ENVIRONMENTAL PRODUCT DECLARATION

LANDMARK® AND LANDMARK® PRO SHINGLES

MATERIAL: DUAL-LAMINATE FIBERGLASS-BASED ASPHALT SHINGLES
INSTALLATION: FASTENED

Landmark in Weathered Wood. *Dual-layer asphalt shingle series designed to emulate true wood shake with added solar reflectance and wind, moisture, impact, and fire-resistance technologies.*

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The Landmark and Landmark PRO replicate the dimensional beauty of wood shake with the performance, durability, and low maintenance of dual-layered asphalt shingles.

Each shingle features multiple proven technologies. The installer friendly NailTrak® wide nailing area improves accuracy. QuadraBond ™ and CertaSeal ™ adhesives firmly secure the layers of a shingle and seal them together to prevent delamination, uplift, and moisture intrusion. And StreakFighter® copper-infused surface granules provide long-term protection against algae formation. Landmark shingles have a Class A fire-resistance rating and are independently certified as meeting the highest quality standards for roofing. Offering the widest array of color options in their class, Landmark shingles are the reliable choice for beautifying and protecting a home.

For more information visit:
https://www.certainteed.com/residential-roofing/products/landmark/

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ENVIRONMENTAL PRODUCT DECLARATION

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LANDMARK® SERIES SHINGLES
DUAL-LAMINATE FIBERGLASS-BASED ASPHALT SHINGLES

According to ISO 14025 and ISO21930:2017

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	CertainTeed 20 Moores Road, Malvern, PA 18355
DECLARATION NUMBER	4790954820.101.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	1 m^2 (10.8 ft^2) of Asphalt Shingle
REFERENCE PCR AND VERSION NUMBER	Part A: Life Cycle Assessment Calculation Rules and Report Requirements V3.2 (UL Environment, 2018); Part B: Built-up Asphalt Membrane Roofing and Modified Bituminous Membrane Roofing. Edition 3 (UL Environment, 2019)
DESCRIPTION OF PRODUCT APPLICATION/USE	Asphalt Shingle Roofing System (Installation: Fastened)
PRODUCT RSL DESCRIPTION (IF APPL.)	Not applicable
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	June 21, 2024
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-Specific
RANGE OF DATASET VARIABILITY	Mean
EPD SCOPE	Cradle to Gate
YEAR(S) OF REPORTED PRIMARY DATA	2021
LCA SOFTWARE & VERSION NUMBER	Sphera LCA for Experts 10.7.1.28
LCI DATABASE(S) & VERSION NUMBER	Managed LCA Content (formerly GaBi databases) CUP 2023.1; Ecoinvent 3.9; USLCI
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 and ISO 21930:2017 ☐ INTERNAL ☒ EXTERNAL	Cooper McCollum Cooper McCollum, UL Solutions
This life cycle assessment was conducted in accordance with ISO 14044, and ISO 21930:2017 , and the reference PCR by:	CertainTeed - Saint Gobain
This life cycle assessment was independently verified in accordance with ISO 14044, and ISO 21930:2017, and the reference PCR by:	MWildnauer Maggie Wildnauer, WAP Sustainability

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.

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LANDMARK® SERIES SHINGLES
DUAL-LAMINATE FIBERGLASS-BASED ASPHALT SHINGLES

According to ISO 14025 and ISO 21930:2017

1. Product Definition and Information

1.1. Description of Company/Organization

With innovative building solutions made possible through its comprehensive offering of interior and exterior products, CertainTeed is transforming how the industry builds. As leaders in building science and sustainable construction, CertainTeed makes it easier than ever to create high-performance, energy-efficient places to live, work and play, so that together we can make the world a better home.

A subsidiary of Saint-Gobain, one of the world's largest and oldest building products companies, CertainTeed has more than 6,900 employees and more than 60 manufacturing facilities throughout the United States and Canada.

1.2. Product Description

Product Identification

The Landmark and Landmark PRO replicate the dimensional beauty of wood shake with the performance, durability, and low maintenance of dual-layered asphalt shingles.

Landmark is manufactured in ten facilities across the US to serve different regions of the country. The facilities are respectively located in Avery, OH; Ennis, TX; Jonesburg, MO; Norwood, MA; Oxford, NC; Peachtree, GA; Portland, OR; Shakopee, MN; Shreveport, LA; and Wilmington, CA.

Landmark shingles have a Class A fire-resistance rating and are independently certified as meeting the highest quality standards for roofing. Offering the widest array of color options in their class, Landmark shingles are the reliable choice for beautifying and protecting a home.

Product Specification

Asphalt shingles consist of fiberglass mat coated on both sides with asphalt and surfaced on the exposed-to-weather portion with granules. Asphalt shingles provide a weather barrier and are a part of the steep-slope roofing system which includes asphalt shingles, underlayment, leak barrier, starter strip, and hip and ridge components.

Features

- NailTrak® wide nailing area improves accuracy.
- QuadraBond ™ and CertaSeal ™ adhesives firmly secure the layers of a shingle and seal them together to prevent delamination, uplift, and moisture intrusion.
- StreakFighter® copper-infused surface granules provide long-term protection against algae formation.
- Class A fire-resistance rating

Flow Diagram

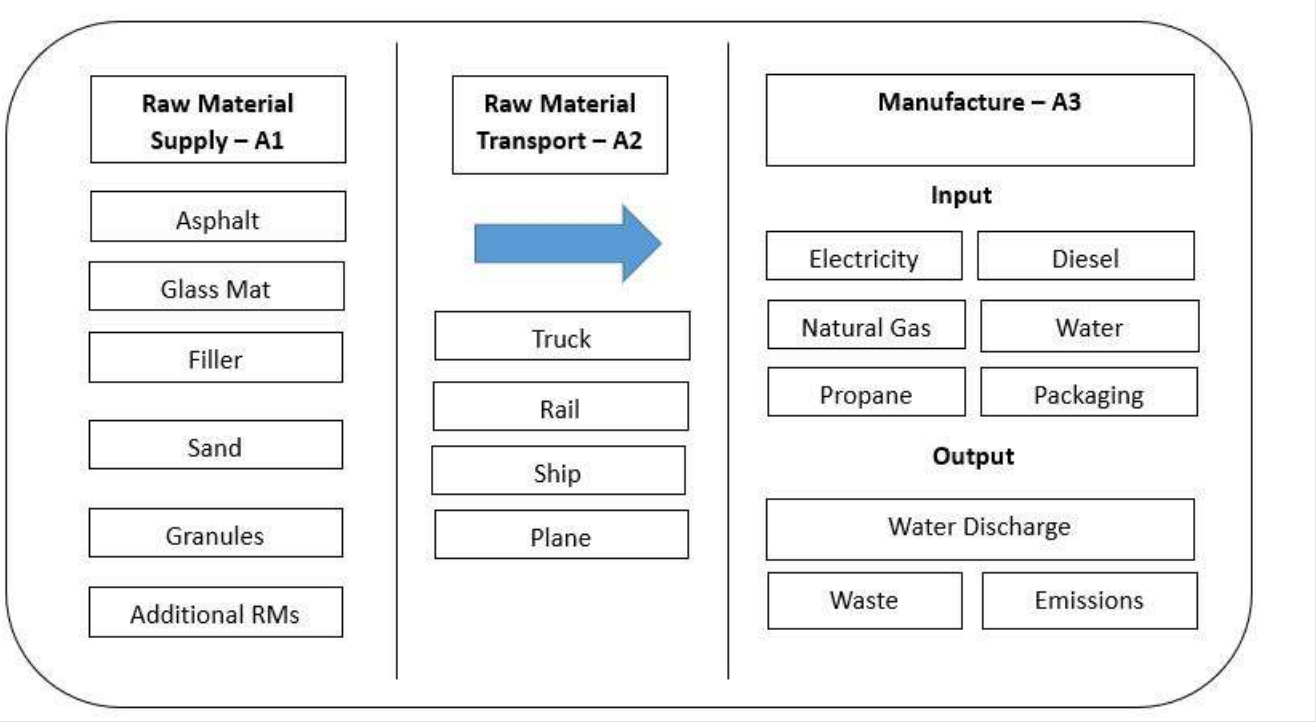

Figure 1-1. Production Process Flow Diagram

Product Average

This EPD represents a product average for all of CertainTeed's manufacturing facilities that produce Landmark and Landmark PRO. A weighted average was calculated based on each facility's' production mass for each product variation. Variation for the products in each average product group (Landmark Average and Landmark Pro Average) was less than +/-10%.

1.3. Application

Steep-slope roofing systems are installed on roofs with slope equal to or greater than 2:12. Steep-slope roofing systems are primarily used to protect residential and light commercial construction from the weather.

Asphalt shingles provide a winning combination of beauty, affordability and reliability. They are available in a variety of colors, textures and styles to fit many unique designs, and offer a long service life.

1.4. Declaration of Methodological Framework

The nature of life cycle assessment is to include a wide range of inputs and outputs associated with the product being analyzed. Constraining the LCA scope is an essential part of the study. The following section describes the various information included in the framework of this LCA study in order to appropriately define goal, scope, and boundaries of

the study. The target group for this EPD is intended for business-to-business (B2B).

1.5. Technical Requirements

The Asphalt Shingle complies with ASTM D3018 Type I, D3462; CSA A123.5.

1.6. Properties of Declared Product as Delivered

Either 20 or 22 shingles per bundle with technical details provided above. The Asphalt Shingle Roofing System roofing membrane complies with ASTM D3909; CSA A123.2 and ASTM D2178; CSA A123.17.

1.7. Material Composition

The input materials for the manufacturing of asphalt shingles is shown below.

MATERIAL INPUT	WEIGHT PERCENTAGE
Asphalt	17 - 20%
Glass Mat	2 - 3%
Filler	33 - 36%
Sand	5 - 7%
Granules	36 - 38%
Additional Raw Materials	1 - 3%

1.8. Manufacturing

Manufacturing begins with impregnation and coating of a fiberglass mat with a filled asphalt coating. The filled coating mixture is produced in a separate process that involves mixing oxidized asphalt and mineral stabilizer in appropriate proportions. Colored mineral granules are added to the top surface on areas that will be exposed in the installed condition. Other granules, typically referred to as headlap granules, are added to the top surface of the impregnated fiberglass mat on areas that will not be exposed in the installed condition. A parting agent is added to the bottom surface to facilitate separation of the shingles during installation. An asphalt-based adhesive is applied to the finished shingle and serves to bond individual shingles to each other after installation. In the case of multi-layer shingles, the individual layers are combined during manufacturing using a laminating adhesive. Finally, the shingle is cut to size and packaged for shipment. The thickness of of roofing shingles, starter strip shingles, and hip and ridge shingles on the market can vary substantially. Manufacturers do not report the thickness of any type of shingle.

1.9. Packaging

The packaging for the final product at the 10 manufacturing locations includes wrapping a bundle of shingles in LDPE

film printed with product information. The bundles are placed on a pallet. In total, approximately 1,040 shingles go on each pallet.

1.10. Transportation

Distribution of the product from the manufacturing facility to the consumer was not included in the study.

1.11. Product Installation

Product installation was not included in the scope of the study; however, typically installation is provided below for reference.

CertainTeed shingles are manufactured in different designs and sizes to fit any style and preference. Shingles can be installed on many different styles of roofs designs and roof pitches. Proper application of CertainTeed shingles plays a vital role in the performance of your roof system. Application instructions are printed on the back of each bundle wrapper with additional resources and detail available from the Shingle Applicator Manual. They include applying fasteners in the appropriate areas of the shingle based on the shingle of choice.

Proper placement of fasteners is important for shingle performance and warranty protection. For traditional fastening and standard slopes, 4 nails should be used for every full shingle. For enhanced wind performance and steep slopes, 6 nails should be used for every full shingle. In addition to 6 nails, add 4 quarter size (1” diameter) spots of asphalt roofing cement under each shingle. It is important to avoid using excessive cement as this can cause blisters or a lumpy appearance on the roof.

1.12. Use

Product use was not included in the scope of the study.

1.13. Reference Service Life and Estimated Building Service Life

Product use was not included in the scope of the study.

1.14. Reuse, Recycling, and Energy Recovery

No reuse, recycling, and energy recovery will be reported for this study

1.15. Disposal

Product end of life was not included in the scope of the study.

2. Life Cycle Assessment Background Information

2.1. Functional or Declared Unit

The declared unit of this study is 1 m^2 (10.8 ft^2) of asphalt shingles.

Name	Value	Unit

Declared unit	1	Square meter
Surface weight per declared unit	10.8 (Landmark) 11.6 (Landmark Pro)	kg/m^2

The properties as delivered are provided on the Technical Data Sheets:

- Landmark Technical Data Sheet
  https://certainteed.widen.net/content/xnk5hrkbzv/pdf/Landmark_TDS_CTRCOMM-015_2303_E_0.pdf?u=nwk4fd
- Landmark Pro Technical Data Sheet
  https://certainteed.widen.net/content/7swc1einv3/pdf/LandmarkPro_TDS_CTRCOMM-015_2303_E.pdf?u=nwk4fd

2.2. System Boundary

The life cycle study encompasses the cradle-to-gate production stages of the shingles including raw material extraction and processing, product manufacturing. Raw material transport to the manufacturing facility is accounted for. Distribution, use, maintenance, repair, or replacement of the roof system over a building's service life, and End of Life is not included in this evaluation. In addition, production, manufacture and construction of manufacturing equipment and infrastructure; repair and maintenance of the production system; energy and water use related to company management and sales; delivery vehicles and laboratory equipment; as well as maintenance and operation of support equipment are all outside of the scope of the study.

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Description of the System Boundary Modules
MND = Module not declared

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
x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

2.3. Estimates and Assumptions

Estimates and assumptions are required when little or no data is available. The study's assumptions and estimates are recorded and documented in the background report.

2.4. Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances – as defined by the U.S. Occupational Health and Safety Act the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No known flows were deliberately excluded. Capital items for the production processes (machines, buildings, etc.) were not taken into consideration.

2.5. Data Sources

LCA FE software v10.7 system was used for modeling the life cycle of the CertainTeed Landmark product line. The Sphera LCA FE, US LCI, and Ecoinvent v3.8 databases were used for raw materials, transportation, and energy inputs.

2.6. Data Quality

Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty. Since the inventory flows for the utilized databases are very often accompanied by a series of data quality ratings, a general indication of precision can be inferred. Using these ratings, the data sets used generally have medium-to-high precision. The Saint-Gobain North American ESG Department collected specific data on energy and material inputs, wastes, water use, emissions, and transportation impacts for the CertainTeed manufacturing plants.

2.7. Period under Review

For this life cycle assessment, the Saint-Gobain North American ESG Department collected specific data on energy and material inputs, wastes, water use, emissions, and transportation impacts for the CertainTeed manufacturing plants. The data used spanned between January 1, 2021 and December 31, 2021.

2.8. Allocation

The included roofing facilities are the only locations that produce the Landmark product lines in North America for CertainTeed Corporation. However, there are additional products produced at these locations that were excluded from the study. Allocation was conducted based on the production mass data provided by the facilities as a percentage of the overall production mass at each facility.

3. Life Cycle Assessment Scenarios

As sections A4, A5, and B1-B7 were excluded from this study, their associated PCR-required tables have been omitted.

3.1. Life Cycle Impact Assessment Results

Table 1. North American Impact Assessment Results – Landmark

TRACI v2.1	A1-A3	A4	A5	B1-B7	C1-C4
GWP fossil [kg CO_2 eq]	3.29E+00	MND	MND	MND	MND
ODP [kg CFC-11 eq]	4.95E-08	MND	MND	MND	MND
AP [kg SO_2 eq]	1.02E-02	MND	MND	MND	MND
EP [kg N eq]	2.14E-03	MND	MND	MND	MND
POCP [kg O_3 eq]	1.37E-01	MND	MND	MND	MND
ADP_{fossil} [MJ, LHV]	1.47E+01	MND	MND	MND	MND

Table 2. North American Impact Assessment Results – Landmark PRO

TRACI v2.1	A1-A3	A4	A5	B1-B7	C1-C4
GWP fossil [kg CO_2 eq]	3.65E+00	MND	MND	MND	MND
ODP [kg CFC-11 eq]	5.34E-08	MND	MND	MND	MND
AP [kg SO_2 eq]	1.25E-02	MND	MND	MND	MND
EP [kg N eq]	2.72E-03	MND	MND	MND	MND
POCP [kg O_3 eq]	1.77E-01	MND	MND	MND	MND
ADP_{fossil} [MJ, LHV]	2.00E+01	MND	MND	MND	MND

3.2. Life Cycle Inventory Results

Table 3. Resource Use – Landmark

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
RPR_E [MJ, LHV]	3.32E+00	MND	MND	MND	MND	MND	MND	MND
RPR_M [MJ, LHV]	4.40E+00	MND	MND	MND	MND	MND	MND	MND
RPR_T [MJ, LHV]	7.72E+00	MND	MND	MND	MND	MND	MND	MND

$NRPR_E$ [MJ, LHV]	6.38E+01	MND	MND	MND	MND	MND	MND	MND
$NRPR_M$ [MJ, LHV]	7.92E+01	MND	MND	MND	MND	MND	MND	MND
$NRPR_T$ [MJ, LHV]	1.43E+02	MND	MND	MND	MND	MND	MND	MND
SM [kg]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
RSF [MJ, LHV]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
NRSF [MJ, LHV]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
RE [MJ, LHV]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
FW [m^3]	1.21E-02	MND	MND	MND	MND	MND	MND	MND

Table 4. Resource Use – Landmark PRO

PARAMETER	A1-A3	A4	A5	B1-B7	C1-C4
RPR_E [MJ, LHV]	3.24E+00	MND	MND	MND	MND
RPR_M [MJ, LHV]	6.28E+00	MND	MND	MND	MND
RPR_T [MJ, LHV]	9.52E+00	MND	MND	MND	MND
$NRPR_E$ [MJ, LHV]	6.61E+01	MND	MND	MND	MND
$NRPR_M$ [MJ, LHV]	9.79E+01	MND	MND	MND	MND
$NRPR_T$ [MJ, LHV]	1.64E+02	MND	MND	MND	MND
SM [kg]	0.00E+00	MND	MND	MND	MND
RSF [MJ, LHV]	0.00E+00	MND	MND	MND	MND
NRSF [MJ, LHV]	0.00E+00	MND	MND	MND	MND
RE [MJ, LHV]	0.00E+00	MND	MND	MND	MND
FW [m^3]	1.54E-02	MND	MND	MND	MND

Table 5. Output Flows and Waste Categories - Landmark

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
HWD [kg]	3.28E-04	MND	MND	MND	MND	MND	MND	MND
NHWD [kg]	2.23E-01	MND	MND	MND	MND	MND	MND	MND
HLRW [kg] or [m^3]	1.76E-06	MND	MND	MND	MND	MND	MND	MND

ILLRW [kg] or [m^3]	1.48E-03	MND	MND	MND	MND	MND	MND	MND
CRU [kg]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
R [kg]	4.70E-03	MND	MND	MND	MND	MND	MND	MND
MER [kg]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
EE [MJ, LHV]	0.00E+00	MND	MND	MND	MND	MND	MND	MND

Table 6. Output Flows and Waste Categories – Landmark PRO

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
HWD [kg]	3.84E-04	MND	MND	MND	MND	MND	MND	MND
NHWD [kg]	1.84E-01	MND	MND	MND	MND	MND	MND	MND
HLRW [kg] or [m^3]	1.82E-06	MND	MND	MND	MND	MND	MND	MND
ILLRW [kg] or [m^3]	1.54E-03	MND	MND	MND	MND	MND	MND	MND
CRU [kg]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
R [kg]	5.51E-03	MND	MND	MND	MND	MND	MND	MND
MER [kg]	0.00E+00	MND	MND	MND	MND	MND	MND	MND
EE [MJ, LHV]	0.00E+00	MND	MND	MND	MND	MND	MND	MND

Table 7. Carbon Emissions and Removals

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
BCRP [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND
BCEP [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND
BCRK [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND
BCEK [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND
BCEW [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND
CCE [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND
CCR [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND

CWNR [kg CO2]	MND	MND	MND	MND	MND	MND	MND	MND

4. LCA Interpretation

Based on the results from the life cycle assessment, the life cycle impacts are strongly driven by the raw materials followed by the manufacturing processes.

5. Additional Environmental Information

No substances required to be reported as hazardous are associated with the production of this product.

5.1. Environment and Health During Manufacturing

CertainTeed has well-established Environmental, Health, and Safety (EHS) and product stewardship programs which help to enforce proper evaluation and monitoring of chemicals that are chosen to manufacture products. These programs ensure that all environmental and OSHA requirements are met or exceeded to ensure the health and safety of all employees and contractors.

5.2. Environment and Health During Installation

CertainTeed Roofing products meet the definition of an article, as defined by the Occupational Safety and Health Administration (OSHA). An article is defined as follows:

"means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees."

Articles are exempt from the requirement of publishing Safety Data Sheets (SDSs). Title 29 of the Code of Federal Regulations, Section 1910.1200 (amended), specifically states that it does not apply to articles.

5.3. Extraordinary Effects

Fire

Landmark Series shingles have a Class A fire-resistance rating and are independently certified as meeting the highest quality standards for roofing.

Water

The shingle is used on top of the overall roofing system that provides a water barrier.

Mechanical Destruction

CertainTeed Landmark and Landmark PRO wind rating is 110/130 MPH. Other specifications can be found at https://www.certainteed.com/residential-roofing/products/landmark/

5.4. Delayed Emissions

No delayed emissions are expected from this product.

5.5. Environmental Activities and Certifications

Saint-Gobain is committed to achieving Carbon Neutrality by 2050. In January 2021, Saint-Gobain North America started receiving renewable energy certificates (RECs) from a 12-year virtual power purchase agreement (vPPA) with the Blooming Grove Wind Farm in McLean County, Illinois. Each year within the agreement, the company receives and retires these RECs, effectively reduced approximately 33% of carbon dioxide (CO2) emissions from electricity usage in 2021 in the United States and Canada. Updated results reflecting the RECs in the electricity input in manufacturing (A3) are shown below.

Table 8. North American Impact Assessment Results – Landmark

TRACI v2.1	A1-A3
GWP 100 [kg CO_2 eq]	3.24E+00
ODP [kg CFC-11 eq]	4.95E-08
AP [kg SO_2 eq]	1.01E-02
EP [kg N eq]	2.13E-03
POCP [kg O_3 eq]	1.36E-01
ADP_{fossil} [MJ, LHV]	1.47E+01

Table 9. North American Impact Assessment Results – Landmark PRO

TRACI v2.1	A1-A3
GWP 100 [kg CO_2 eq]	3.60E+00
ODP [kg CFC-11 eq]	5.34E-08
AP [kg SO_2 eq]	1.24E-02
EP [kg N eq]	2.71E-03
POCP [kg O_3 eq]	1.76E-01
ADP_{fossil} [MJ, LHV]	1.99E+01

5.6. Further Information

Additional information can be found at https://www.certainteed.com/residential-roofing/products/landmark/.

6. References

- Product Category Rules for Building-Related Product and Services: Part A – Life Cycle Assessment Calculation Rules and Report Requirements. Version 3.2. 2018. UL Environment.
- Product Category Rule Guidance for Building-Related Products and Services: Part B: Asphalt Shingles, Built-up Asphalt Membrane Roofing and Modified Bituminous Membrane Roofing EPD Requirements. Edition 3. May 24, 2021. UL Environment.
- ISO 21930:2017– Sustainability in building construction – Environmental declaration of building products
- ISO 21930 – Sustainability in building construction – Environmental declaration of building products
- Sphera LCA FE Databases. https://sphera.com/product-sustainability-software/
- US LCI Database. https://www.nrel.gov/lci/
- Ecoinvent v3.9 Database. http://ecoinvent.org/
- GHG Protocol http://ghgprotocol.org/sites/default/files/standards/Product-Life-Cycle-Accounting-Reporting-Standard_041613.pdf
- CertainTeed Residential Roofing Website. https://www.certainteed.com/residential-roofing/products/landmark/
- Asphalt Roofing Manufacturers Association Website. https://www.asphaltroofing.org/