ENVIRONMENTAL PRODUCT DECLARATION

BUR NON-MODIFIED ASPHALT ROOFING

CERTAINTEED ROOFING
HOT ASPHALT APPLIED BASE AND CAP SHEETS

BUR Non-Modified Asphalt roofing products are permeable so that hot asphalt can flow through the product as layers are “built-up” on the roof, resulting in a relatively thick, watertight roof system.

CertainTeed Corporation, a subsidiary of Saint-Gobain, is a leading North American manufacturer of building materials, which include commercial and residential roofing, vinyl siding, trim, fence, railing and decking, as well as interior building materials including gypsum, ceilings, and insulation. CertainTeed, and Saint-Gobain, are committed to providing sustainable building products and to limiting our impacts on the environment while doing so. (See our CSR at https://www.saint-gobain.com/en/commitments/saint-gobains-csr-commitments.)

We are also committed to market transparency through third party verified EPDs. In 2016, Saint-Gobain became the group with the most EPDs registered in the International EPD System. This third party verified EPD for Commercial Roofing continues that commitment.

For more information visit:
www.CertainTeed.com

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ENVIRONMENTAL PRODUCT DECLARATION
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ENVIRONMENTAL PRODUCT DECLARATION

CertainTeed SAINT-GOBAIN

BUR Non-Modified Asphalt Commercial Roofing
Hot Asphalt Applied

According to ISO 14025, ISO 21930:2017 & EN 15804:2012

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. 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, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	CertainTeed Corporation
DECLARATION NUMBER	4789064623.102.1
DECLARED PRODUCT	BUR Non-Modified Asphalt Commercial Roofing: Hot Asphalt Applied
REFERENCE PCR	UL Part B: Asphalt Shingles, Built-up Asphalt Membrane Roofing and Modified Bituminous Membrane Roofing v.2.0 July 2019
REFERENCE PCR STANDARD	☒ EN 15804 (2012) ☐ ISO 21930 (2007) ☒ ISO 21930 (2017)
DATE OF ISSUE	April 1, 2020
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	PCR Peer Review Panel Dr. Tom Gloria (Chair) epd@ul.com
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas Gloria Thomas Gloria, Industrial Ecology Consultants

This EPD conforms with ISO 21930:2017 and EN 15804:2012

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BUR Non-Modified Asphalt Commercial Roofing
Hot Asphalt Applied

According to ISO 14025

Product Documentation

Product Description

Commercial Roofing systems for low-slope roofing are asphalt based systems with a base sheet and a cap sheet. Roof systems may consist of one or multiple materials depending on the desired performance, warranty, and cost (see Figure 1). CertainTeed offers over forty roll good products, which equates to hundreds of system configurations and specification options. This EPD is specific to the BUR Non-Modified Asphalt Commercial Roofing products. BUR Non-modified asphalt products are manufactured using an extra strength fiberglass reinforced mat that receives a coating of weathering grade asphalt and is then lightly surfaced with a mineral release agent. BUR Non-Modified Asphalt products provide additional strength and moisture resistance.

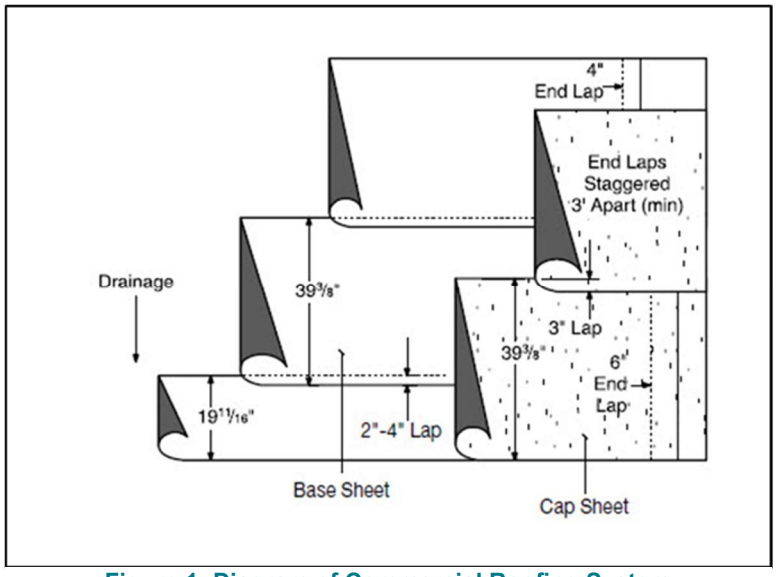

Figure 1: Diagram of Commercial Roofing System

Reinforcement mats serve as the structure to asphalt based low-slope roll goods. The fiberglass mats are impregnated and coated with asphalt. Fiberglass stands up well to heat and tension. Its inherently high melting point affords superior fire resistance. Fiberglass-reinforced products applied in hot asphalt retain excellent dimensional stability. Additionally, fiberglass has superior tensile strength.

CertainTeed BUR Non-Modified Asphalt Commercial Roofing systems are available only in a Hot Asphalt applied application. Hot asphalt application is proven, durable, and cost-effective, but is limited by fumes/odor, burn risk, and require the availability of trained labor and appropriate equipment.

The BUR Non-Modified Asphalt Commercial Roofing Base Sheets and Cap Sheets included in this EPD and the underlying Life Cycle Assessment Study are shown in Table 1.

BUR Non-Modified Asphalt Commercial Roofing					
Product	**Thickness**	**Roll Weight** (includes packaging)	**Coverage per Roll**	**Mat Type**	**Base or Cap Sheet**
Glasbase Base Sheet	1.0mm (40 mils)	75 lbs.	300 ft^2	Fiberglass	Base
Flintglas MS Cap	3.0mm (120 mils)	77 lbs.	100 ft^2	Fiberglass	Cap
Flintglas MS Cap CoolStar	3.0mm (120 mils)	80 lbs.	100 ft^2	Fiberglass	Cap

Table 1: BUR Non-Modified Asphalt Commercial Roofing Products

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BUR Non-Modified Asphalt Commercial Roofing
Hot Asphalt Applied

According to ISO 14025

Flow Diagram

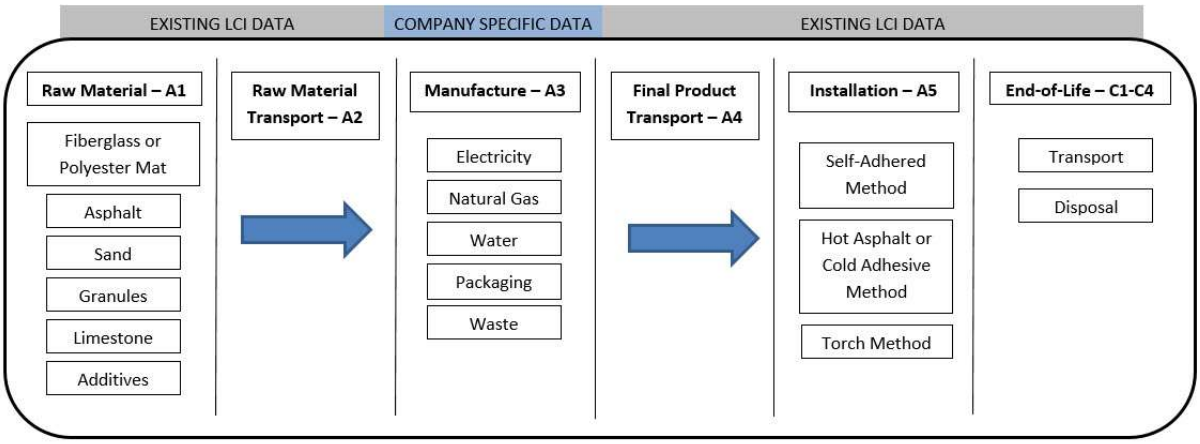

Figure 2: BUR Non-Modified Asphalt Commercial Roofing Product Flow Diagram

Description of Organization

All CertainTeed BUR Non-Modified Asphalt Commercial Roofing Products are manufactured at the Little Rock, AR manufacturing location in the United States.

The Little Rock, AR Roofing manufacturing facility operates an integrated Environmental, Health, and Safety Management Systems that align with the ISO 14001 and ISO 45001 standards.

Little Rock
2701 E. Roosevelt Rd. Little Rock, AR 72206

Product Average EPD

A weighted average of the overall square meter production of each product within the BUR Non-Modified Asphalt 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.

Application

BUR Non-Modified Asphalt Commercial Roofing systems are intneded for use as low-slope roofing materials on commercial, institutional or residential buildings.

Material Content

BUR Non-Modified Asphalt Commercial Roofing Base and Cap Sheets		
Material	**BUR Non-Modified Asphalt Base Sheet Average**	**BUR Non-Modified Asphalt Cap Sheet Average**
Fiberglass Mat	8.07%	2.56%
Sand	34.74%	7.11%
Granules	0.00%	49.26%
Asphalt	30.06%	19.53%
Limestone	27.13%	21.54%
Total kg/m²:	**1.128**	**3.505**
Base Sheet + Cap Sheet System Total kg/m²:		**4.633**

Table 2: BUR Non-Modified Asphalt Commercial Roofing Material Content

Technical Data

BUR Non-Modified Asphalt Commercial Roofing	
UNSPSC Code: 301515 CSI Code: 07 51 13	
Product	**ASTM**
Glasbase Base Sheet	D4601, Type II, UL G2
Flintglas MS Cap	D3909, UL G3
Flintglas MS Cap CoolStar	D3909

Table 3: Technical Data for BUR Non-Modified Asphalt Commercial Roofing

Methodological Framework

Declared Unit

Declared Unit = 1 m² (10.8 ft²)		
Product System	**Mass (kg/m²)**	**Thickness to achieve Declared Unit (mm)**
BUR Non-Modified Asphalt Base Sheet	1.128	1.000
BUR Non-Modified Asphalt Cap Sheet	3.505	3.000
BUR Non-Modified Asphalt System	**4.633**	**4.000**

Table 4: Declared Unit Information

System Boundary

The life cycle analysis performed for this EPD is classified as a “cradle-to-gate w/options” study. The system boundary includes raw material supply, manufacture, and transport; the BUR Non-Modified Asphalt Roofing products manufacture in Little Rock, AR, and packaging; product transportation to building site; installation; and product end-of-life.

Description of the System Boundary (X=included in LCA: MND=module not declared)																
Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits & Loads Beyond System Boundaries
Raw Material Supply	Transport	Manufacturing	Transport from the gate to the site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction demolition	Transport	Waste Processing	Disposal	Reuse-Recover-Recycling Potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	MND

Table 5: System Boundary

Allocation

The Little Rock, AR is the only CertainTeed location that produces all of the BUR Non-Modified Asphalt Commercial Roofing products. The BUR Non-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 Criteria

The cut-off criteria established for the study include materials, energy, and emissions data. For the purposes of this study, the crtieria are as follows:

- Mass – Chemicals with a combined weight less than 1% of the mass of the modeled product may be excluded, providing its environmental relevance is not a concern.
- Human activity factors were not included in the scope of this study.
- Capital equipment factors were not includd in the scope of this study.

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Data Sources

GaBi version 8.2 software system was used for modeling the life cycle of the BUR Non-Modified Asphalt Commercial Roofing products. Each background dataset was taken from the GaBi Thinkstep US Ecoinvent, USLCI databases, and Ecoinvent v3.

Data Quality

Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty. The data sources used are complete and representative of North America and Europe (depending on the material source) in terms of the geographic and technological coverage and are less than 10 years old. Any deviations from these initial data quality requirements for secondary data are documented in the report. Overall, the primary data from the manufacturing location is of very high quality, being directly tracked and measured by facility personel. Secondary data sets are of fair-to-good quality.

Period Under Review

Data for this LCA was collected for the 2018 calendar year.

Comparability

Comparison of the environmental performance of building and construction products using EPD information shall be based on the product's use and impacts at the building level. In general, EPDs may not be used for comparability purposes when not considered in a building context. Given the PCR ensures products meet the same functional requirements, comparablity is permissible provided the information given for such comparison is transparent and the limitations of comparability are explained.

Estimates and Assumptions

Estimates and assumptions are required in life cycle analysis to constrain the project boundary or model when little or not data is available. In this study of BUR Non-Modified Asphalt Commercial Roofing, estimates or assumptions were used for the transporation distances of some raw materials and packaging material as only the state (OH, AR, GA, TX, etc) was specifically available. The PCR also specifies the assumptions required for the transportation and installation of the products. All estmates and assumptions are appropriately noted in the report.

Technical Information and Scenarios

Manufacturing

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.

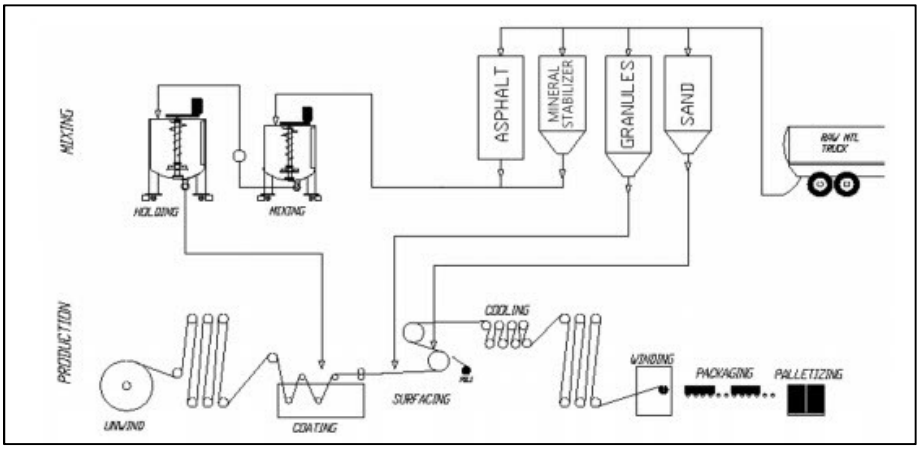

Figure 3: Manufacture of Commercial Roofing Products

Packaging

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.

Transportation

Final products are transported via truck throughout the United States.

Transport to the Building Site	Unit	Value
Fuel type	-	Diesel
Liters of fuel	l/100km	39
Vehicle type	-	Standard Diesel Freight Trailer
Transport Distance	km	800
Capacity utilization	%	100
Gross density of product transported		kg/m^3
BUR Non-Modified Asphalt Base Sheet		92.114
BUR Non-Modified Asphalt Cap Sheet		277.740
BUR Non-Modified Asphalt Commercial Roofing System		**369.854**
Capacity utilization volume factor	-	1

Table 6: Transport to the Building Site

Installation

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) study completed by ThinkStep in 2015 for each of the three installation types. CertainTeed Roofing installation experts, estimate a 15% scrap rate during installation.

Installation into the Building	Unit	BUR Non-Modified Asphalt
Ancillary materials	**kg**	**6.374**
Primer *(per ARMA study 2015)*	kg	0.000
Flashing *(per ARMA study 2015)*	kg	0.110
Asphalt *(per ARMA study 2015)*	kg	5.130
Granules *(per ARMA study 2015)*	kg	0.080
Interply Sheets *(per CertainTeed)*	Kg	1.054
Net freshwater consumption	m^3	0.000
Other resources	kg	0.000
Electricity consumption	kWh	0.000
Other energy carriers *(from Table 4.10)*	MJ	5.000
Product loss per square meter	kg	0.680
Waste materials at the construction site before waste processing, generated by product installation	kg	0.000
Output materials resulting from on-site waste processing	kg	0.000
Mass of packaging waste	kg	0.078
Biogenic carbon contained in packaging	kg CO_2	0.261
Direct emissions to ambient air, soil, and water	kg	0.000
NMVOC emissions *(per ARMA study 2015)*	kg/m^2	0.020

Table 7: Installation into the Building

Disposal

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.

Parameter		Unit	Value
Assumptions for scenario development		-	Disposal inert in landfill, including transport of 161 km (100 miles) per PCR
			BUR Non-Modified Asphalt
Collection Process	Collected separately	kg	0.00
	Collected with mixed construction waste	kg	4.633
Recovery	Reuse	kg	0.00
	Recycling	kg	0.00
	Landfill	kg	4.633
	Incineration	kg	0.00
	Incineration with energy recovery	kg	0.00
	Energy conversion efficiency rate	-	0.00
Disposal	Product or material for final deposition	kg	4.633
Biogenic Carbon	Removals of biogenic carbon (excluding packaging)	kg CO_2	0.206

Table 8: End-of-Life Scenario

LCA Results

BUR Non-Modified Asphalt Commercial Roofing Self-Adhered Results

BUR Non-Modified Asphalt Base Sheets – TRACI Environmental Impacts						
	Global Warming Potential	*Ozone Depletion Potential*	*Acidification Potential*	*Eutrophication Potential*	*Smog Creation Potential*	*Abiotic Depletion Potential (fossil)*
	kg CO_2 eq	*kg CFC 11 eq*	*kg SO_2 eq*	*kg N eq*	*kg O_3 eq*	*MJ*
Raw Materials (A1)	3.89E-01	7.03E-11	1.82E-03	1.13E-04	1.58E-02	7.87E-01
Raw Material Transport (A2)	3.02E-02	2.66E-13	1.40E-04	1.15E-05	4.63E-03	5.72E-02
Manufacture (A3)	4.80E-01	3.81E-10	8.86E-04	1.63E-04	1.43E-02	9.74E-01
Total A1-A3:	***8.99E-01***	***4.51E-10***	***2.85E-03***	***2.87E-04***	***3.47E-02***	***1.82E+00***
Final Product Transport (A4)	6.53E-02	5.75E-13	3.03E-04	2.49E-05	1.00E-02	1.24E-01
Installation (A5)	1.81E+00	1.65E-10	6.42E-03	2.72E-04	1.31E-01	6.31E+00
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	1.31E-02	1.16E-13	6.10E-05	5.01E-06	2.02E-03	2.49E-02
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	4.79E-02	7.47E-13	2.24E-04	1.13E-05	4.41E-03	9.60E-02
Total Cradle-to-Gate w/Options:	***2.84E+00***	***6.18E-10***	***9.86E-03***	***6.01E-04***	***1.82E-01***	***8.37E+00***
BUR Non-Modified Asphalt Cap Sheets – TRACI Environmental Impacts						
	Global Warming Potential	*Ozone Depletion Potential*	*Acidification Potential*	*Eutrophication Potential*	*Smog Creation Potential*	*Abiotic Depletion Potential (fossil)*
	kg CO_2 eq	*kg CFC 11 eq*	*kg SO_2 eq*	*kg N eq*	*kg O_3 eq*	*MJ*
Raw Materials (A1)	9.62E-01	8.62E-11	2.37E-03	1.42E-04	3.14E-02	2.30E+00
Raw Material Transport (A2)	9.15E-02	8.06E-13	4.25E-04	3.49E-05	1.40E-02	1.73E-01
Manufacture (A3)	4.80E-01	3.81E-10	8.86E-04	1.63E-04	1.43E-02	9.74E-01
Total A1-A3:	***1.53E+00***	***4.68E-10***	***3.68E-03***	***3.40E-04***	***5.97E-02***	***3.45E+00***
Final Product Transport (A4)	2.05E-01	1.81E-12	9.53E-04	7.84E-05	3.15E-02	3.89E-01
Installation (A5)	1.95E+00	1.68E-10	6.74E-03	2.94E-04	1.40E-01	6.63E+00
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	4.13E-02	3.64E-13	1.92E-04	1.58E-05	6.34E-03	7.82E-02
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	1.51E-01	2.35E-12	7.03E-04	3.57E-05	1.39E-02	3.02E-01
Total Cradle-to-Gate w/Options:	***3.88E+00***	***6.40E-10***	***1.23E-02***	***7.63E-04***	***2.51E-01***	***1.08E+01***
Total System: Base Sheets + Cap Sheets:	***6.72E+00***	***1.26E-09***	***2.21E-02***	***1.36E-03***	***4.33E-01***	***1.92E+01***

Table 9: BUR Non-Modified Asphalt Base Sheets and Cap Sheets, TRACI 2.1 Environmental Impacts

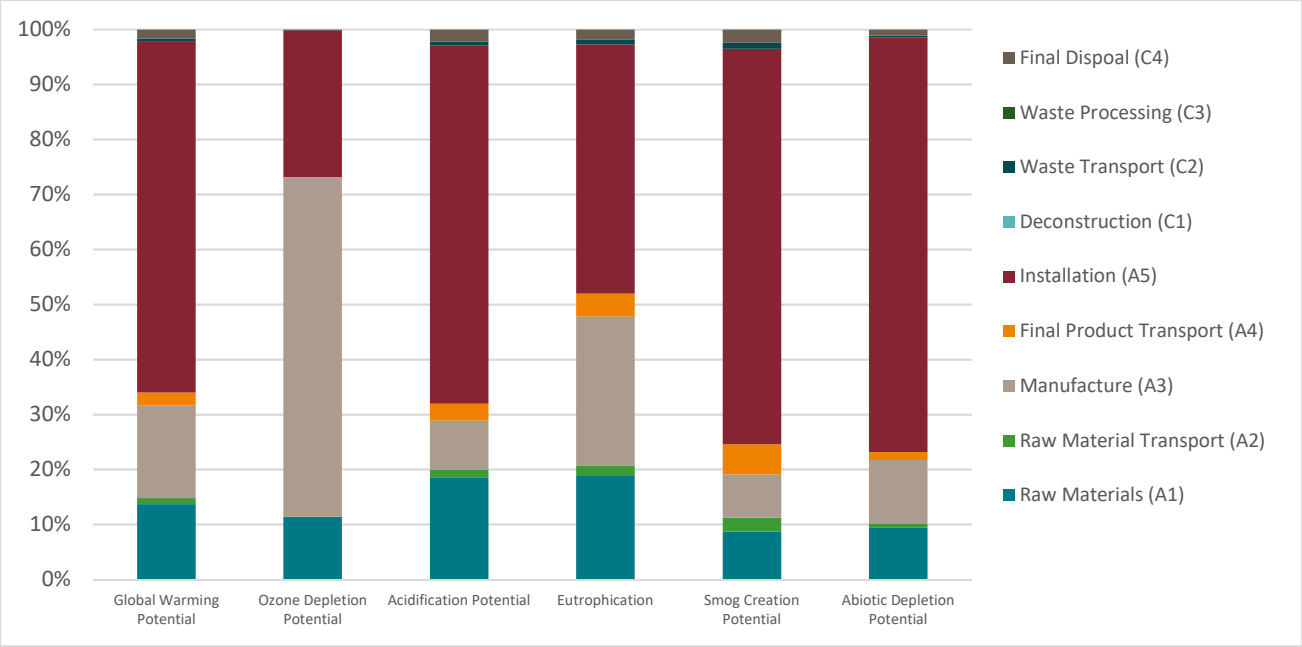

Figure 4: BUR Non-Modified Asphalt Base Sheets TRACI 2.1 Environmental Impacts

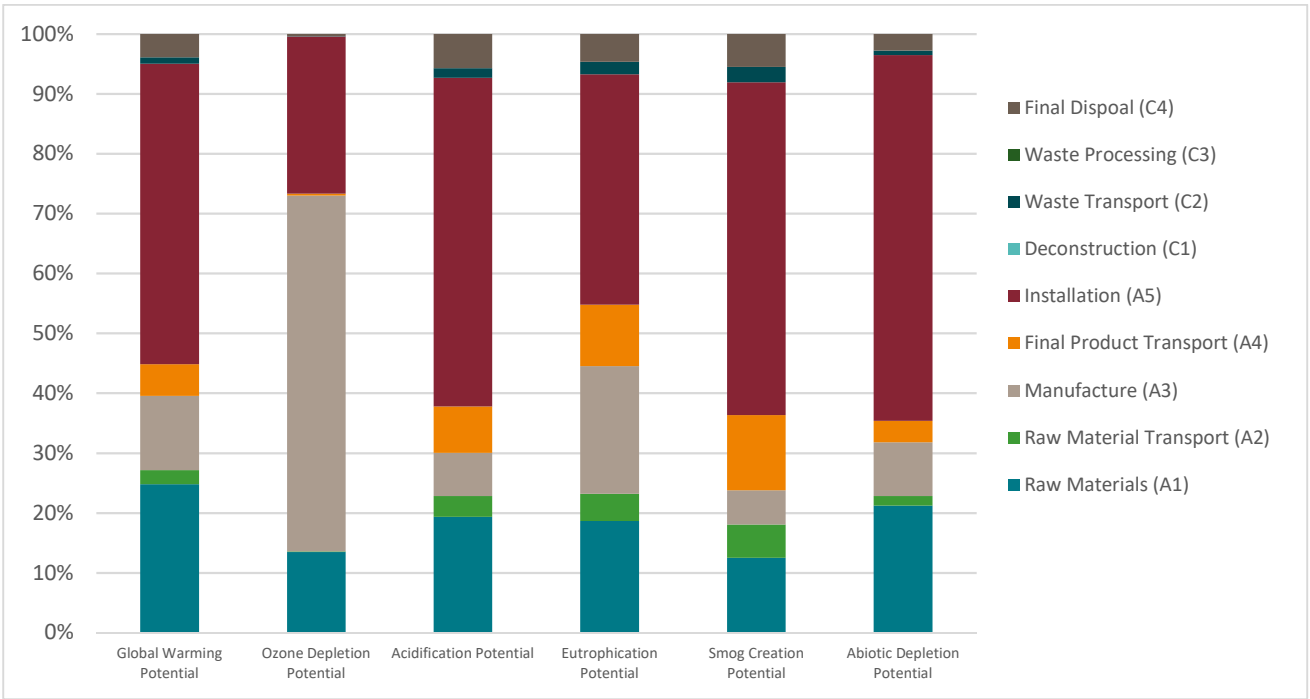

Figure 5: BUR Non-Modified Asphalt Cap Sheets TRACI 2.1 Environmental Impacts

BUR Non-Modified Asphalt Base Sheets – Use of Primary Resources				
	RPR_E: *Renewable primary energy used as 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*
	MJ	*MJ*	*MJ*	*MJ*
Raw Materials (A1)	4.69E-01	1.14E-11	7.37E+00	9.01E-05
Raw Material Transport (A2)	1.06E-02	1.39E-14	4.27E-01	7.97E-06
Manufacture (A3)	2.45E-01	7.63E-01	8.03E+00	2.54E-05
Total A1-A3:	***7.24E-01***	***7.63E-01***	***1.58E+01***	***1.23E-04***
Final Product Transport (A4)	2.29E-02	3.00E-14	9.23E-01	1.72E-05
Installation (A5)	1.63E+00	1.14E-01	4.88E+01	3.16E-04
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	4.61E-03	6.04E-15	1.86E-01	3.47E-06
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	5.26E-02	1.47E-12	7.67E-01	1.41E-05
Total Cradle-to-Gate w/Options:	***2.44E+00***	***8.78E-01***	***6.65E+01***	***4.74E-04***
BUR Non-Modified Asphalt Cap Sheets – Use of Primary Resources				
	RPR_E: *Renewable primary energy used as 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*
	MJ	*MJ*	*MJ*	*MJ*
Raw Materials (A1)	5.45E-01	1.16E-11	1.79E+01	1.02E-04
Raw Material Transport (A2)	3.21E-02	4.21E-14	1.29E+00	2.42E-05
Manufacture (A3)	2.45E-01	7.63E-01	8.03E+00	2.54E-05
Total A1-A3:	***8.22E-01***	***7.63E-01***	***2.73E+01***	***1.52E-04***
Final Product Transport (A4)	7.21E-02	9.45E-14	2.90E+00	5.42E-05
Installation (A5)	1.67E+00	1.14E-01	5.12E+01	3.31E-04
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	1.45E-02	1.90E-14	5.84E-01	1.09E-05
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	1.65E-01	4.62E-12	2.41E+00	4.43E-05
Total Cradle-to-Gate w/Options:	***2.75E+00***	***8.78E-01***	***8.43E+01***	***5.93E-04***
Total System: Base Sheets + Cap Sheets:	**5.19E+00**	**1.76E+00**	**1.51E+02**	**1.07E-03**

Table 10: BUR Non-Modified Asphalt Base Sheets and Cap Sheets, Use of Primary Resources

BUR Non-Modified Asphalt Base Sheets – Use of Secondary Resources					
	SM: *Secondary materials*	**RSF:** *Renewable secondary fuels*	**NRSF:** *Non-renewable secondary fuels*	**RE:** *Recovered energy*	**FW:** *Use of net fresh water resources*
	kg	*MJ*	*MJ*	*MJ*	*m^3*
Raw Materials (A1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.07E-01
Raw Material Transport (A2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.85E-04
Manufacture (A3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.93E-02
Total A1-A3:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***	***2.68E-01***
Final Product Transport (A4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-03
Installation (A5)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E+00
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.29E-04
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.24E-02
Total Cradle-to-Gate w/Options:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***	***1.38E+00***
BUR Non-Modified Asphalt Cap Sheets – Use of Secondary Resources					
	SM: *Secondary materials*	**RSF:** *Renewable secondary fuels*	**NRSF:** *Non-renewable secondary fuels*	**RE:** *Recovered energy*	**FW:** *Use of net fresh water resources*
	kg	*MJ*	*MJ*	*MJ*	*m^3*
Raw Materials (A1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-01
Raw Material Transport (A2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E-03
Manufacture (A3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.93E-02
Total A1-A3:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***	***3.24E-01***
Final Product Transport (A4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.70E-03
Installation (A5)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E+00
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-03
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.06E-02
Total Cradle-to-Gate w/Options:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***	***1.50E+00***
Total System: Base Sheets + Cap Sheets:	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**2.88E+00**

Table 11: BUR Non-Modified Asphalt Base Sheets and Cap Sheets, Use of Secondary Resources

BUR Non-Modified Asphalt Base Sheets – Waste Flows				
	Hazardous waste disposed	*Non-hazardous waste disposed*	*High level radioactive waste, conditioned*	*Intermediate and low level radioactive waste*
	kg	*kg*	*kg*	*kg*
Raw Materials (A1)	9.77E-09	4.50E-02	3.18E-07	8.43E-06
Raw Material Transport (A2)	3.49E-09	1.58E-05	1.13E-09	3.02E-08
Manufacture (A3)	3.59E-09	2.39E-01	2.88E-07	7.81E-06
Total A1-A3:	***1.69E-08***	***2.84E-01***	***6.06E-07***	***1.63E-05***
Final Product Transport (A4)	7.54E-09	3.41E-05	2.44E-09	6.53E-08
Installation (A5)	4.28E-08	4.83E-01	1.09E-06	2.43E-05
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	1.52E-09	6.86E-06	4.91E-10	1.31E-08
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	2.74E-09	1.10E+00	9.48E-09	2.38E-07
Total Cradle-to-Gate w/Options:	***7.14E-08***	***1.86E+00***	***1.71E-06***	***4.09E-05***
BUR Non-Modified Asphalt Cap Sheets – Waste Flows				
	Hazardous waste disposed	*Non-hazardous waste disposed*	*High level radioactive waste, conditioned*	*Intermediate and low level radioactive waste*
	kg	*kg*	*kg*	*kg*
Raw Materials (A1)	1.43E-08	4.74E-02	3.83E-07	1.02E-05
Raw Material Transport (A2)	1.06E-08	4.78E-05	3.42E-09	9.15E-08
Manufacture (A3)	3.59E-09	2.39E-01	2.88E-07	7.81E-06
Total A1-A3:	***2.84E-08***	***2.86E-01***	***6.75E-07***	***1.81E-05***
Final Product Transport (A4)	2.37E-08	1.07E-04	7.68E-09	2.05E-07
Installation (A5)	4.83E-08	8.37E-01	1.11E-06	2.47E-05
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	4.77E-09	2.16E-05	1.54E-09	4.13E-08
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	8.62E-09	3.45E+00	2.98E-08	7.48E-07
Total Cradle-to-Gate w/Options:	***1.14E-07***	***4.57E+00***	***1.82E-06***	***4.37E-05***
Total System: Base Sheets + Cap Sheets:	**1.85E-07**	**6.43E+00**	**3.53E-06**	**8.46E-05**

Table 12: BUR Non-Modified Asphalt Base Sheets and Cap Sheets, Waste Flows

BUR Non-Modified Asphalt Base Sheets – Output Material Flows				
	Components for reuse	*Materials for recycling*	*Materials for energy recovery*	*Recovered energy exported*
	kg	*kg*	*kg*	*kg*
Raw Materials (A1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Raw Material Transport (A2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manufacture (A3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total A1-A3:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***
Final Product Transport (A4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Installation (A5)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Cradle-to-Gate w/Options:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***
BUR Non-Modified Asphalt Cap Sheets – Output Material Flows				
	Components for reuse	*Materials for recycling*	*Materials for energy recovery*	*Recovered energy exported*
	kg	*kg*	*kg*	*kg*
Raw Materials (A1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Raw Material Transport (A2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manufacture (A3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total A1-A3:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***
Final Product Transport (A4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Installation (A5)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Deconstruction (C1)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Transport (C2)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Processing (C3)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Final Disposal (C4)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Cradle-to-Gate w/Options:	***0.00E+00***	***0.00E+00***	***0.00E+00***	***0.00E+00***
Total System: Base Sheets + Cap Sheets:	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**

Table 13: BUR Non-Modified Asphalt Base Sheets and Cap Sheets, Output Material Flows

CertainTeed
SAINT-GOBAIN

BUR Non-Modified Asphalt Commercial Roofing
Hot Asphalt Applied

According to ISO 14025

LCA 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 granules 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 diffcult 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 presense of fire retardant metals in the raw material composiiton. The results for the each individual product included in the average are reported in the appendix of this EPD.

Commercial Roofing systems are often comprised of base sheet and cap sheet combinations from different product lines. Environmental impact potentials of specific commerical roofing combinations can be calculated by adding the cradle-to-gate w/options results found in the appendix of a specified base sheet with those of a specified cap sheet.

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 Roofing manufacturing facility operates an integrated Environmental, Health, and Safety Management Systems that align with the ISO 14001 and ISO 45001 standards.

Environment and Health During Installation

Commerical Roofing products should be installed by trained roofing application professionals according to the installtion method specified for the individual product, as indication in the CertainTeed Application Guide. Appropriate tools and PPE should be used.

CertainTeed
SAINT-GOBAIN

BUR Non-Modified Asphalt Commercial Roofing
Hot Asphalt Applied

According to ISO 14025

Extraordinary Effects

Fire

Fire classification of BUR Non-Modified Asphalt Commerical 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 accorance with ASTM E108 or UL 790.*Water and Mechanical Destruction*

SBS- Modified Asphalt Commerical Roofing products have no known extraordinary effects concerning water, or mechanical destruction.

Further Information

https://www.certainteed.com/commercial-roofing/

LCA Development

This EPD and the corresponding LCA were prepared by Saint-Gobain Corporation North America in Malvern, Pennslyvania.

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. Version 1.0 2019. UL Environment
- ISO 14040: 2006 Series – Environmental Management-Life Cycle Assessment
- EN 15804 – Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products
- ISO 21930: 2017 – Sustainability in building construction – Environmental declaration of building products
- ARMA Industry Wide Commercial Roofing Life Cycle Assessment, 2015. ThinkStep
- ICC-ES Evaluation Report for CertainTeed Corporation, May 2019. ICC Evaluation Service
- CertainTeed Roofing Commercial Roofing Life Cycle Assessment Report, January 2020. Saint-Gobain North America EHS&S Department
- CertainTeed Website: https://www.certainteed.com/commercial-roofing/

Appendix: Individual Product Results for BUR Non-Modified Asphalt Commercial Roofing

BUR Non-Modified Asphalt Base and Cap Sheets				
Cradle-to-Gate w/Options		**Glasbase Base Sheet**	**Flintglas MS Cap**	**Flintglas MS Cap CoolStar**
TRACI 2.1 Impact Categories				
Global Warming Potential	kg CO^2 eq	2.84E+00	3.88E+00	3.85E+00
Ozone Depletion Potential	kg CFC-11 eq	6.18E-10	6.41E-10	6.38E-10
Acidification Potential	kg SO_2 eq	9.86E-03	1.23E-02	1.23E-02
Eutrophication Potential	kg N eq	6.01E-04	7.63E-04	7.65E-04
Smog Creation Potential	kg O_3 eq	1.82E-01	2.51E-01	2.52E-01
Abiotic Depletion Potential	MJ	8.37E+00	1.09E+01	1.08E+01
Use of Primary Resources				
Renewable primary energy used as energy carrier	MJ	2.44E+00	2.75E+00	2.75E+00
Renewable primary resources with energy content used as material	MJ	8.78E-01	8.78E-01	8.78E-01
Non-renewable primary resources used as an energy carrier	MJ	6.65E+01	8.44E+01	8.41E+01
Non-renewable primary resources with energy content used as material	MJ	4.74E-04	5.92E-04	5.95E-04
Use of Secondary Resources				
Secondary materials	kg	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00
Recovered energy	MJ	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources	m^3	1.38E+00	1.50E+00	1.50E+00
Waste Flows				
Hazardous waste disposed	kg	7.14E-08	1.14E-07	1.15E-07
Non-hazardous waste disposed	kg	1.86E+00	4.56E+00	4.68E+00
High level radioactive waste	kg	1.71E-06	1.82E-06	1.81E-06
Intermediate and low level radioactive waste	kg	4.09E-05	4.38E-05	4.35E-05
Output Material Flows				
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00
Recovered energy exported	kg	0.00E+00	0.00E+00	0.00E+00

Table 14: BUR Non-Modified Asphalt Base and Cap Sheets Individual Results