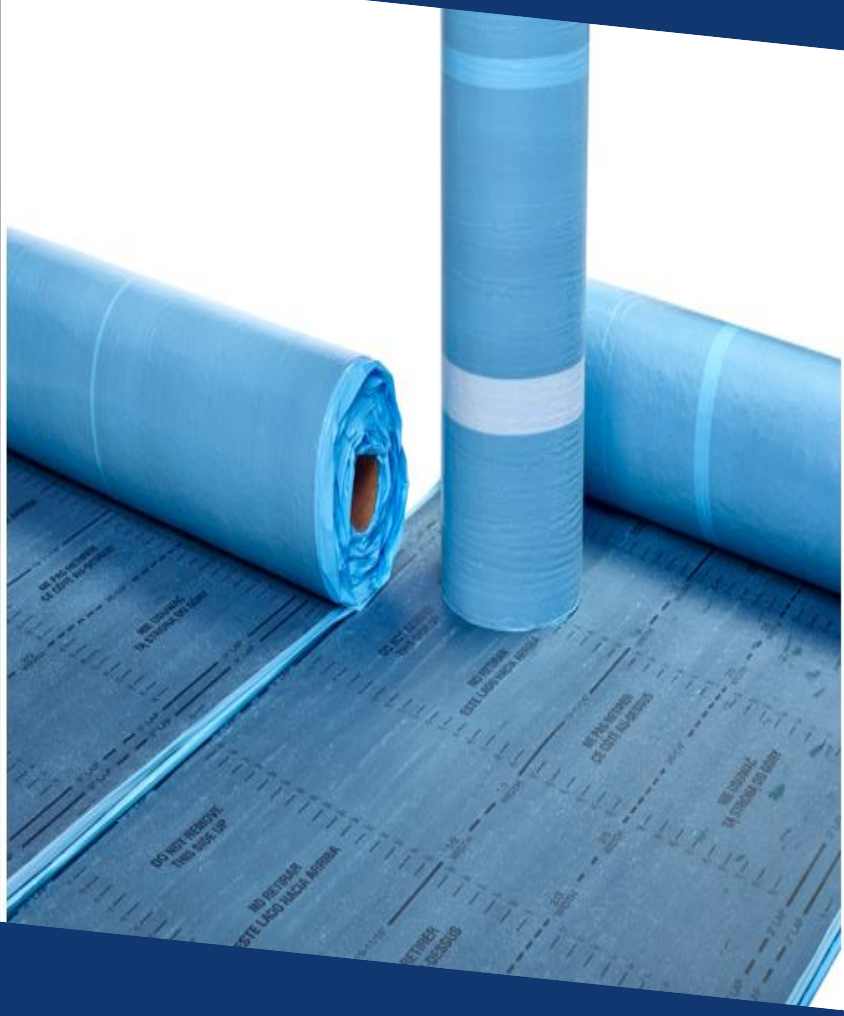
Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND ISO 21930:2017

Program Operator: Smart EPD®
www.smartepd.com



SmartEPD-2025-060-0386-01

SBS-Modified Asphalt Roofing (Self-Adhered)

Date of Issue	Expiration date	Last updated
Apr 01, 2025	**Apr 01, 2030**	**Apr 02, 2025**

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

CertainTeed

20 Moores Rd, Malvern, PA 19355

888-233-8990

Sustainability@Saint-Gobain.com certainteed.com

Product Name:	SBS-Modified Asphalt Roofing (Self-Adhered)
Declared Unit:	1 m2
Declaration Number:	SmartEPD-2025-060-0386-01
Date of Issue:	April 01, 2025
Expiration:	April 01, 2030
Last updated:	April 02, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4
Market(s) of Applicability:	North America

General Organization Information

CertainTeed Corporation, a subsidiary of Saint-Gobain, is a leading North American manufacturer of interior building materials including gypsum, ceilings, and insulation as well as exterior building materials which include roofing, vinyl siding, trim, and water protection.

Further information can be found at: https://www.certainteed.com/

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the products use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible 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. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and ISO 21930:2017
Core PCR:	UL Part A PCR for Building-Related Products and Services v.4 Date of issue: March 01, 2022

Sub-category PCR:	UL Part B: Asphalt Shingles, Built-up Asphalt and Modified Bituminous Membrane Roofing Date of issue: May 24, 2021 Valid until: December 17, 2024
Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Saint-Gobain North American ESG Sustainability Group | sustainability@saint-gobain.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Sarah Curpen | curpen1996@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Sarah Curpen | curpen1996@gmail.com

Product Information

Declared Unit:	1 m2
Mass:	6.3 kg
Product Specificity:	✓ Product Average ✗ Product Specific
Variation in GWP Result (Products):	-12% to +27%

Product Description

Commercial manufactures asphalt-base or bituminous, multi-layer, low-slope, commercial roof systems. Roof systems may consist of one or multiple materials depending on desired performance, warranty, and cost. Roof systems, at minimum include a base sheet and a cap sheets. Most base sheets can also be installed as interply layers . CertainTeed offers over forty roll good products, which equates to hundreds of system configurations and specification options. This EPD is specific to the SBS-Modified Asphalt Roofing (Self-Adhered) products. SBS-modified asphalt products are manufactured with styrene-butadiene-styrene infused asphalt which increases flexibility, especially in low temperatures. Additionally, some products listed as FR are manufactured with proprietary additives to increase fire resistance. CertainTeed SBS-modified asphalt roofing systems can be applied by four different application methods: self-adhered, hot asphalt, cold adhesive, or torch-applied. Though hot asphalt and cold adhesive are distinct application methods, the CertainTeed products used for these applications are the same and for the purposes of this study, they are grouped together as one application method.

Reinforcement mats serve as the structure to bituminous low-slope roll goods. The mats are impregnated and coated with SBS-modified asphalt. Products are available with either fiberglass or polyester reinforcement which can vary in thickness and weight. Fiberglass stands up well to heat and tension. Its inherently high melting point affords superior fire resistance when combined with a fire-retardant asphalt formulation. Fiberglass-reinforced products applied in hot asphalt retain excellent dimensional stability. When combined with SBS-modified asphalt, the sheets will resist roof movement until the stress absorbed in the mat forces a break. Polyesters predominant benefits are puncture resistance and high elongation. Polyester products handle rooftop foot traffic better. They can also cyclically absorb the strain of building movement and return back to their original dimension.

CertainTeed SBS-modified asphalt roofing systems can be applied by four different application methods: self-adhered, hot asphalt, cold adhesive, or torch-applied. Each application method results in excellent adhesion when applied correction. Self-adhered (SA) sheets are valued for their ability to be installed quickly and with less kill when compared to the other application methods. Benefits also include minimized health and safety risks as they require no solvent-based adhesive, kettle or torch for heating so there are no fumes, and no burn/fire risk. And despite successfully being in service for almost twenty years (CertainTeed introduced their self-adhered product

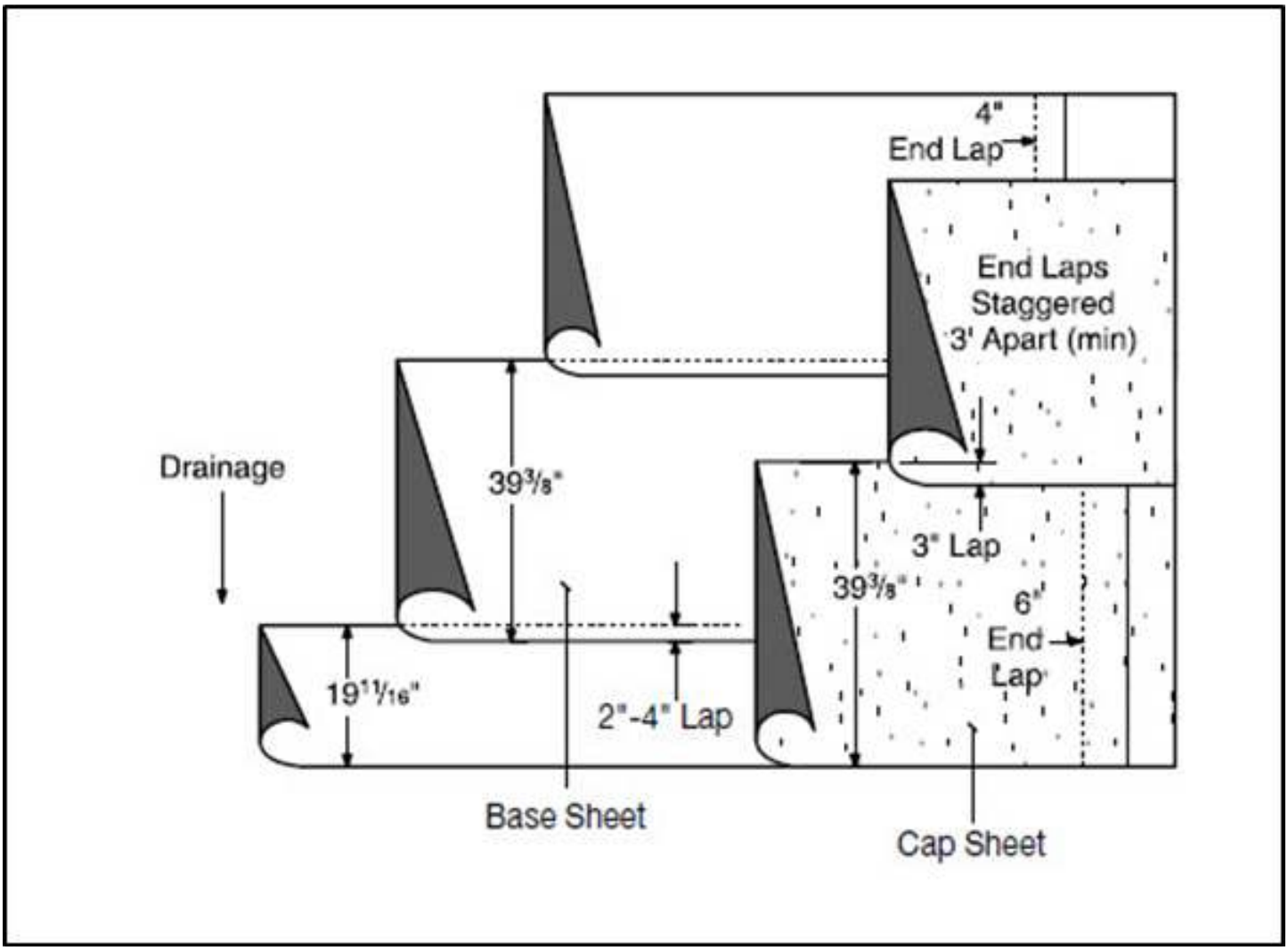
line in 2003), self-adhered systems are not yet widely accepted for commercial roofing projects. They are, however, very popular on residential low-slope projects and represent the fastest growing product type within the bituminous segment. Hot asphalt is proven, durable, and cost-effect, and limited by fumes, burn risk, and require the availability of highly skilled labor and appropriate equipment.

Further information can be found at: https://www.certainteed.com/products/commercial-roofing-products

Product Specifications

Product Classification Codes:	UNSPSC - 301515 EC3 - Cladding -> RoofPanels
Thickness to achieve declared or functional unit:	5.55 mm

Product Composition Diagram


4"
End Lap
End Laps
Staggered
3' Apart (min)
Drainage
39⅜"
3" Lap
39⅜"
6"
End
Lap
19¹¹⁄₁₆"
2"-4" Lap
Base Sheet
Cap Sheet

Material Composition

Material/Component Category	Origin	% Mass
Base/Cap - Fiberglass Mat	US	2-7
Base/Cap - Asphalt	US	35-45
Base/Cap - Polymer SBS 1	US	1-5
Base/Cap - Polymer SBS 2	US	1-5
Base/Cap - SBS Coating	US	5-10
Base/Cap - Limestone	US	15-25
Base/Cap- Polymer SIS	US	0.5-2
Base - Permanent Film	US	0.5-2
Cap - Granules	US	25-35
Cap - Polyester Mat	US	1-5
None	US	None

Packaging Material	Origin	kg Mass
Pallet	US	0.50
Core	US	0.08
Bag	Canada	0.03
Stretch Film	US	0.03

Biogenic Carbon Content	kg C per m2
Biogenic carbon content in product	0.09
Biogenic carbon content in accompanying packaging	0.259

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

EPD Data Specificity

Primary Data Year: 2023-2024

Manufacturing Specificity:

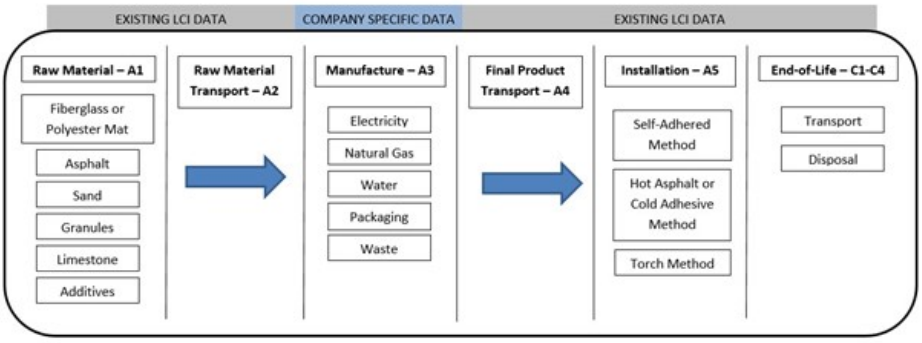
- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

A weighted average of the overall square meter production of each product within the SBS-Modified Asphalt (self-Adhered) Commercial Roofing product family was used for the results in this EPD. The weighted average of each base sheet and cap sheet will be shown as well as a summary of the results for each individual product.

System Boundary

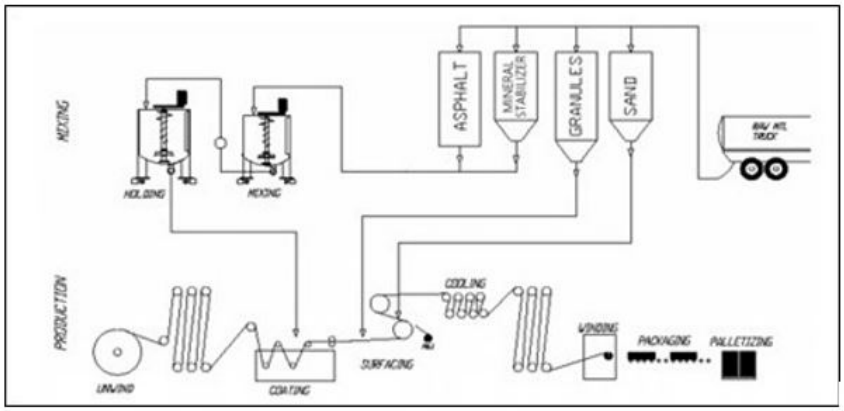
Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	ND



Plants

Little Rock
2701 E Roosevelt Rd, Little Rock, AR, USA

Product Flow Diagram



Software and Database

LCA Software:	Sphera LCA for Experts (formerly GaBi) v. 10.9
LCI Foreground Database(s):	GaBi Professional Database v. 2024.2
LCI Background Database(s):	Ecoinvent v. 3.10 | GaBi Extension database XVIII: NREL USLCI Integrated v. 2022 | US LCI v. FY21.Q3.01 | Sphera Professional + Extension v. 2023

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 has collected specific data on energy and material inputs, wastes, water use, emissions, and transportation impacts for included manufacturing plant(s).

Life Cycle Module Descriptions

This LCA study is characterized as a Cradle-to-Gate with Options study, examining the SBS-Modified Asphalt Commercial Roofing (Self Adhered) product line from raw material extraction, raw material transportation, manufacturing, product transport, installation, and final disposal. For this life cycle assessment, the SGNA EHS&S department, with assistance from personnel at the manufacturing locations, collected specific data on energy and material inputs, wastes, water usage, emissions, and transportation impacts for the CertainTeed Commercial Roofing production in Little Rock, AR from June 1, 2023- May 31, 2024

- **Raw Material (Module A1)**

A thorough analysis of the material inputs was completed for the inventory of this study.

- **Transportation of raw materials (Module A2)**

Raw materials are transported to the manufacturing sites by standard freight truck, train, or ocean freighters. Unless otherwise noted, transport vehicles are fueled with diesel fuel. The Raw material transportation distance were modeled based on the actual data provided by experts from the plant.

- **Manufacturing (Module A3)**

The process begins with the roll of fiberglass mat being mounted and fed into the mat accumulator machine. This machine accumulates the mat in accordion-style so that the machine can continue to run when the mat roll is exhausted and a new one is being mounted. The mat is then fed through the coater machine where the mats are pre-coated with the batch of asphalt and additives. The mix of asphalt must be heated in order to be applied as a thick liquid. The next coat is the filler of granules or sand and any other specified chemicals for the product being made. Cooling the mat is done with through evaporative cooling. Once the mat is cooled and dried, it is wound on to the cardboard core and the finished roll is packaged.

- **Packaging (Module A3)**

Packaging of the final product after production is included in the life cycle assessment. Packaging material includes the cardboard cores the material is wound on, plastic bags, tape, and pallets

- **Transport from the gate to the site (Module A4)**

Final products are transported on trucks throughout the United States. According to the Part B PCR for Roofing Products, in the absence of primary data, the product transport from the point of manufacture to the building site is assumed to be 800 km (497 miles) by diesel powered truck/trailer.

- **Installation (Module A5)**

The Asphalt Roofing PCR specifies the equipment and energy consumption requirements for the different installation types used for Commercial Roofing. Depending on the installation, there are additional ancillary material requirements; however, the type and amounts of materials varies widely. In order to remain consistent with industry standards, this study adopts the additional material specifications and VOC emissions detailed in the Asphalt Roofing Manufacturers Association (ARMA). CertainTeed Roofing installation experts, estimate a 15% scrap rate during installation.In addition, disposal of the packaging material is included in the installation phase. The packaging disposal assumptions based off the Product Category Rules for Building-Related Product and Services: Part A Life Cycle Assessment Calculation Rules and Report Requirements.

- **End of Life (Modules C1-C4)**

Deconstruction (module C1) of Commercial Roofing is typically done with manual labor, typically with roofing shovels. At this time there are no recycling scenarios and processing scenarios (module C3) for Commercial Roofing products at the end of the service life. This study assumes the deconstruction and waste processing modules to be burden free. Disposal in a municipal landfill or in commercial incineration facilities is permissible and should be done in accordance with local, provincial, and federal regulations.

LCA Discussion

Allocation Procedure

The Little Rock, AR is the only CertainTeed location that produces all of the SBS-modified asphalt Commercial Roofing products. The SBS-modified asphalt Commercial Roofing products are not the only products produced at this facility. Allocation was conducted based on the square meter production of each individual product line as a percentage of the overall square meter production of the facility.

Cut-off Procedure

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.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)
A4 Module

Fuel Type:	Diesel
Liters of Fuel:	39 l/100km
Vehicle Type:	Standard Freight Trailer
Transport Distance:	800 km
Capacity Utilization:	100 %
Packaging Mass:	0.63 kg
Gross density of products transported:	553.01 kg/m3
Capacity utilization volume factor:	=1
SBS-Modified Asphalt Self-Adhered Base Sheet:	275.40 kg/m3
SBS-Modified Asphalt Self-Adhered Cap Sheet:	277.61 kg/m3

Installation in to the building/construction site (A5)
A5 Module

Installation Scrap Rate Assumed:	15 %
Ancillary Materials:	0.302 kg
Product Lost per Declared/Functional Unit:	0.92 kg
Mass of Packaging Waste Specified by Type:	0.63 kg
Biogenic Carbon Contained in Packaging:	0.259 kg

End of Life (C1 - C4)
C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste: 6.30 kg

Recovery

Landfill: 6.30 kg

Disposal

Product or Material for Final Disposal: 6.30 kg

Removals of Biogenic Carbon: 0.348 kg CO2

Assumptions for scenario development:

Deconstruction (module C1) of low-slope roofing is typically done with manual labor, typically with roofing shovels and crow bars. At this time there are no recycling scenarios and processing scenarios (module C3) for low-slope roofing products at the end of the service life. This study assumes the deconstruction and waste processing modules to be burden free. Disposal in a municipal landfill or in commercial incineration facilities is permissible and should be done in accordance with local, provincial, and federal regulations

Results

Environmental Impact Assessment Results

IPCC AR6 GWP 100, TRACI 2.1, CML 2016 v4.8

per 1 m2 of product .

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Base and Cap Sheets

Impact Category	Method	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
GWP-total (incl biogenic)	IPCC AR6 GWP 100	kg CO2 eq	2.85e+0	1.88e-1	1.20e-1	8.30e-1	4.74e-1	1.41e+0	0	2.10e-2	0	1.39e-1
GWP-fossil	IPCC AR6 GWP 100	kg CO2 eq	2.86e+0	1.88e-1	9.39e-1	5.39e+0	4.74e-1	1.41e+0	0	2.10e-2	0	1.40e-1
ODP	TRACI 2.1	kg CFC 11 eq	4.47e-10	7.02e-12	5.16e-9	2.03e-8	1.77e-11	3.78e-13	0	7.83e-13	0	6.53e-15
AP	TRACI 2.1	kg SO2 eq	5.47e-3	1.29e-3	1.98e-3	1.46e-2	2.81e-3	3.71e-3	0	1.24e-4	0	7.06e-4
EP	TRACI 2.1	kg N eq	4.01e-4	7.11e-5	4.27e-4	4.40e-3	1.56e-4	1.69e-4	0	6.89e-6	0	3.04e-5
POCP	TRACI 2.1	kg O3 eq	4.96e-4	3.16e-5	5.78e-4	3.32e-3	7.15e-5	1.16e-4	0	3.16e-6	0	5.44e-5
ADP-fossil	CML 2016 v4.8	MJ	8.38e+0	3.28e-1	1.76e+0	1.32e+1	8.27e-1	4.23e+0	0	3.66e-2	0	2.68e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Global Warming Potential or Climate Change is an indicator aimed at including in a single value the added effect of all the substances contributing to the greenhouse effect.

Global Warming Potential (GWP-Total) includes biogenic carbon, fossil carbon, land use and land use change. To calculate GWP-Total within the above table, the equation below is used:

GWP-total = GWP-biogenic + GWP-fossil + GWP-luluc

- *GWP-total* or *GWPtotal (including biogenic)* is the sum of GWP-biogenic, GWP-fossil and GWP-luluc

- *GWP-biogenic* only includes biogenic carbon which is carbon that is stored in bio-sourced materials, like plants, trees, and soil. This excludes fossil.
- *GWP-fossil or GWPtotal (excluding biogenic)* only includes fossil carbon which is the carbon dioxide emitted when fossil fuels like coal, oil, or natural gas are combusted. This excludes biogenic.
- *GWP-luluc* only includes the greenhouse gas emissions that arise in connection with changes in the specified carbon stock as a result of land use and land use change, such as deforestation.

Depending on the required or optional standards, GWP can be reported with different methods and indicators including United States Environmental Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts (TRACI 2.1, etc.), Intergovernmental Panel on Climate Change (IPCC) Assessment Report (AR 5, AR 6, etc.), Environmental Footprint (EF 3.0, 3.1), and/or EN 15804.
GWP can be reported on a time frame such as GWP 100 for 100-year time horizon.

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Base Sheets

Impact Category	Method	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
GWP-total (incl biogenic)	IPCC AR6 GWP 100	kg CO2 eq	9.65e-1	5.27e-2	7.40e-2	-1.24e+0	1.53e-1	6.77e-1	0	6.76e-3	0	4.48e-2
GWP-fossil	IPCC AR6 GWP 100	kg CO2 eq	9.68e-1	5.27e-2	2.99e-1	2.72e+0	1.53e-1	6.77e-1	0	6.76e-3	0	4.50e-2
ODP	TRACI 2.1	kg CFC 11 eq	1.71e-10	1.97e-12	1.57e-9	1.64e-8	5.70e-12	1.51e-13	0	2.52e-13	0	2.10e-15
AP	TRACI 2.1	kg SO2 eq	2.00e-3	3.13e-4	6.01e-4	8.75e-3	9.05e-4	1.82e-3	0	4.01e-5	0	2.27e-4
EP	TRACI 2.1	kg N eq	1.46e-4	1.73e-5	3.30e-4	3.34e-3	5.01e-5	8.21e-5	0	2.22e-6	0	9.79e-6
POCP	TRACI 2.1	kg O3 eq	1.46e-4	7.95e-6	1.67e-4	2.53e-3	2.30e-5	5.59e-5	0	1.02e-6	0	1.75e-5
ADP-fossil	CML 2016 v4.8	MJ	3.15e+0	9.21e-2	5.70e-1	6.56e+0	2.66e-1	2.06e+0	0	1.18e-2	0	8.63e-2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

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- *GWP-total* or *GWPtotal (including biogenic)* is the sum of GWP-biogenic, GWP-fossil and GWP-luluc
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GWP can be reported on a time frame such as GWP 100 for 100-year time horizon.

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Cap Sheets

Impact Category	Method	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
GWP-total (incl biogenic)	IPCC AR6 GWP 100	kg CO2 eq	1.89e+0	1.35e-1	4.60e-2	2.07e+0	3.21e-1	7.32e-1	0	1.42e-2	0	9.48e-2
GWP-fossil	IPCC AR6 GWP 100	kg CO2 eq	1.89e+0	1.35e-1	6.40e-1	2.67e+0	3.21e-1	7.32e-1	0	1.42e-2	0	9.44e-2
ODP	TRACI 2.1	kg CFC 11 eq	2.76e-10	5.05e-12	3.59e-9	3.87e-9	1.20e-11	2.27e-13	0	5.31e-13	0	4.43e-15
AP	TRACI 2.1	kg SO2 eq	3.47e-3	9.78e-4	1.38e-3	5.82e-3	1.91e-3	1.89e-3	0	8.43e-5	0	4.79e-4
EP	TRACI 2.1	kg N eq	2.55e-4	5.38e-5	9.69e-5	1.06e-3	1.06e-4	8.64e-5	0	4.67e-6	0	2.06e-5
POCP	TRACI 2.1	kg O3 eq	3.50e-4	2.36e-5	4.11e-4	7.86e-4	4.85e-5	6.02e-5	0	2.14e-6	0	3.69e-5
ADP-fossil	CML 2016 v4.8	MJ	5.23e+0	2.36e-1	1.19e+0	6.66e+0	5.61e-1	2.17e+0	0	2.48e-2	0	1.82e-1

Note:

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GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Global Warming Potential or Climate Change is an indicator aimed at including in a single value the added effect of all the substances contributing to the greenhouse effect.

Global Warming Potential (GWP-Total) includes biogenic carbon, fossil carbon, land use and land use change. To calculate GWP-Total within the above table, the equation below is used:

GWP-total = GWP-biogenic + GWP-fossil + GWP-luluc

- *GWP-total* or *GWPtotal (including biogenic)* is the sum of GWP-biogenic, GWP-fossil and GWP-luluc
- *GWP-biogenic* only includes biogenic carbon which is carbon that is stored in bio-sourced materials, like plants, trees, and soil. This excludes fossil.
- *GWP-fossil or GWPtotal (excluding biogenic)* only includes fossil carbon which is the carbon dioxide emitted when fossil fuels like coal, oil, or natural gas are combusted. This excludes biogenic.
- *GWP-luluc* only includes the greenhouse gas emissions that arise in connection with changes in the specified carbon stock as a result of land use and land use change, such as deforestation.

Depending on the required or optional standards, GWP can be reported with different methods and indicators including United States Environmental Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts (TRACI 2.1, etc.), Intergovernmental Panel on Climate Change (IPCC) Assessment Report (AR 5, AR 6, etc.), Environmental Footprint (EF 3.0, 3.1), and/or EN 15804.
GWP can be reported on a time frame such as GWP 100 for 100-year time horizon.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicators

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Base and Cap Sheets

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
RPRE	MJ	3.63e+0	0	1.58e+1	1.95e+1	0	3.29e+0	0	0	0	1.48e+0
RPRM	MJ	7.96e-11	6.30e-14	1.43e+0	1.43e+0	1.67e-13	2.14e-1	0	3.36e-14	0	8.17e-12
RPRT	MJ	3.63e+0	6.30e-14	1.72e+1	2.09e+1	1.67e-13	3.51e+0	0	3.36e-14	0	1.48e+0
NRPRE	MJ	6.08e+1	2.39e+0	1.02e+1	7.81e+1	6.03e+0	3.16e+1	0	8.58e-2	0	8.46e-1
NRPRM	MJ	6.53e-4	5.34e-5	1.53e-4	8.59e-4	6.59e-5	1.07e-1	0	1.33e-5	0	5.38e-5
NRPRT	MJ	6.08e+1	2.39e+0	1.02e+1	7.81e+1	6.03e+0	3.18e+1	0	8.58e-2	0	8.46e-1
ADP-fossil	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SM	kg	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m3	9.59e-3	0	3.84e-3	1.34e-2	0	3.86e-3	0	0	0	2.67e-4
RE	ND	0	0	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Base Sheets

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
RPRE	MJ	1.26e+0	0	4.41e+0	5.67e+0	0	1.64e+0	0	0	0	8.24e-2
RPRM	MJ	1.67e-11	0	7.16e-1	7.16e-1	5.21e-14	1.07e-1	0	1.05e-14	0	2.55e-12
RPRT	MJ	1.26e+0	0	5.13e+0	6.39e+0	5.21e-14	1.75e+0	0	1.05e-14	0	8.24e-2
NRPRE	MJ	2.25e+1	6.70e-1	4.78e+0	2.80e+1	1.94e+0	1.54e+1	0	8.58e-2	0	6.65e-1
NRPRM	MJ	2.02e-4	1.72e-5	8.17e-5	3.00e-4	5.21e-14	1.07e-1	0	1.05e-14	0	2.55e-12
NRPRT	MJ	2.25e+1	6.70e-1	4.78e+0	2.80e+1	1.94e+0	1.55e+1	0	8.58e-2	0	6.65e-1
ADP-fossil	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SM	kg	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m3	3.63e-3	0	1.18e-3	4.81e-3	0	1.92e-3	0	0	0	8.59e-5
RE	ND	0	0	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Cap Sheets

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
RPRE	MJ	2.37e+0	0	1.14e+1	1.38e+1	0	1.65e+0	0	0	0	1.40e+0
RPRM	MJ	6.29e-11	6.30e-14	7.16e-1	7.16e-1	1.15e-13	1.07e-1	0	2.31e-14	0	5.62e-12
RPRT	MJ	2.37e+0	6.30e-14	1.21e+1	1.45e+1	1.15e-13	1.76e+0	0	2.31e-14	0	1.40e+0
NRPRE	MJ	3.83e+1	1.72e+0	5.46e+0	5.01e+1	4.09e+0	1.62e+1	0	0	0	1.81e-1
NRPRM	MJ	4.51e-4	3.62e-5	7.17e-5	5.59e-4	6.59e-5	3.22e-4	0	1.33e-5	0	5.38e-5
NRPRT	MJ	3.83e+1	1.72e+0	5.46e+0	5.01e+1	4.09e+0	1.63e+1	0	1.33e-5	0	1.81e-1
ADP-fossil	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SM	kg	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m3	5.96e-3	0	2.66e-3	8.62e-3	0	1.94e-3	0	0	0	1.81e-4
RE	ND	0	0	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Base and Cap Sheets

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
HWD	kg	2.88e-7	0	5.72e-9	2.93e-7	0	8.58e-9	0	0	0	5.10e-10
NHWD	kg	1.43e-1	0	5.08e-1	6.50e-1	0	3.97e-1	0	0	0	6.32e+0
HLRW	kg	1.25e-6	0	2.76e-7	1.53e-6	0	3.83e-7	0	0	0	2.46e-8
ILLRW	kg	1.08e-3	0	2.31e-4	1.31e-3	0	3.74e-4	0	0	0	2.20e-5
CRU	kg	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0
MNER	kg	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Base Sheets

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
HWD	kg	1.23e-7	0	1.85e-9	1.25e-7	0	4.23e-9	0	0	0	1.64e-10
NHWD	kg	5.55e-2	0	1.63e-1	2.19e-1	0	1.42e-1	0	0	0	2.03e+0
HLRW	kg	4.26e-7	0	8.99e-8	5.16e-7	0	1.90e-7	0	0	0	7.91e-9
ILLRW	kg	3.67e-4	0	7.52e-5	4.43e-4	0	1.86e-4	0	0	0	7.06e-6
CRU	kg	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0
MNER	kg	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

per 1 m2 of product .

SBS-Modified Asphalt Commercial Roofing (Self-Adhered) Cap Sheets

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
HWD	kg	1.65e-7	0	3.87e-9	1.68e-7	0	4.35e-9	0	0	0	3.46e-10
NHWD	kg	8.71e-2	0	3.44e-1	4.31e-1	0	2.55e-1	0	0	0	4.29e+0
HLRW	kg	8.28e-7	0	1.86e-7	1.01e-6	0	1.93e-7	0	0	0	1.67e-8
ILLRW	kg	7.08e-4	0	1.56e-4	8.63e-4	0	1.88e-4	0	0	0	1.49e-5
CRU	kg	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	ND	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0
MNER	kg	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 1 m2 of product .

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
BCRP	kg CO2	-3.48e-1	ND	ND	-3.48e-1	ND	ND	ND	ND	ND	ND
BCEP	kg CO2	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.48e-1
BCRK	kg CO2	ND	ND	-3.39e+0	-3.39e+0	ND	ND	ND	ND	ND	ND
BCEK	kg CO2	ND	ND	ND	ND	ND	3.39e+0	ND	ND	ND	ND
BCEW	kg CO2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CCE	kg CO2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CCR	kg CO2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CWNR	kg CO2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

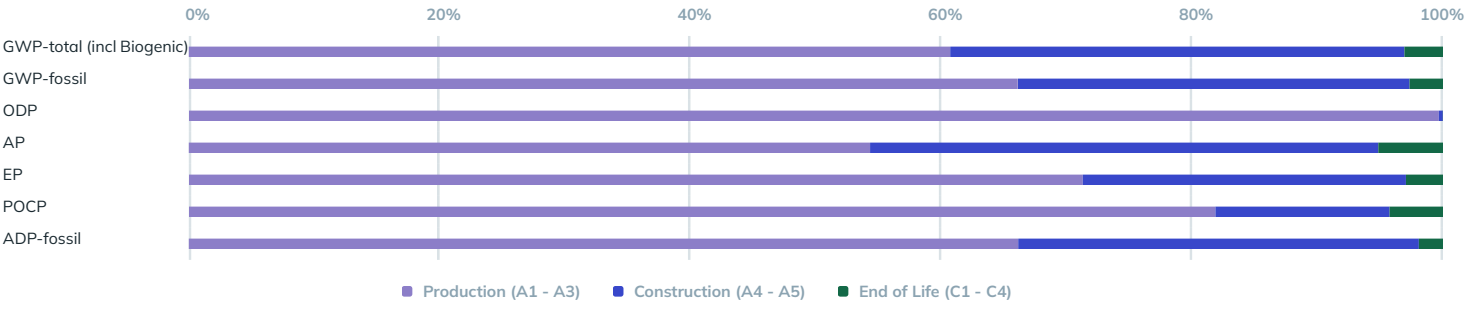
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE =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

Impact Scaling Factors

Product Name and/or Product Attribute	Product Specific Functional/Declared Unit Multiplier

Interpretation

Based on the results of the life cycle assessment, the life cycle impacts are strongly driven by the raw materials and installation phases. Within the raw materials, the mats and coatings, and where included, the fire retardant metals, contributed significantly to the environmental impact potentials. Installation methods vary among the products in the study and installation for specific projects varies widely depending on the project, products used, applications, etc. This makes specific installation data difficult to obtain. Due to the variable nature of the installation methods and materials, the results for the installation phase of the life cycle should be considered highly uncertain. The results for individual products within each of the product lines specified in this study vary slightly compared to the averages reported in this EPD, typically due to the coatings and presence of fire retardant metals in the raw material composition.



Additional Environmental Information

Environment and Health During Manufacture

CertainTeed and Saint-Gobain have well-established Environmental, Health, and Safety (EHS) and product stewardship programs, which help to enforce proper evaluation and monitoring of chemicals and raw materials 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.
The Little Rock, AR and Shakopee, MN Roofing manufacturing facilities operate integrated Environmental, Health, and Safety Management Systems that align with the ISO 14001 and ISO 45001 standards.

Environment and Health During Installation
Low-slope roofing products should be installed by trained roofing application professionals according to the installation method specified for the individual product, as published in CertainTeed applicator manuals and specifications. Appropriate tools and personal protective equipment (PPE) should be used.

Extraordinary Effects

- *Fire*

Fire classification of SBS-modified asphalt low-slope roofing is dependent on the products included in the system combination as well as the installation. According to an ICC-ES Evaluation Report for CertainTeed Commercial Roofing, roof covering systems are classified as Class A, B or C roof coverings in accordance with ASTM E108 or UL 790.

- *Water and Mechanical Destruction*

SBS-modified asphalt low-slope roofing products have no known extraordinary effects concerning water, or mechanical destruction.

Modified Impact Results: Renewable Electricity

per 1 m2 of product .

Impact Category	Unit	Method	A1	A2	A3	A1A2A3	A4	A5	C1	C2	C3	C4
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	2.86e+0	1.88e-1	3.06e-3	3.05e+0	4.74e-1	1.41e+0	0	2.10e-2	0	1.39e-1
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	2.86e+0	1.88e-1	8.22e-1	3.87e+0	4.74e-1	1.41e+0	0	2.10e-2	0	1.40e-1
ODP	kg CFC 11 eq	TRACI 2.1	4.47e-10	7.02e-12	5.23e-9	5.68e-9	1.77e-11	3.78e-13	0	7.83e-13	0	6.53e-15
AP	kg SO2 eq	TRACI 2.1	5.47e-3	1.29e-3	1.86e-3	8.62e-3	2.82e-3	3.71e-3	0	1.24e-4	0	7.06e-4
EP	kg N eq	TRACI 2.1	4.01e-4	7.11e-5	4.32e-4	9.04e-4	1.56e-4	1.69e-4	0	6.89e-6	0	3.04e-5
POCP	kg O3 eq	TRACI 2.1	4.96e-4	3.16e-5	5.77e-4	1.10e-3	7.15e-5	1.16e-4	0	3.16e-6	0	5.44e-5
ADP-fossil	MJ	CML 2016 v4.8	8.38e+0	3.28e-1	1.63e+0	1.03e+1	8.27e-1	4.23e+0	0	3.66e-2	0	2.68e-1
ADP-fossil	MJ	TRACI 2.1	0	0	0	0	ND	ND	ND	ND	ND	ND
GWP-total	kg CO2 eq	IPCC AR5 GWP 100	0	0	0	0	ND	ND	ND	ND	ND	ND

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Further Information

Product	Thickness (mm)	Roll Weight (lbs)	Coverage per Roll (ft2)	Mat Type	Base or Cap Sheet
Flintlastic Ultra Glass SA	3.0	72	100	Fiberglass	Base
Flintlastic SA PlyBase	1.5	86	200	Fiberglass	Base
Flintlastic SA NailBase	1.5	82	200	Fiberglass	Base
Flintlastic SA MidPly	2.8	63	100	Fiberglass	Base
Flintlastic SA Cap	4.0	95	100	Polyester	Cap
Flintlastic SA Cap CoolStar®	4.0	98	100	Polyester	Cap
Flintlastic SA Cap FR	3.2	88	100	Fiberglass	Cap
Flintlastic SA Cap FR CoolStar	3.2	90	100	Fiberglass	Cap

Product System	Mass (kg/m2)	Thickness to achieve Declared Unit (mm)
SBS-Modified Asphalt Self-Adhered Base Sheet	2.02	1.56
SBS-Modified Asphalt Self-Adhered Cap Sheet	4.28	3.98
SBS- Modified Asphalt Self-Adhered System	6.30	5.54

References

- Product Category Rules for Building-Related Product and Services: Part A Life Cycle Assessment Calculation Rules and Report Requirements, ULE 10010 v3.2.
- Product Category Rule Guidance for Building-Related Products and Services: Part B Built-up Asphalt Membrane Roofing and Modified Bituminous Membrane Roofing Requirements, ULE 10010-11 v1.0.
- ISO 14040: 2006 Series Environmental Management-Life Cycle Assessment
- ISO 21930 Sustainability in building construction Environmental declaration of building products
- GaBi Ecoinvent Database. www.thinkstep.com
- US LCI Database. www.nrel.gov.lci
- Ecoinvent v3 Database. http://ecoinvent.org/
- CertainTeed Commercial Roofing Website. https://www.certainteed.com/commercial-roofing/