.49E+00	N/A	2.01E+00
HLRW [kg] or [m^3]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW [kg] or [m^3]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU [kg]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MR [kg]	6.39E-02	N/A	3.91E-04	0.00E+00	1.47E+01	N/A	3.61E+00
MER [kg]	1.72E-01	N/A	0.00E+00	0.00E+00	6.89E-01	N/A	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Remark: HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, HLRW = High-level radioactive waste, conditioned, to final repository, ILLRW = Intermediate- and low-level radioactive waste, conditioned, to final repository, CRU = Components for re-use, MR = Materials for recycling, MER = Materials for energy recovery, EE = Recovered energy exported from the product system

Table 18. Carbon Emissions and Removals

Parameter	A1-A3	A4	A5	B2	B4	C2	C4
BCRP [kg CO2]	0.00E+00	N/A	0.00E+00	0.00E+00	0.00E+00	N/A	N/A
BCEP [kg CO2]	0.00E+00	N/A	0.00E+00	0.00E+00	0.00E+00	N/A	N/A
BCRK [kg CO2]	4.77E-01	N/A	1.91E-02	0.00E+00	1.99E+00	N/A	N/A
BCEK [kg CO2]	0.00E+00	N/A	3.16E-02	0.00E+00	1.27E-01	N/A	N/A
BCEW [kg CO2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CCE [kg CO2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CCR [kg CO2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CWNR [kg CO2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A

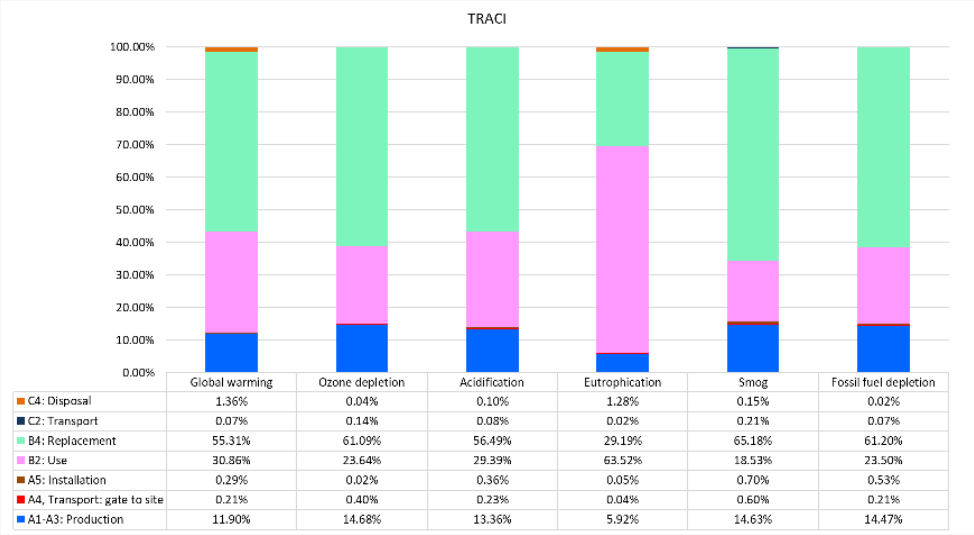
Remark: BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes

5. LCA Interpretation

The LCIA results showed the replacement (B4) is the highest impact contribution (55-75 %) in almost impact category for the product of Nylon EcoSoft® Recycled Cushion Back Carpet Tile by considered throughout the ESL (the 75-year building estimated service life) followed by the

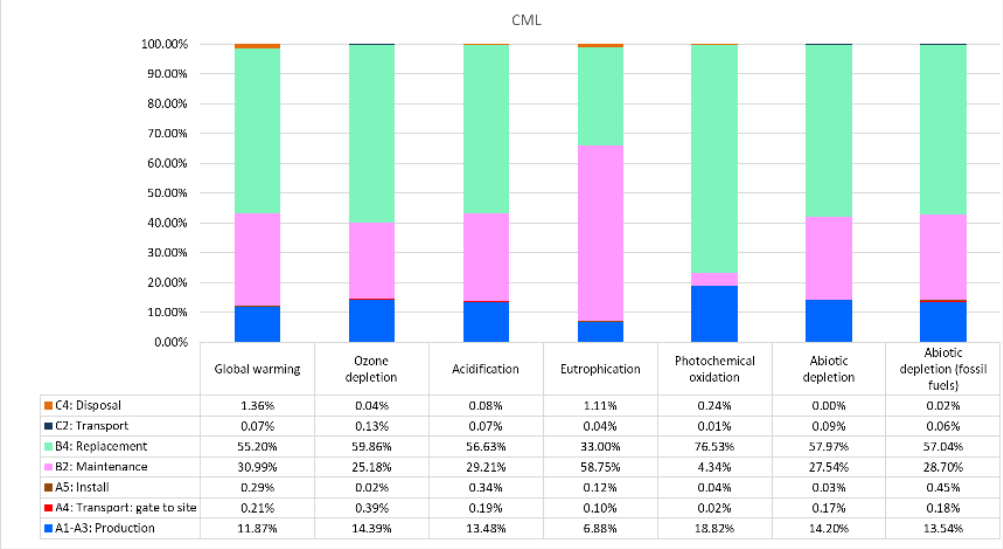
maintenance (B2) accounted for 20-60 %

The analysis results represent on the RSL of product life assumption, the production stage is the main stage significantly contributing to almost environmental impact categories except the Eutrophication Potential, with a total share of 55-93%. In the product stage, the largest contributor is the raw material acquisition (A1) accounting for more than 62-86% of the total while the carpet manufacturing (A3) accounts for 13-37 %.



	Global warming	Ozone depletion	Acidification	Eutrophication	Smog	Fossil fuel depletion
C4: Disposal	1.36%	0.04%	0.10%	1.28%	0.15%	0.02%
C2: Transport	0.07%	0.14%	0.08%	0.02%	0.21%	0.07%
B4: Replacement	55.31%	61.09%	56.49%	29.19%	65.18%	61.20%
B2: Use	30.86%	23.64%	29.39%	63.52%	18.53%	23.50%
A5: Installation	0.29%	0.02%	0.36%	0.05%	0.70%	0.53%
A4, Transport: gate to site	0.21%	0.40%	0.23%	0.04%	0.60%	0.21%
A1-A3: Production	11.90%	14.68%	13.36%	5.92%	14.63%	14.47%

Figure 2. The contribution analysis of the Environmental Impacts associated with the life cycle of the nylon EcoSoft® carpet tile by TRACI method



	Global warming	Ozone depletion	Acidification	Eutrophication	Photochemical oxidation	Abiotic depletion	Abiotic depletion (fossil fuels)
C4: Disposal	1.36%	0.04%	0.08%	1.11%	0.24%	0.00%	0.02%
C2: Transport	0.07%	0.13%	0.07%	0.04%	0.01%	0.09%	0.06%
B4: Replacement	55.20%	59.86%	56.63%	33.00%	76.53%	57.97%	57.04%
B2: Maintenance	30.99%	25.18%	29.21%	58.75%	4.34%	27.54%	28.70%
A5: Install	0.29%	0.02%	0.34%	0.12%	0.04%	0.03%	0.45%
A4: Transport: gate to site	0.21%	0.39%	0.19%	0.10%	0.02%	0.17%	0.18%
A1-A3: Production	11.87%	14.39%	13.48%	6.88%	18.82%	14.20%	13.54%

Figure 3. The contribution analysis of the Environmental impacts associated with the life cycle of the nylon EcoSoft® carpet tile by CML method

6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

We produce and supply quality products and services based on ethical codes of conduct and standards on occupational health & safety, environment, energy, and labor with responsible care to society and employees.

Carpets Inter is equally committed to reducing our environmental impact. More information on our sustainability program can be found on https://carpetsinter.com/sustainability-campaigndetail

6.2 Environment and Health During Installation

EcoSoft® recycled cushion back carpet tile meets requirements of the Carpet and Rug Institute's Green Label Plus Program for indoor air quality. All recommendations shall be utilized as indicated by Carpets International's Installation manual.

6.3 Extraordinary Effects

Fire Performance

Class I, Radiant panel ASTM E 648

Less than 450, Smoke density ASTM E 662

Water Transmission

The product is breathable.

Acoustic Classification

Class D, Sound Absorption Coefficient BS EN ISO 354

6.4 Environmental Activities and Certifications

Carpets Inter practices prevention at source rather than solely relying on purchasing carbon credits to offset our carbon footprint from repurposing and reusing waste PET bottles into new product, providing organic waste to agriculture and planting thousands of trees each year in our local community, it's just good stewardship.

We drive sustainable growths by delivering key values to customers while preventing all kind of wastages & losses by participation & involvement of all stakeholders across our whole supply chain with responsible care which results in low detrimental effects to the environment and the society.

This is the inspiration for our sustainable efforts as follows:-

- **Water Conservation Program:** Recycling and reuse of water have been in practice since 2004, and achieving to zero discharge in 2015.
- **Zero Landfill:** In 2009, we reached our commitment becoming Thailand's first and the only one zero landfill carpet manufacturer, with all wastes recycled and reused.
- **Regenerative Power of Soil**: The wastewater treatment sediment has been repurposed into organic fertilizer and distributed to farming since 2014.
- **Take Back Program**: We provide the non-landfill disposal solution by recycling all installation 'off-cut' waste, and uplifting the end of life floorcovering to be alternative material in cement kiln manufacturer.

- **Diverting Manufacturing Off-Cut Waste**: Since 2017 as part of Carpets Inters cradle to grave mission, we have diverted all manufacturing 'off-cut' waste to be used as Refuse Derived Fuel (RDF) by local Thailand Power Plants to generate positive clean energy.
- **NSF/ANSI 140 Sustainable Carpet Assessment**: Nylon EcoSoft® carpet tile, nylon EcoSquare® carpet tile, machine tufted broadloom carpet, hand tufted carpet, axminster broadloom carpet, and axminster tile.
- **Singapore Green Labelling Scheme (SGLS)**: Nylon EcoSoft® carpet tile, nylon EcoSquare® carpet tile, hand tufted carpet, and axminster broadloom carpet.
- **Sigapore Green Building Council (SGBC) Certification Scheme**: Nylon EcoSoft® carpet tile, nylon EcoSquare® carpet tile
- **Thailand Carbon Footprint**: Certification from Thailand Green Organization, Nylon EcoSoft® recycled cushion back carpet tiles, nylon EcoSquare® carpet tile, machine tufted broadloom carpet, and Axminster broadloom carpet.

6.5 Further Information

For more information on the EcoSoft® Recycled Cushion Back Carpet Tiles visit us at https://carpetsinter.com/

7. References

- Product Category Rule (PCR) Guidance for building-related products and services, Part A: Life cycle assessment calculation rules and report requirements UL 10010 version 3.2
- Product Category Rule (PCR) Guidance for building-related products and services, Part B: Flooring EPD requirements. UL 10010-7
- ISO 14040: 2006 Environment Management - Life cycle assessment - Principle and framework
- ISO 14044: 2006 Environment Management - Life cycle assessment - Requirements and Guidelines.
- ISO 21930 Secondary edition 2017-07, Sustainability in buildings and civil engineering works- core rules for environmental product declarations of construction products and services.
- ACLCA Guidance to calculating non-LCIA inventory metrics in accordance with ISO 21930:2017
- Guidance on Data Quality Assessment for life cycle inventory data, EPA: 2016
- EN 15804:2012+A1:2013 – Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products
- BS EN ISO 354 Measuring the sound absorption coefficient of acoustical materials
- ASTM E 648 Standard test method of critical radiant flux of floor covering systems using a radiant heat energy source
- ASTM E662-06 Smoke density standard test method for specific optical density of smoke generated by solid materials