

ENVIRONMENTAL PRODUCT DECLARATION

ECOTOUCH® INSULATION FOR METAL BUILDING

ECOTOUCH® CERTIFIED R METAL BUILDING INSULATION, ECOTOUCH® INSULATION FOR MBI PLUS, ECOTOUCH® UTILITY BLANKET METAL BUILDING INSULATION



Owens Corning® EcoTouch® Insulation for Metal Building products are light-density fibrous glass blankets, designed for use in metal buildings.



Owens Corning and its family of companies, are a leading global producer of residential and commercial building materials, glass fiber reinforcements, and engineered materials for composite systems. It uses a decision framework for managing the company as a sustainable enterprise. It is the foundation of the company's strategy of building market-leading businesses, global in scope—human in scale, and reflects the company's purpose: our people and products make the world a better place.

Owens Corning is committed to balancing economic growth with social progress and sustainable solutions to its building materials and composite customers around the world.

This Environmental Product Declaration is a component of our stated goal to provide life cycle information on all core products.

sustainability.owenscorning.com



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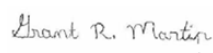



EcoTouch® Insulation for Metal Building

EcoTouch® Certified R Metal Building Insulation, EcoTouch® Insulation for MBI Plus, EcoTouch® Utility Blanket Metal Building Insulation

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

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 333 Pfingsten Road Northbrook, IL 60061 https://www.ul.com/ https://spot.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	General Program Instructions v.2.4 July 2018
MANUFACTURER NAME AND ADDRESS	Owens Corning, One Owens Corning Parkway, Toledo, OH, USA
DECLARATION NUMBER	4788986648.102.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	EcoTouch® Insulation for Metal Buildings 1 m ² insulation at R _{SI} =1
REFERENCE PCR AND VERSION NUMBER	Part B: Mechanical, Specialty, Thermal, and Acoustic Insulation Product EPD Requirements, UL 10010-03, version 1.0
DESCRIPTION OF PRODUCT APPLICATION/USE	EcoTouch Insulation for Metal Building are for use in thermal applications for in metal building roofs and walls.
PRODUCT RSL DESCRIPTION (IF APPL.)	75 years
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	January 1, 2020
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-specific
RANGE OF DATASET VARIABILITY	NEA
EPD SCOPE	Cradle to gate with options (A4, A5, C2, C4)
YEAR(S) OF REPORTED PRIMARY DATA	2014
LCA SOFTWARE & VERSION NUMBER	SimaPro 9.0.0.30
LCI DATABASE(S) & VERSION NUMBER	ecoinvent 3.5
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1 v1.05; CML I-A baseline v4.7; Cumulative Energy Demand (LHV) v1.00

This PCR review was conducted by:	UL Environment
	PCR Review Panel
	epd@ulenvironment.com
This declaration was independently verified in accordance with ISO 14025: 2006. <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	
	Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	
	Thomas P. Gloria, Industrial Ecology Consultants

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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1. Product Definition and Information

1.1. Description of Company/Organization

Founded in 1938, Owens Corning is a leader in insulation, roofing and fiberglass composites. It has a global presence with 20,000 people in 33 countries. Product covered by this Environmental Product Declaration was produced in the following locations:

Fairburn Plant
Fairburn, GA 30123

Newark Plant
Newark, OH 43058

Waxahachie Plant
Waxahachie, TX 75165

All varieties of product described are not produced at all locations listed.

1.2. Product Description

Product Identification

Owens Corning® Metal Building Insulation products are formaldehyde-free, light-density fibrous glass blankets with excellent recovery, designed for use in metal building roofs and walls. They are available in a variety of densities, thicknesses, R-values and laminating capabilities to meet a variety of building needs and code requirements. Final MBI products have a minimum total recycled content of 65%.

EcoTouch® Certified R Metal Building Insulation

Owens Corning® EcoTouch® Certified R Metal Building Insulation a light density fibrous glass blanket designed to be laminated with a variety of appropriate facings. Certified R is available in standard R-values of 10, 11, 13, 16, 19, 25 and 30 - is regularly tested to ensure compliance to the NAIMA 202-96 (Rev. 2000) Standard. Standard roll widths are 36", 48", 60" and 72".

EcoTouch® Insulation for MBI Plus

Owens Corning® EcoTouch® Insulation for MBI Plus with PureFiber® Technology is a light density fibrous glass blanket designed for use in metal building roofs and walls. The product is intended for installation at the job site and is not designed for lamination. EcoTouch® Insulation for MBI Plus is available in standard R-values of 10, 11, 13, 16, 19, 25 and 30. Standard roll widths are 48", 60" and 72". The product has ink jet printing on the surface: "MBI Plus INSULATION...NOT TO BE LAMINATED" for easy identification on the project.

EcoTouch® Utility Blanket Metal Building Insulation

Owens Corning® EcoTouch® Utility Blanket Metal Building Insulation is an unfaced light density fibrous glass blanket. The product is designed to be laminated with a variety of facings and is used for condensation and noise control in metal buildings. The product is available in rolls with widths of 36", 48" and 72" at a nominal product thickness of 2".



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Product Specification

Table 1. Physical Properties of EcoTouch® Certified R Metal Building Insulation

PROPERTY	TEST METHOD	VALUE		
Thermal Resistance	ASTM C 177/C 518	Thickness	Pre-lam.	Post-lam.
		3.4"	R-10.8	R-10
		3.7"	R-11.9	R-11
		4.3"	R-14.1	R-13
		5.3"	R-17.3	R-16
		6.3"	R-20.6	R-19
		6.5"	R-21.7	R-20
		8.0"	R-27.1	R-25
		9.25"	R-32.5	R-30
Surface Burning	ASTM E 84 / UL723* CAN/ULC S102	Flame spread index <25 Smoke developed index <50		
Combustion Characteristics	ASTM E136 CAN/ULC S114	Non-combustible		
Water Vapor Sorption	ASTM C 1104 / C 1104M	<0.2% by volume		
Fungi Resistance	ASTM C 1338	Passes		
Corrosiveness	ASTM C665, part 13.8	Passes		
Odor Emission	ASTM C 1304	Passes		
Dimensional Tolerances	ASTM C 167	Length, - 0" / + ½" Width, - ¼" / + ¼"		

*The surface burning characteristics of these products have been determined in accordance with UL 723. The standard should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest 5 rating.

Table 2. Physical Properties of EcoTouch® Insulation for MBI Plus

PROPERTY	TEST METHOD	VALUE
Thermal Resistance	ASTM C 177/C 518	Product R-value
Surface Burning Characteristics	ASTM E 84 / UL723*	Flame spread index <25 Smoke developed index <50
Combustibility Characteristics	ASTM E136	Non-combustible
Water Vapor Sorption	ASTM C 1104	<0.2% by volume
Fungi Resistance	ASTM C 1338	Passes
Corrosiveness	ASTM C665	Passes
Odor Emission	ASTM C 1304	Passes

*The surface burning characteristics of these products have been determined in accordance with UL 723. The standard should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest 5 rating.



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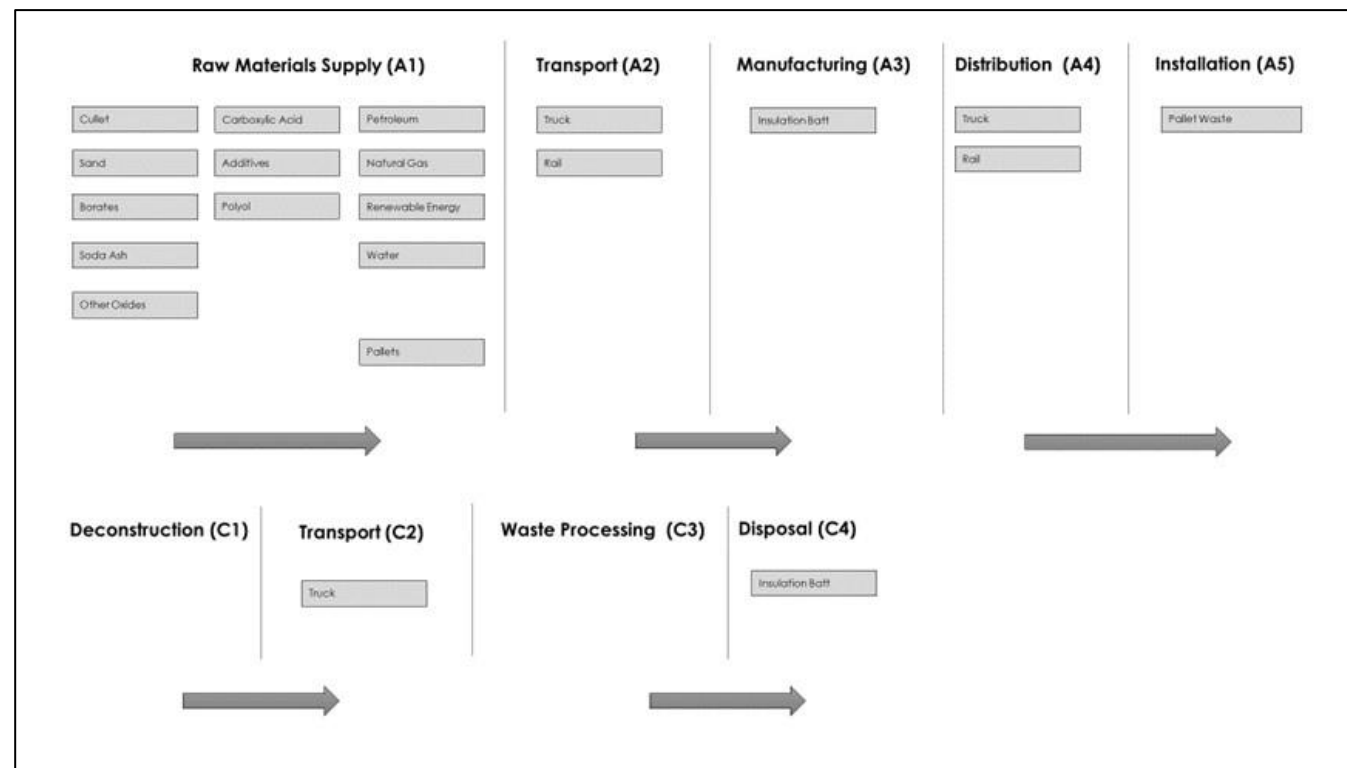
Table 3. Physical Properties of EcoTouch® Utility Blanket Metal Building Insulation

PROPERTY	TEST METHOD	VALUE
Thermal Resistance 2" 51mm	ASTM C 518	Product R-value ¹ 7.0, RSI Value ¹ 1.23
Combustibility	ASTM E136, CAN/ULC S114	Noncombustible
Surface Burning Characteristics ²	ASTM E 84 / UL 723, CAN/ULC S102	Flame spread index <25 Smoke developed index <50
Water Vapor Sorption	ASTM C 1104	<5% by weight
Fungi Resistance	ASTM C 1338	Passes (does not support fungi growth)
Odor Emission	ASTM C 1304	Passes (no detectable odor)
Corrosiveness	ASTM C665, section 13.8	Passes

¹Pre-lamination values

²The surface burning characteristics of these products have been determined in accordance with ASTM E84, UL 723 or CAN/ULC S102. These standards should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest 5 rating.

Flow Diagram



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Product Average

The results of this declaration represent an average performance for the listed products and manufacturing locations. Reported area weights for included products and production locations were taken from quality control data to create a weighted average which was used to determine the functional unit mass for the LCA.

1.3. Application

Owens Corning® EcoTouch® Insulation for Certified R Metal Building Insulation is used as part of the insulation system in the roofs and side walls of metal buildings. It is designed to be laminated with a variety of facings to provide attractive interior finishes, abuse resistance, and assistance in control of moisture.

Owens Corning® EcoTouch® Insulation for MBI Plus is used when unfaced insulation is required in various metal building roof or wall systems. EcoTouch® Insulation for MBI Plus is not designed for lamination and is generally shipped directly to a job site.

Owens Corning® EcoTouch® Utility Blanket Metal Building Insulation product is laminated with an appropriate facing, the insulation is typically installed in a single layer between the structural members (purlins for roofs and girts for walls) and the exterior panels. In most cases, the product is installed over and perpendicular to the structural members with the facing towards the interior of the structure.

1.4. Declaration of Methodological Framework

This declaration is a product-specific EPD. It is cradle-to-gate with modules A1-A5 and end-of-life included. The LCA study included the following:

- Raw materials including extraction, production, pallets and recycle cullet
- Transportation of raw materials to the manufacturing facility
- Fiberglass manufacturing
- Finished goods transportation
- Installation in the building
- End-of-life, including transport to landfill and landfill disposal

No known flows are deliberately excluded from this EPD.

The product is expected to last for at least the 75 years reference service life if it remains clean and dry in its installed state.

1.5. Technical Requirements

Compliance

EcoTouch® Certified R Metal Building Insulation

- ASTM C991-08, Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings; Type I
- NAIMA 202-96 (Rev. 2000) Standard for Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings

EcoTouch® Insulation for MBI Plus

- Manufactured in compliance with ASTM C991, Type I



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EcoTouch® Utility Blanket Metal Building Insulation

- CAN/ULC – S702 – Standard for Mineral Fiber Thermal insulation for Buildings – Type 1.
- ASTM C665 – Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction; Type 1.

1.6. Properties of Declared Product as Delivered

Metal Building Insulation is delivered in compression packaged batts, blankets and rolls. Once removed from the packaging, the product will recover to the needed thickness to deliver the advertised R-value. Laminating a facing to the insulation can impact the R-value as shown in the product properties table.

1.7. Material Composition

Metal Building Insulation products consist of two major components: fiberglass (nominally $\geq 85\%$) and the remainder being the add-on chemicals for binder. The fiberglass is made from various inorganic minerals, which are referred to as batch chemicals. The binder system consists of renewable and non-renewable organic materials.

Certified R and Utility Blanket use a hybrid binder (a mix of bio-based binder and acrylic resin EcoTouch®), whereas MBI Plus uses the bio-based binder mix. The binder materials used for the two groups are therefore different.

The Certified R and Utility Blanket may be laminated with a facing material by customers. To that end, the environmental impact of potential facing materials for Certified R and Utility Blanket are not included in the LCA or this EPD.

Table 4. Material Content for EcoTouch® Insulation for Metal Building

MATERIALS	FUNCTION	CERTIFIED R QUANTITY (% BY MASS)	MBI PLUS QUANTITY (% BY MASS)	UTILITY BLANKET QUANTITY (% BY MASS)
Cullet	Glass Batch	25-75%	25-75%	25-75%
Sand	Glass Batch	5-50%	5-50%	5-50%
Borates	Glass Batch	10-30%	10-30%	10-30%
Soda Ash	Glass Batch	<15%	<15%	<15%
Silicates	Glass Batch	<5%	<5%	<5%
Other Oxides	Glass Batch	<5%	<5%	<5%
Carboxylic Acid	Binder	<15%	<15%	<15%
Polyol	Binder	<5%	<5%	<5%
Additives	Binder	<5%	<5%	<5%



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1.8. Manufacturing

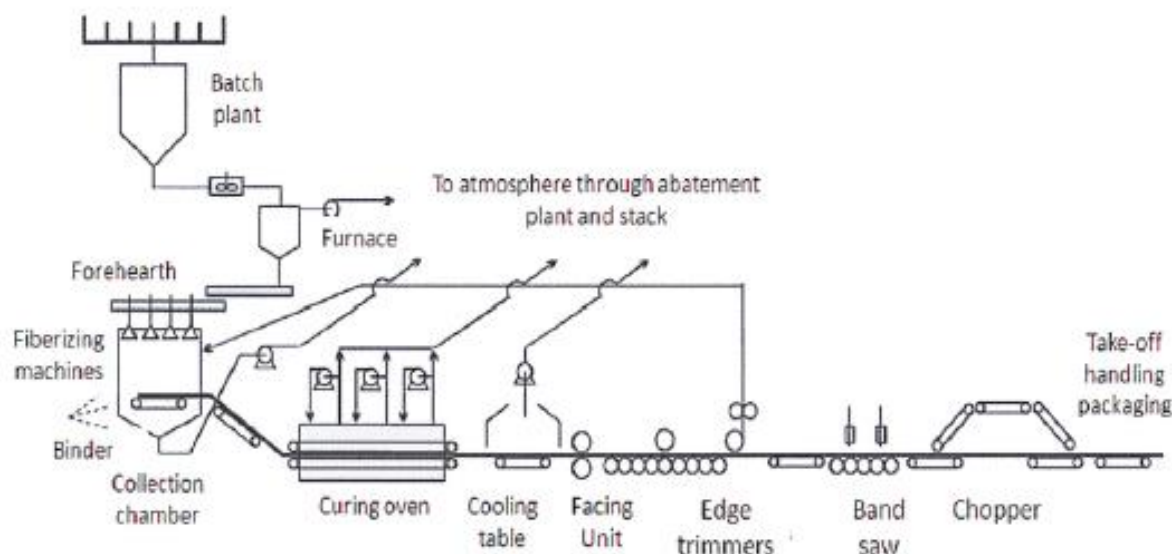
Owens Corning North American Insulation manufacturing locations can be found across the United States.

Fairburn Plant^a
Fairburn, GA 30123

Newark Plant
Newark, OH 43058

Waxahachie Plant
Waxahachie, TX 75165

^aManufacturing location was not included in product LCA.



The diagram above is representative for the manufacturing of bonded fiberglass insulation product. There are no significant process differences between locations.

1.9. Packaging

Packaging in the form of pallets was included in the analysis as a part of the overhead calculation. The weight of the other packaging materials is non-significant compared to the weight of the final product. As such, it has been excluded to reduce data collection efforts.

1.10. Transportation

The outbound transportation or distribution includes the transportation of the final product to fabrication customers by a combination of diesel semi-truck and rail. The weighted average distance from the manufacturing site to the customer is 729 km by truck and 648 km by rail.



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1.11. Product Installation

Certified R Metal Building Insulation

Several methods are used to insulate metal buildings. The usual method is to apply the insulation over the structural members (purlins and girts) and inside the exterior panels. This method generally accommodates single layer installations. Methods are also available to apply insulation between purlins so as to accommodate greater insulation thicknesses and better thermal performance.

MBI Plus

EcoTouch® Insulation for MBI Plus is applied between or over the purlins or girts when unfaced insulation is required in the installation process. In a typical double layer roof system, EcoTouch® Insulation for MBI Plus will be applied as the second layer of material between the purlins after installing a laminated layer of EcoTouch® Insulation for Certified R Metal Building Insulation over the purlins. These double layer roof systems accommodate greater insulation thicknesses and provide additional thermal performance. EcoTouch® Insulation for MBI Plus can also be used in any filled cavity insulation system that does not require the insulation to be laminated to a vapor retarder facing.

Utility Blanket Metal Building Insulation

After EcoTouch® Utility Blanket Metal Building Insulation is laminated with an appropriate facing, the insulation is typically installed in a single layer between the structural members (purlins for roofs and girts for walls) and the exterior panels. In most cases, the product is installed over and perpendicular to the structural members with the facing towards the interior of the structure. All seams should be sealed to help maintain a continuous vapor retarder. EcoTouch® Utility Blanket Metal Building Insulation can also be used over the purlins in roof systems that utilize a primary layer of insulation between the purlins.

1.12. Use

Insulation is a passive device that requires no extra utilities or maintenance to operate over its useful life.

1.13. Reference Service Life and Estimated Building Service Life

The product is assumed to remain in service for the life of the building, 75 years.

1.14. Reuse, Recycling, and Energy Recovery

Metal Building Insulation can be reused if remains clean and dry. Recycling programs do not currently exist for fiberglass insulation. Small amounts of organic material are available from the binder chemicals and could be recovered for energy.

1.15. Disposal

It was assumed that all materials removed from the decommissioning of a building were taken to a local construction waste landfill, using 100 miles as the average distance to landfill.

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2. Life Cycle Assessment Background Information

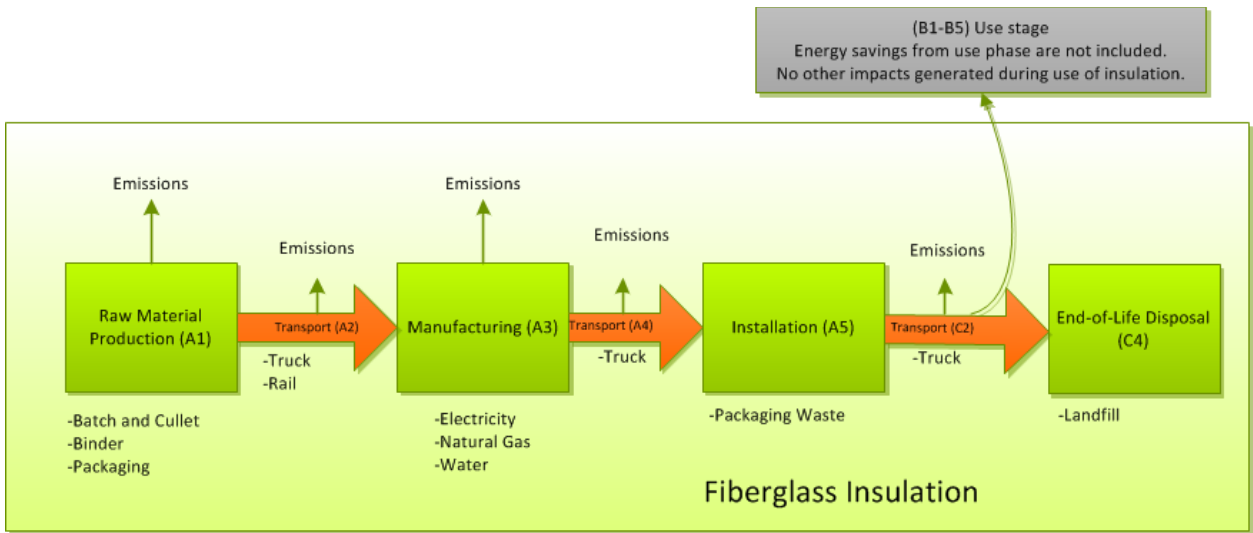
2.1. Functional Unit

Table 5. Functional Unit

NAME	CERTIFIED R	MBI PLUS	UTILITY BLANKET	UNIT
Functional Unit	1 m² of insulation material with a thickness that gives an average thermal resistance R _{Si} =1 m²KW			
Mass	4.40E-01	4.80E-01	5.90E-01	kg
Thickness to achieve Functional Unit	4.60E-02	4.69E-02	4.10E-02	m

2.2. System Boundary

This EPD is cradle-to-installation with end-of-life. Details of the system boundaries may be found in the diagram below.



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2.3. Estimates and Assumptions

Since insulation is a passive device, it is assumed that no utility source or maintenance is needed during the use stage.

2.4. Cut-off Criteria

This LCA is in compliance with the cutoff criteria specified in the PCR. Due to the long lifetime of equipment, capital goods and infrastructure flows were excluded as having a negligible impact on the conclusions of the LCA.

Packaging in the form of pallets was included in the analysis as a part of the overhead calculation. The weight of the packaging materials is not significant compared to the weight of the final product, and previous studies of insulation products have shown the impact from the plastic packaging is not significant to the overall result. As such, it has been excluded to reduce data collection efforts.

2.5. Data Sources

Primary manufacturing data was collected from the included manufacturing locations listed in the Manufacturing section. Secondary data primarily references the ecoinvent 3.5 database and the US-LCI database.

2.6. Data Quality

Primary data was based on measured and calculated data from the North American Owens Corning plants which produced all of the product in calendar year 2014. It meets requirements for completeness along with temporal, geographical and technological representativeness. Background data was taken from the ecoinvent and US-LCI databases which are on the approved database list in the PCR.

2.7. Period under Review

Owens Corning manufacturing data is for calendar year 2014. Ecoinvent datasets were valid through 2018.

2.8. Allocation

Where it was not possible to avoid allocation, allocation was made based on production machine hours. Due to the variety of products produced at these plants, this method of allocation was deemed more appropriate by the plant engineers than allocation by product mass which is suggested by the PCR.

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3. Life Cycle Assessment Scenarios

For part of the transport to the building site, some products included truck and rail components as noted in Table 6.

Table 6. Transport to the building site (A4)

NAME	CERTIFIED R	MBI PLUS	UTILITY BLANKET	UNIT
Fuel type	Low-sulfur diesel	Low-sulfur diesel	Low-sulfur diesel	
Liters of fuel	1.97E-03 [5.56E-04] ^R	2.14E-03	2.64E-03 [7.45E-04] ^R	l/100km
Vehicle type	EURO3, 16-32 metric ton lorry [US diesel freight train] ^R	EURO3, 16-32 metric ton lorry	EURO3, 16-32 metric ton lorry [US diesel freight train] ^R	
Transport distance	9.64E+02 [2.65E+02] ^R	1.13E+03	9.67E+02 [2.43E+02] ^R	km
Capacity utilization (including empty runs, mass based)	50	50	50	%
Gross density of products transported	9.47E+00	1.03E+01	1.42E+01	kg/m ³
Weight of products transported (if gross density not reported)	4.40E-01	4.80E-01	5.90E-01	kg
Volume of products transported (if gross density not reported)	4.65E-02	4.65E-02	4.16E-02	m ³
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	1	1	1	-

^R[Rail component of transport]

Table 7. Installation into the building (A5)

NAME	CERTIFIED R	MBI PLUS	UTILITY BLANKET	UNIT
Ancillary materials	0.00E+00	0.00E+00	0.00E+00	kg
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	0.00E+00	0.00E+00	0.00E+00	m ³
Other resources	0.00E+00	0.00E+00	0.00E+00	kg
Electricity consumption	0.00E+00	0.00E+00	0.00E+00	kWh
Other energy carriers	0.00E+00	0.00E+00	0.00E+00	MJ
Product loss per functional unit	0.00E+00	0.00E+00	0.00E+00	kg
Waste materials at the construction site before waste processing, generated by product installation	5.80E-06	2.67E-07	6.70E-06	kg
Output materials resulting from on-site waste processing (specified by route; e.g. for recycling, energy recovery and/or disposal)	0.00E+00	0.00E+00	0.00E+00	kg
Biogenic carbon contained in packaging	0.00E+00	0.00E+00	0.00E+00	kg CO ₂
Direct emissions to ambient air, soil and water	0.00E+00	0.00E+00	0.00E+00	kg
VOC content	None detected	None detected	None detected	µg/m ³



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Table 8. Reference Service Life

NAME	CERTIFIED R	MBI PLUS	UTILITY BLANKET	UNIT
RSL	75	75	75	years
Declared product properties (at the gate) and finishes, etc.	Insulation properties require installation into a building			
Design application parameters (if instructed by the manufacturer), including references to the appropriate practices and application codes)	Install per product instructions			
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Will meet R-value. Installer should install per manufacturer instructions			
Outdoor environment, (if relevant for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	Not applicable – indoor application			
Indoor environment, (if relevant for indoor applications), e.g. temperature, moisture, chemical exposure)	Product should be kept dry			
Use conditions, e.g. frequency of use, mechanical exposure.	Insulation is a passive product which is not used directly			
Maintenance, e.g. required frequency, type and quality of replacement components	None needed			

Table 9. End of life (C2)

NAME		CERTIFIED R	MBI PLUS	UTILITY BLANKET	UNIT
Although reuse and recycling of fiberglass insulation at its end of life are possible, there are no formal programs for collection and transport. It is assumed that all product is sent to landfill at end of life.					
Collection process (specified by type)	Collected separately	0.00E+00	0.00E+00	0.00E+00	kg
	Collected with mixed construction waste	4.40E-01	4.80E-01	5.90E-01	kg
Recovery (specified by type)	Reuse	0.00E+00	0.00E+00	0.00E+00	kg
	Recycling	0.00E+00	0.00E+00	0.00E+00	kg
	Landfill	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration with energy recovery	0.00E+00	0.00E+00	0.00E+00	kg
	Energy conversion efficiency rate	0.00E+00	0.00E+00	0.00E+00	
Disposal (specified by type)	Product or material for final deposition	0.00E+00	0.00E+00	0.00E+00	kg
Removals of biogenic carbon (excluding packaging)		0.00E+00	0.00E+00	0.00E+00	kg CO ₂



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Table 10. End of life (C4)

NAME		CERTIFIED R	MBI PLUS	UTILITY BLANKET	UNIT
Although reuse and recycling of fiberglass insulation at its end of life are possible, there are no formal programs for collection and transport. It is assumed that all product is sent to landfill at end of life.					
Collection process (specified by type)	Collected separately	0.00E+00	0.00E+00	0.00E+00	kg
	Collected with mixed construction waste	0.00E+00	0.00E+00	0.00E+00	kg
Recovery (specified by type)	Reuse	0.00E+00	0.00E+00	0.00E+00	kg
	Recycling	0.00E+00	0.00E+00	0.00E+00	kg
	Landfill	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration with energy recovery	0.00E+00	0.00E+00	0.00E+00	kg
	Energy conversion efficiency rate	0.00E+00	0.00E+00	0.00E+00	
Disposal (specified by type)	Product or material for final deposition	4.40E-01	4.80E-01	5.90E-01	kg
Removals of biogenic carbon (excluding packaging)		0.00E+00	0.00E+00	0.00E+00	kg CO ₂

4. Life Cycle Assessment Results

Table 11. Description of the system boundary modules

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
EPD Type	X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X	MND

MND – Module Not Declared



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EcoTouch® Insulation for Metal Building

EcoTouch® Certified R Metal Building Insulation, EcoTouch® Insulation for MBI Plus,
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According to ISO 14025,
EN 15804 and ISO 21930:2017

4.1. Life Cycle Impact Assessment Results

Table 12. North American Impact Assessment Results for 1 m² EcoTouch® Certified R Metal Building Insulation at R_{SI} = 1

TRACI v2.1	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO ₂ eq]	1.31E+00	7.66E-02	2.70E-05	MND	MND	1.39E-02	MND	3.29E-03
ODP [kg CFC-11 eq]	8.70E-08	1.86E-08	2.53E-12	MND	MND	3.98E-09	MND	1.24E-09
AP [kg SO ₂ eq]	4.41E-03	5.02E-04	2.79E-07	MND	MND	9.26E-05	MND	2.39E-05
EP [kg N eq]	6.91E-03	1.01E-04	5.81E-07	MND	MND	1.88E-05	MND	3.63E-06
POCP [kg O ₃ eq]	4.82E-02	1.37E-02	8.64E-06	MND	MND	2.44E-03	MND	6.74E-04
ADP _{fossil} [MJ, LHV]	1.53E+00	1.67E-01	3.37E-05	MND	MND	3.62E-02	MND	1.19E-02

[GWP – Global Warming Potential, ODP – Ozone Depletion Potential, AP – Acidification Potential, EP – Eutrophication Potential, POCP – Smog Formation Potential, ADP_{fossil} – Abiotic Depletion Potential of Non-renewable (fossil) energy resources]

Table 13. EU Impact Assessment Results for 1 m² EcoTouch® Certified R Metal Building Insulation at R_{SI} = 1

CML v4.7	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO ₂ eq]	1.33E+00	7.69E-02	2.63E-05	MND	MND	1.40E-02	MND	3.34E-03
ODP [kg CFC-11 eq]	6.86E-08	1.40E-08	2.04E-12	MND	MND	3.00E-09	MND	9.26E-10
AP [kg SO ₂ eq]	4.26E-03	4.11E-04	2.13E-07	MND	MND	7.71E-05	MND	1.93E-05
EP [kg PO ₄ ⁻³ eq]	3.18E-03	9.98E-05	2.42E-07	MND	MND	1.80E-05	MND	4.39E-06
POCP [kg ethene eq]	2.57E-04	1.47E-05	7.45E-09	MND	MND	3.03E-06	MND	7.22E-07
ADP _{element} [kg Sb-eq]	1.06E-06	2.18E-07	3.44E-11	MND	MND	3.74E-08	MND	3.38E-09
ADP _{fossil} [MJ, LHV]	1.46E+01	1.16E+00	2.45E-04	MND	MND	2.48E-01	MND	8.03E-02

[GWP – Global Warming Potential, ODP – Depletion potential of the stratospheric ozone layer, AP – Acidification Potential of soil and water, EP – Eutrophication Potential, POCP – Photochemical Oxidant Creation Potential, ADP_{element} – Abiotic depletion potential (ADP-Elements) for non-fossil resources, ADP_{fossil} – Abiotic Depletion Potential (ADP-fossil fuels) for fossil resources]

Table 14. North American Impact Assessment Results for 1 m² EcoTouch® Insulation for MBI Plus at R_{SI} = 1

TRACI v2.1	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO ₂ eq]	1.65E+00	9.14E-02	1.24E-06	MND	MND	1.28E-02	MND	2.52E-03
ODP [kg CFC-11 eq]	1.06E-07	2.26E-08	1.16E-13	MND	MND	3.15E-09	MND	1.22E-09
AP [kg SO ₂ eq]	5.68E-03	5.69E-04	1.28E-08	MND	MND	7.96E-05	MND	2.21E-05
EP [kg N eq]	9.49E-03	1.14E-04	2.68E-08	MND	MND	1.59E-05	MND	4.72E-06
POCP [kg O ₃ eq]	5.50E-02	1.54E-02	3.98E-07	MND	MND	2.16E-03	MND	5.25E-04
ADP _{fossil} [MJ, LHV]	1.74E+00	2.03E-01	1.55E-06	MND	MND	2.84E-02	MND	1.13E-02



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Table 15. EU Impact Assessment Results for 1 m² EcoTouch® Insulation for MBI Plus at R_{SI} = 1

CML v4.7	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO ₂ eq]	1.67E+00	9.17E-02	1.21E-06	MND	MND	1.28E-02	MND	2.54E-03
ODP [kg CFC-11 eq]	8.47E-08	1.70E-08	9.38E-14	MND	MND	2.37E-09	MND	9.17E-10
AP [kg SO ₂ eq]	5.52E-03	4.68E-04	9.79E-09	MND	MND	6.54E-05	MND	1.92E-05
EP [kg PO ₄ ⁻³ eq]	4.32E-03	1.12E-04	1.11E-08	MND	MND	1.57E-05	MND	4.08E-06
POCP [kg ethene eq]	3.12E-04	1.70E-05	3.43E-10	MND	MND	2.38E-06	MND	9.44E-07
ADP _{element} [kg Sb-eq]	1.21E-06	2.73E-07	1.58E-12	MND	MND	3.82E-08	MND	2.86E-09
ADP _{fossil} [MJ, LHV]	1.76E+01	1.40E+00	1.13E-05	MND	MND	1.95E-01	MND	7.71E-02

Table 16. North American Impact Assessment Results for 1 m² EcoTouch® Utility Blanket Metal Building Insulation at R_{SI} = 1

TRACI v2.1	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO ₂ eq]	1.97E+00	1.04E-01	3.12E-05	MND	MND	1.87E-02	MND	4.42E-03
ODP [kg CFC-11 eq]	1.30E-07	2.52E-08	2.92E-12	MND	MND	5.35E-09	MND	1.66E-09
AP [kg SO ₂ eq]	6.56E-03	6.76E-04	3.22E-07	MND	MND	1.24E-04	MND	3.21E-05
EP [kg N eq]	1.07E-02	1.35E-04	6.71E-07	MND	MND	2.52E-05	MND	4.88E-06
POCP [kg O ₃ eq]	6.78E-02	1.85E-02	9.99E-06	MND	MND	3.28E-03	MND	9.05E-04
ADP _{fossil} [MJ, LHV]	2.24E+00	2.27E-01	3.89E-05	MND	MND	4.86E-02	MND	1.60E-02

Table 17. EU Impact Assessment Results for 1 m² EcoTouch® Utility Blanket Metal Building Insulation at R_{SI} = 1

CML v4.7	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO ₂ eq]	2.00E+00	1.04E-01	3.04E-05	MND	MND	1.88E-02	MND	4.48E-03
ODP [kg CFC-11 eq]	1.03E-07	1.90E-08	2.35E-12	MND	MND	4.02E-09	MND	1.24E-09
AP [kg SO ₂ eq]	6.38E-03	5.54E-04	2.46E-07	MND	MND	1.04E-04	MND	2.59E-05
EP [kg PO ₄ ⁻³ eq]	4.91E-03	1.34E-04	2.79E-07	MND	MND	2.42E-05	MND	5.89E-06
POCP [kg ethene eq]	3.69E-04	1.99E-05	8.60E-09	MND	MND	4.07E-06	MND	9.71E-07
ADP _{element} [kg Sb-eq]	1.53E-06	2.97E-07	3.98E-11	MND	MND	5.03E-08	MND	4.54E-09
ADP _{fossil} [MJ, LHV]	2.18E+01	1.57E+00	2.83E-04	MND	MND	3.33E-01	MND	1.08E-01



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4.2. Life Cycle Inventory Results

Table 18. Resource Use for 1 m² EcoTouch® Certified R Metal Building Insulation at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
RPR _E [MJ, LHV]	5.57E-01	1.29E-02	5.17E-06	MND	MND	2.35E-03	MND	3.69E-04
RPR _M [MJ, LHV]	6.85E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRPR _E [MJ, LHV]	1.78E+01	1.18E+00	2.50E-04	MND	MND	2.52E-01	MND	8.22E-02
NRPR _M [MJ, LHV]	2.16E-03	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
SM [kg]	3.14E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
FW [m ³]	8.21E-03	2.17E-04	-3.82E-07	MND	MND	1.06E-04	MND	9.09E-05

[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 energy used as energy carrier (fuel), NRPR_M – Non-renewable primary resources with energy content used as material, SM – Secondary materials, RSF – Renewable secondary fuels, NRSF – Non-renewable secondary fuels, RE – Recovered energy, FW – Use of net fresh water resources]

Table 19. Output Flows and Waste Categories for 1 m² EcoTouch® Certified R Metal Building Insulation at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
HWD [kg]	1.13E-05	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NHWD [kg]	4.54E-02	0.00E+00	5.80E-06	MND	MND	0.00E+00	MND	4.40E-01
HLRW [kg] or [m ³]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
ILLRW [kg] or [m ³]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
R [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00

[HWD – Hazardous waste disposed, NHWD – Non-hazardous waste disposed, HLRW – High-level radioactive waste, conditioned, to final repository, ILLRW – Intermediate- and low-level radioactive waste, conditioned, to final repository, CRU – Components for re-use, R – Materials for recycling, MER – Materials for energy recovery, EE – Exported energy]



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According to ISO 14025,
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Table 20. Carbon Emissions and Removals for 1 m² EcoTouch® Certified R Metal Building Insulation at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
BCRP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCRK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEW [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCE [kg CO ₂]	9.89E-03	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CWNR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00

[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 – Calcination Carbon Removals, CWNR – Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes]

Table 21. Resource Use for 1 m² EcoTouch® Insulation for MBI Plus at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
RPR _E [MJ, LHV]	4.98E-01	1.39E-02	2.38E-07	MND	MND	1.94E-03	MND	6.39E-04
RPR _M [MJ, LHV]	7.51E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRPR _E [MJ, LHV]	2.21E+01	1.42E+00	1.15E-05	MND	MND	1.98E-01	MND	7.81E-02
NRPR _M [MJ, LHV]	7.40E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
SM [kg]	3.45E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
FW [m ³]	8.91E-03	2.52E-04	-1.76E-08	MND	MND	3.53E-05	MND	8.15E-05

Table 22. Output Flows and Waste Categories for 1 EcoTouch® Insulation for MBI Plus at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
HWD [kg]	1.62E-05	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NHWD [kg]	3.45E-02	0.00E+00	2.67E-07	MND	MND	0.00E+00	MND	4.80E-01
HLRW [kg] or [m ³]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
ILLRW [kg] or [m ³]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
R [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00



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Table 23. Carbon Emissions and Removals for 1 m² EcoTouch® Insulation for MBI Plus at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
BCRP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCRK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEW [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCE [kg CO ₂]	1.09E-05	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CWNR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00

Table 24. Resource Use for 1 m² EcoTouch® Utility Blanket Metal Building Insulation at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
RPR _E [MJ, LHV]	8.30E-01	1.73E-02	5.98E-06	MND	MND	3.16E-03	MND	4.95E-04
RPR _M [MJ, LHV]	9.46E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRPR _E [MJ, LHV]	2.59E+01	1.59E+00	2.89E-04	MND	MND	3.38E-01	MND	1.10E-01
NRPR _M [MJ, LHV]	1.05E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
SM [kg]	4.34E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
FW [m ³]	1.16E-02	2.93E-04	-4.41E-07	MND	MND	1.43E-04	MND	1.22E-04

Table 25. Output Flows and Waste Categories for 1 m² EcoTouch® Utility Blanket Metal Building Insulation n at R_{SI} = 1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
HWD [kg]	1.76E-05	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NHWD [kg]	6.17E-02	0.00E+00	6.70E-06	MND	MND	0.00E+00	MND	5.90E-01
HLRW [kg] or [m ³]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
ILLRW [kg] or [m ³]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
R [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00



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

Table 26. Carbon Emissions and Removals for 1 m² EcoTouch® Utility Blanket Metal Building Insulation at $R_{SI} = 1$

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
BCRP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCRK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEW [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCE [kg CO ₂]	1.41E-05	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CWNR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00

4.3. Environmental Impact Values for “R” Values other than the Functional Unit

Table 27. Total impact category values for 1 m² EcoTouch® Certified R Metal Building Insulation material at various R-values

Thickness (in)	1.8	3.4	3.7	4.3	5.3	6.3	8.0	9.3
Thickness (m)	4.60E-02	8.64E-02	9.40E-02	1.09E-01	1.35E-01	1.60E-01	2.03E-01	2.36E-01
R_{SI} m² K/W	1.00	1.76	1.94	2.29	2.82	3.34	4.40	5.28
GWP 100 [kg CO ₂ eq]	1.40E+00	2.63E+00	2.87E+00	3.33E+00	4.11E+00	4.88E+00	6.20E+00	7.21E+00
ODP [kg CFC-11 eq]	1.11E-07	2.08E-07	2.26E-07	2.63E-07	3.24E-07	3.86E-07	4.90E-07	5.69E-07
AP [kg SO ₂ eq]	5.03E-03	9.44E-03	1.03E-02	1.19E-02	1.47E-02	1.75E-02	2.22E-02	2.58E-02
EP [kg N eq]	7.04E-03	1.32E-02	1.44E-02	1.67E-02	2.06E-02	2.45E-02	3.11E-02	3.61E-02
POCP [kg O ₃ eq]	6.50E-02	1.22E-01	1.33E-01	1.54E-01	1.90E-01	2.26E-01	2.87E-01	3.34E-01
ADP _{fossil} [MJ, LHV]	1.75E+00	3.28E+00	3.57E+00	4.15E+00	5.11E+00	6.08E+00	7.72E+00	8.97E+00

Table 28. Total impact category values for 1 m² EcoTouch® Insulation for MBI Plus material at various R-values

Thickness (in)	1.9	3.4	3.7	4.3	5.3	6.3	8.0	9.0
Thickness (m)	4.69E-02	8.64E-02	9.40E-02	1.09E-01	1.35E-01	1.60E-01	2.03E-01	2.29E-01
R_{SI} m² K/W	1.00	1.84	2.00	2.33	2.87	6.41	4.34	4.88
GWP 100 [kg CO ₂ eq]	1.76E+00	3.23E+00	3.52E+00	4.09E+00	5.04E+00	5.99E+00	7.61E+00	8.56E+00
ODP [kg CFC-11 eq]	1.33E-07	2.45E-07	2.67E-07	3.10E-07	3.82E-07	4.54E-07	5.76E-07	6.48E-07
AP [kg SO ₂ eq]	6.35E-03	1.17E-02	1.27E-02	1.48E-02	1.82E-02	2.17E-02	2.75E-02	3.10E-02
EP [kg N eq]	9.62E-03	1.77E-02	1.93E-02	2.24E-02	2.76E-02	3.28E-02	4.17E-02	4.69E-02
POCP [kg O ₃ eq]	7.31E-02	1.35E-01	1.47E-01	1.70E-01	2.10E-01	2.49E-01	3.17E-01	3.56E-01
ADP _{fossil} [MJ, LHV]	1.98E+00	3.64E+00	3.96E+00	4.61E+00	5.68E+00	6.75E+00	8.57E+00	9.64E+00



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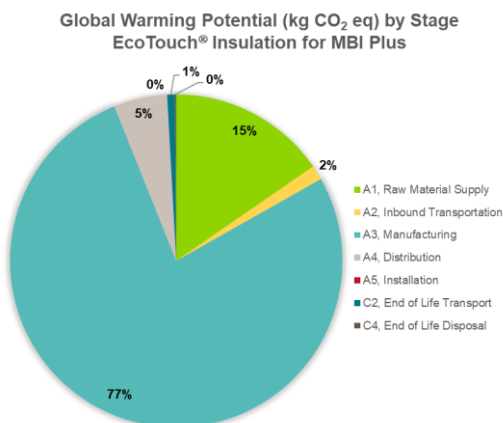
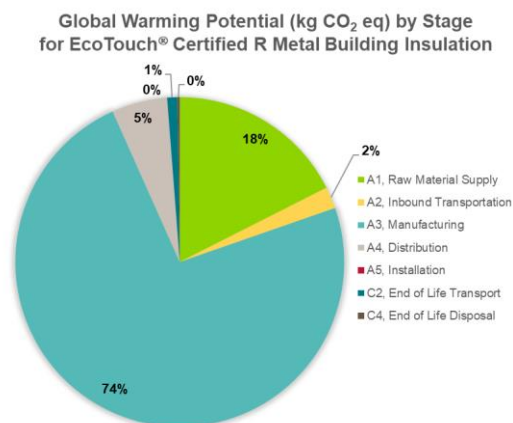
According to ISO 14025,
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Table 29. Total impact category values for 1 m² EcoTouch® Utility Blanket Metal Building Insulation material at various R-values

Thickness (in)	1.6	2.0
Thickness (m)	4.10E-02	5.08E-02
R _{SI} m² K/W	1.00	1.23
GWP 100 [kg CO ₂ eq]	2.10E+00	2.60E+00
ODP [kg CFC-11 eq]	1.62E-07	2.01E-07
AP [kg SO ₂ eq]	7.39E-03	9.16E-03
EP [kg N eq]	1.09E-02	1.35E-02
POCP [kg O ₃ eq]	9.04E-02	1.12E-01
ADP _{fossil} [MJ, LHV]	2.54E+00	3.14E+00

5. LCA Interpretation

The manufacturing stage drives most of the environmental impact categories, although ozone depletion potential and fossil fuel depletion are also highly influenced by the raw materials stage. Manufacturing impacts are primarily driven by energy use (electricity and natural gas) for glass melting.



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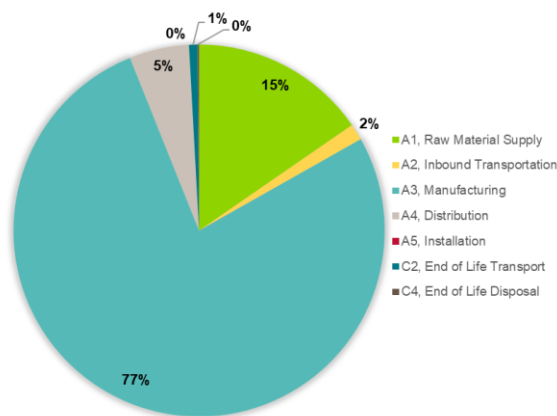


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Global Warming Potential (kg CO₂ eq) by Stage
for EcoTouch® Utility Blanket Metal Building Insulation



6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

Depending on the plant facility, the following environmental equipment may be used to control emissions: electrostatic precipitator, incinerator, scrubber and/or fabric filter (baghouse).

6.2. Environment and Health During Installation

This product is considered an article. 29 CFR 1910.1200(c) definition of an article is as follows: "Article" 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.

Manufactured articles which meet the definition of the Canadian Hazardous Products Act (any article that is formed to a specific shape or design during manufacture, the intended use of which when in that form is dependent in whole or in part on its shape or design, and that, when being installed, if the intended use of the article requires it to be installed, and under normal conditions of use, will not release or otherwise cause an individual to be exposed to a hazardous product) are not regulated by the Canadian Hazardous Products Regulation SOR/2015-17.

The product's Safe Use Instruction Sheet includes exposure guidelines, engineering controls and individual protection measures. The following individual protection measures can be considered:

- Eye/face protection – Wear safety glasses with side shields (or goggles)
- Skin and body protection – Wear protective gloves, long-sleeved shirt and long pants
- Respiratory protection – When facing airborne/dust concentration above the exposure limits, use an appropriate certified respirator. A properly fitted NIOSH approved disposable N 95 type dust respirator or better is recommended.



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- General hygiene considerations – Wash hands before breaks and immediately after handling products. Remove and wash contaminated clothing before re-use.

6.3. Extraordinary Effects

No extraordinary effects or environmental impacts are expected due to destruction of the product by fire, water or mechanical means.

6.4. Delayed Emissions

No delayed emissions are expected from this product.

6.5. Environmental Activities and Certifications

Certifications and Sustainable Features

- Certified by SCS Global Services to contain a minimum of 65% recycled glass content, 18% pre-consumer and 47% post-consumer.
- GREENGUARD Gold: Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage.
- Declare (Unfaced EcoTouch® Insulation)
- Health Product Declaration (EcoTouch® PINK® Fiberglas™ Insulation Unfaced)



Declare.



Made with Wind Energy and Reduced Carbon Footprint

Metal Building Insulation products are available upon request in the US with SCS Global Services certification for “Made with Wind Energy” and “Reduced Carbon Footprint”. The updated environmental impacts for the products by matching the amount of electricity used in manufacturing with wind energy produced as part of Owens Corning’s Power Purchase Agreement were calculated and can be found in the table below. The values for life cycle stages A1-A3 below reflect calculations based on the electricity impacts per the SimaPro implementation of the ecoinvent versions of the NERC power grids. Certificates published on the SCS Global Services website are based on calculations using updated NERC and eGrid power grid data and updated manufacturing production data per the certification guideline, so variation between the values is expected.



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TRACI v2.1	Certified R Metal Building Insulation			MBI Plus			Utility Blanket Metal Building Insulation		
	A1-A3 Standard Product	A1-A3 Certified Product	% Change	A1-A3 Standard Product	A1-A3 Certified Product	% Change	A1-A3 Standard Product	A1-A3 Certified Product	% Change
GWP 100 [kg CO ₂ eq]	1.31E+00	6.61E-01	-49%	1.65E+00	7.73E-01	-53%	1.97E+00	9.47E-01	-52%
ODP [kg CFC-11 eq]	8.70E-08	3.80E-08	-56%	1.06E-07	4.00E-08	-62%	1.30E-07	5.29E-08	-59%
AP [kg SO ₂ eq]	4.41E-03	2.19E-03	-50%	5.68E-03	2.40E-03	-58%	6.56E-03	2.99E-03	-54%
EP [kg N eq]	6.91E-03	1.36E-03	-80%	9.49E-03	1.43E-03	-85%	1.07E-02	1.86E-03	-83%
POCP [kg O ₃ eq]	4.82E-02	3.27E-02	-32%	5.50E-02	3.29E-02	-40%	6.78E-02	4.31E-02	-36%
ADP _{fossil} [MJ, LHV]	1.53E+00	1.14E+00	-25%	1.74E+00	1.37E+00	-21%	2.24E+00	1.67E+00	-26%

6.6. Further Information

Additional information may be found at www.owenscorning.com.

7. References

Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL Environment (December 12, 2018, version 3.2)

Part B: Mechanical, Specialty, Thermal and Acoustic Insulation EPD Requirements, UL Environment, UL 10010-03 (September 3, 2019, version 1.0)

ISO 14025: 2006, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 14040: 2006, Environmental management – Life cycle assessment – Principles and framework

ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines

ISO 14046:2013, Environmental management- Water footprint- Principles, requirements and guidelines

ISO 15804:2012+A1:2013, 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

EN 15804, Sustainability of construction works, Environmental product declarations, Core rules for the product category of construction products

ASTM C665-17, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

ASTM C177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot-Plate Apparatus

ASTM C167, Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations

ASTM C518, Standard Test Method for Stead-State Thermal Transmission Properties by Means of the heat Flow



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Meter Apparatus

ASTM E136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750C

ASTM C1104/C1104M, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation

ASTM C1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings

ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM C1304, Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials

ASTM E96, Standard Test Methods for Water Vapor Transmission of Materials

UL723, Standard for Test for Surface Burning Characteristics of Building Materials

CAN/ULC S102, Standard Method for Test of Surface Burning Characteristics of Building Materials and Assemblies

CAN/ULC S114, Standard Method of Test for Determination of Non-Combustibility in Building Materials

SCS Global Services Guideline for Claims of "Made with Renewable Energy" or "Reduced Carbon Footprint" Based on Power Purchase Agreement, February 2018

