Environmental Product Declaration

EcoTouch® PINK® FIBERGLAS™ Batt & Roll Insulation - Unfaced and Faced

Owens Corning EcoTouch® Insulation with PureFiber® Technology enhances comfort, energy savings and sustainability in new and existing structures.

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

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

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ENVIRONMENTAL PRODUCT DECLARATION

EcoTouch® PINK® Fiberglas™ Batt & Roll Insulation – Unfaced and Faced

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 60611 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	4788548937.101.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	1 m^2 insulation at RSI=1
REFERENCE PCR AND VERSION NUMBER	UL Part B: Building Envelope Thermal Insulation EPD Requirements, UL 10010-1
DESCRIPTION OF PRODUCT APPLICATION/USE	EcoTouch® Unfaced and Faced Insulation for use in wall, floor, roofing and ceiling applications for residential and commercial installations.
PRODUCT RSL DESCRIPTION (IF APPL.)	75 years
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	September 19, 2018
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-specific
RANGE OF DATASET VARIABILITY	NA
EPD SCOPE	Cradle to gate with options (A4, A5, C2, C4)
YEAR(S) OF REPORTED PRIMARY DATA	2016
LCA SOFTWARE & VERSION NUMBER	SimaPro 8.4.0.0
LCI DATABASE(S) & VERSION NUMBER	ecoinvent 3.3
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1 v1.04; CML I-A baseline v4.2; Cumulative Energy Demand (CED) v1.09

The PCR review was conducted by:	PCR Review Panel Chair: Thomas Gloria, PhD t.gloria@industrial-ecology.com
This declaration was independently verified in accordance with ISO 14025:2006 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 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.

1. Product Definition and Information

1.1. Description of Company

Founded in 1938, Owens Corning is a leader in insulation, roofing and fiberglass composites. It has a global presence with 19,000 people in 37 countries. Product covered by this Environmental Product Declaration was produced in the following locations:

Delmar Plant Fuera Bush, NY 12067	Edmonton Plant Edmonton, AB, Canada T6S1A1
Fairburn Plant Fairburn, GA 30123	Kansas City Plant Kansas City, KS, USA 66115
Newark Plant Newark, OH 43058	Santa Clara Plant Santa Clara, CA 95050
Toronto Plant Scarborough, ON, Canada M1V1Z5	Waxahachie Plant Waxahachie, TX 75165

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

1.2. Product Description

Product Identification

EcoTouch® PINK® Fiberglas™ Insulation with PureFiber® Technology is a preformed, flexible blanket insulation. It is produced in R-values from 11 to 49, with thicknesses ranging from 3½ inches to 14 inches. It is available unfaced, or faced with a kraft, foil, foil-scrim-kraft or polypropylene-scrim-kraft vapor retarder. Insulation with facing typically includes stapling flanges.

Product Specification

EcoTouch® PINK® Fiberglas™ Insulation with PureFiber® Technology

	Width		Length		Thickness	R-Value
Metal Frame Construction	16” (406mm)	24” (609mm)	48” (1,219mm)	96” (2,438mm)	3 ½” (89mm)	11
	16” (406mm)	24” (609mm)	48” (1,219mm	96” (2,438mm)	3 ½” (89mm)	13
	16” (406mm)	24” (609mm)		96” (2,438mm)	3 ½” (89mm)	15
	16” (406mm)	24” (609mm)		96” (2,438mm)	5 ½” (139mm)	21
Wood Frame Construction Walls	11” (406mm)		93” (2,362mm)	105” (2,667mm)	3 ½” (89mm)	11
	11” (406mm)		93” (2,362mm)		3 ½” (89mm)	13
	11” (406mm)			105” (2,667mm)	3 ½” (89mm)	15
	11” (406mm)		93” (2,362mm)		6 ¼” (159mm)	19*

EcoTouch® PINK® Fiberglas™ Batt & Roll Insulation – Unfaced and Faced

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

	Width			Length		Thickness	R-Value
	15" (381mm)			48" (1,219mm)		9 ½" (241mm)	30
	15" (381mm)	23" (584mm)		48" (1,219mm)	93" (2,362mm)	3 ½" (89mm)	11
	15" (381mm)	23" (584mm)		48" (1,219mm)	93" (2,362mm)	3 ½" (89mm)	13
	15" (381mm)	23" (584mm)			93" (2,362mm)	3 ½" (89mm)	15
	15" (381mm)	19 ¼"	23" (584mm)	48" (1,219mm)	93" (2,362mm)	6 ¼" (159mm)	19*
	15" (381mm)	23" (584mm)			93" (2,362mm)	5 ½" (139mm)	20
	15" (381mm)	23" (584mm)			93" (2,362mm)	5 ½" (139mm)	21
	15" (381mm)	23" (584mm)			93" (2,362mm)	5 ½" (139mm)	21
	23" (381mm)	23" (584mm)			93" (2,362mm)	5 ½" (139mm)	21
Floor/Ceiling	15" (381mm)	19 ¼"	23" (584mm)	48" (1,219mm)	93" (2,362mm)	6 ¼" (159mm)	19
	15" (381mm)	23" (584mm)		48" (1,219mm)		6 ¾" (171mm)	22
	15" (381mm)	23" (584mm)		48" (1,219mm)		8" (203mm)	25
	15 ½" (394mm)	23 ¾" (603mm)		48" (1,219mm)		8 ¼" (209mm)	30C
	16" (406mm)	19 ¼"	24" (609mm)	48" (1,219mm)		9 ½" (241mm)	30
	15 ½" (394mm)	23 ¾" (603mm)		48" (1,219mm)		10 ¼" (260mm)	38C
	16" (406mm)	24" (609mm)		48" (1,219mm)		12" (305mm)	38
	16" (406mm)	24" (609mm)		48" (1,219mm)		14" (356mm)	49

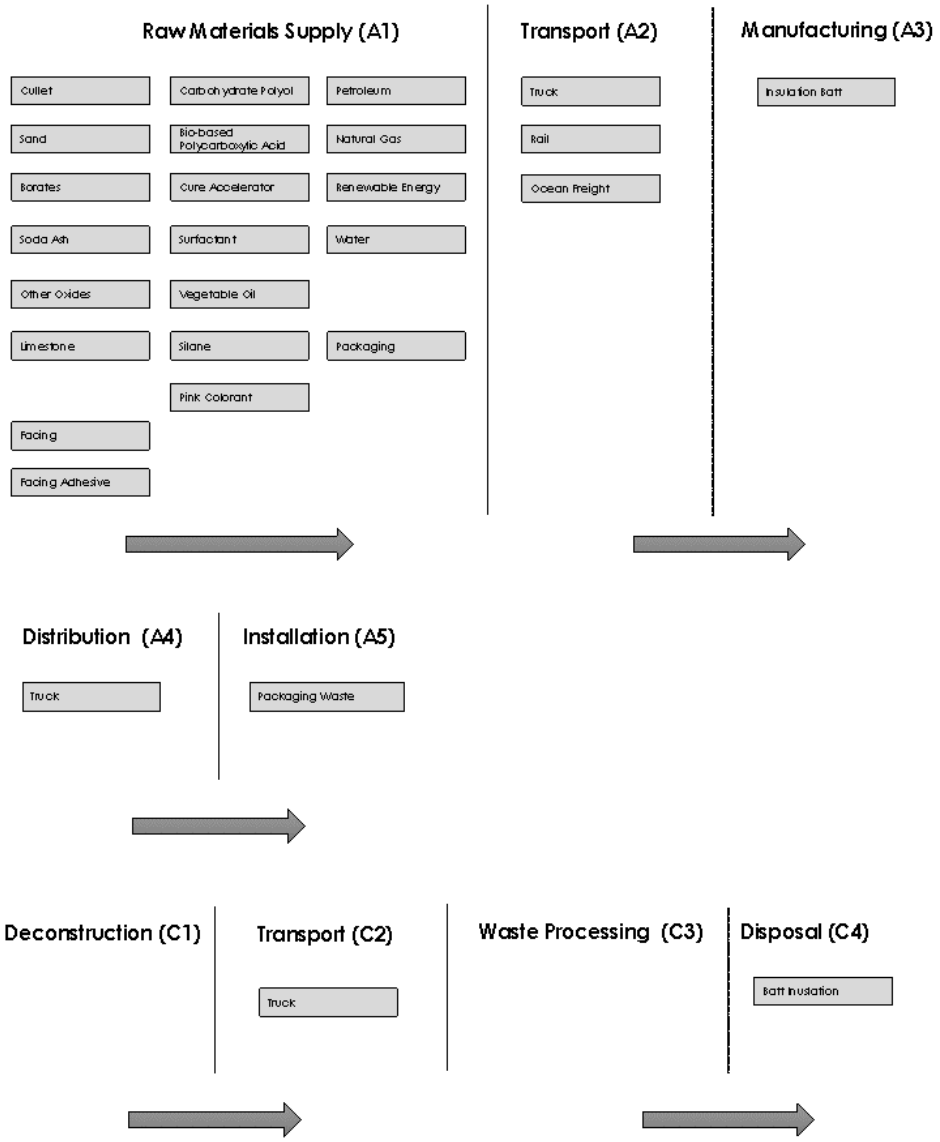
*Delivers R18 value when installed in 5.5" deep cavity.

Thermal resistance (R-) values shown in the table above were determined in accordance with ASTM C518.

PROPERTY (UNIT)	TEST	VALUE
Surface Burning Characteristics* (flame spread / smoke developed) Unfaced Kraft faced Foil faced FSK faced PSK faced	ASTM E84 / UL723	 25 / 50 NR / NR 75 / 150 25 / 50 25 / 50
Critical Radiant Flux (W/cm2)	ASTM E970	>0.12
Water Vapor Permeance (perms) Kraft faced Foil faced FSK faced PSK faced	ASTM E96	 1.0 0.5 0.02 0.02
Water Vapor Sorption (by weight)	ASTM C1104	<5%
Odor Emission	ASTM C1304	Pass
Corrosion Resistance	ASTM C665, part 13.8	Pass
Fungi Resistance	ASTM C1338	Pass

*The surface burning characteristics of EcoTouch® Insulation were derived from products tested in accordance with ASTM E84. This standard is used to measure and describe the properties of products in response to heat and flame under controlled laboratory conditions, and should not be used to describe or approve the fire hazard of materials under actual fire conditions. However, the results of these tests may be used as elements of a fire-risk assessment that takes into account all of the factors pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest (5) rating.

Flow Diagram



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

EcoTouch® Insulation can be used in a wide range of exterior wall, floor roofing and ceiling applications for residential and commercial installations. EcoTouch® Insulation is produced in a wide range of R-values and thicknesses with excellent thermal control. The R30C and R38C for use in the USA and R28 and R31 as used in Canada provide excellent thermal performance in the limited space of cathedral ceilings. EcoTouch® Insulation enhances interior noise control by improving Sound Transmission Class (STC) of walls and floor/ceiling assemblies.

If a vapor retarder is required, EcoTouch® Insulation is available with kraft, foil, FSK (foil-scrim-kraft) or PSK (polypropylene-scrim-kraft) facings.

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, packaging materials 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® Insulation products are manufactured in accordance with ASTM C665
- Classified non-combustible when tested in accordance with ASTM E136
- Unfaced EcoTouch® PINK® Fiberglas™ insulation is acceptable for use in ICC building construction types I through V; Faced EcoTouch® insulation is acceptable for use in ICC building construction types III, IV and V.
- Certified to meet California Code of Regulations, Title 24, Chapter 12-13, Article 3, “Standards for Insulating Material”

1.6. Properties of Declared Product as Delivered

EcoTouch® Insulation is delivered to the site of installation in compression packaged batts, blankets and rolls. Once removed from the packaging and installed, the product will recover the needed thickness to deliver the advertised R-value.

1.7. Material Composition

EcoTouch® Insulation consists of two major components, the fiberglass and the binder system. The fiberglass is made from various inorganic minerals, which are referred to as batch chemicals. The binder system consists of organic chemicals.

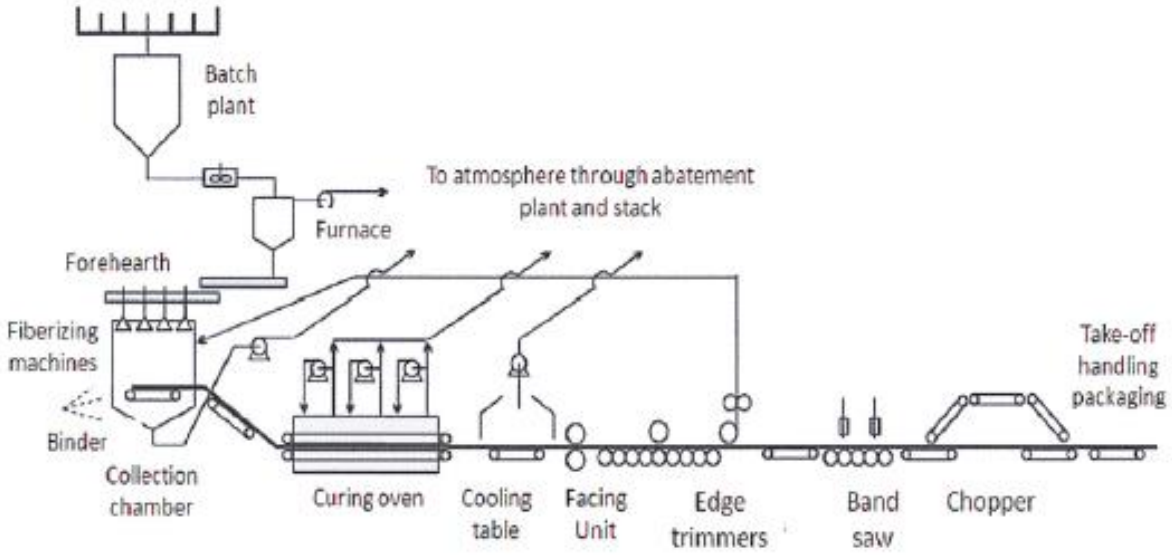
MATERIALS	FUNCTION	QUANTITY (% BY MASS)
Cullet	Glass Batch	25-75%
Sand	Glass Batch	8-25%
Borates	Glass Batch	10-30%
Soda Ash	Glass Batch	0.5-6%
Other Oxides	Glass Batch	1-2%
Limestone	Glass Batch	0-5%
Carbohydrate Polyol	Binder	2-10%
Bio-Based Polycarboxylic Acid	Binder	1-5%
Cure Accelerator	Binder	0.2-1%
Surfactant	Binder	0-0.1%
Vegetable Oil	Binder	0-3.5%
Silane	Binder	0.03-0.1%
Pink Colorant	Binder	0.1-0.2%

1.8. Manufacturing

Owens Corning North American Insulation Manufacturing Locations can be found across the United States and Canada.

Delmar Plant Fuera Bush, NY 12067	Edmonton Plant Edmonton, AB, Canada T6S1A1
Fairburn Plant Fairburn, GA 30123	Kansas City Plant Kansas City, KS, USA 66115
Newark Plant[a] Newark, OH 43058	Santa Clara Plant Santa Clara, CA 95050
Toronto Plant Scarborough, ON, Canada M1V1Z5	Waxahachie Plant[a] Waxahachie, TX 75165

[a] Manufacturing location was not included in LCA for EcoTouch® insulation



The diagram above is representative for the manufacturing of bonded fiberglass insulation product such as a batt or roll. There are no significant process differences between locations.

1.9. Packaging

EcoTouch® Insulation is compression packaged in exclusive SpaceSaver™ packaging. Fiberglass insulation batts are packaged in copolymer poylethylene bags. All batts in rolls or continuous rolls are evenly rolled and packaged individually for unitizing. The rolls are unitized in a SpaceSaver™ sleeve made from polypropylene. Some products include a kraft paper overwrap. Per the PCR regional packaging scenarios, the following dispositions are assumed:

Country/Region	Material Type	Recycling Rate	Landfill Rate	Incineration Rate
Canada	Plastics	78%	22%	0%
	Other	20%	80%	0%
United States	Plastics	15%	68%	17%
	Pulp (cardboard, paper)	75%	20%	5%

Due to the small amount of packaging used, alternate packaging scenarios (100% for each disposal method) only show a 2% increase in GWP for the 100% incineration rate scenario, no change for 100% recycling and a 4-8% increase in the impact indicators for 100% landfill.

1.10. Transportation

The product is transported from the manufacturing facility by diesel semi-truck. Weighted average distance from the manufacturing facility to the building site is 547 km.

1.11. Product Installation

EcoTouch® Insulation is easy to handle and install. Sized for installation in either wood or metal frame construction, unfaced insulation is friction fit into place. Faced insulation may be either friction fit or stapled into place. Trimming and fabrication can be done with a utility knife and can be cut to fit into odd-shaped cavities and small spaces. With less dust than other fiberglass insulation products, EcoTouch® Insulation has excellent stiffness and recovery characteristics.

Between Wood Studs/Rafters

EcoTouch® Unfaced Insulation can be friction-fit between studs after the cover material has been installed on one side of the cavity. For friction fit applications where the insulation does not fit the depth of the cavity, there is no cover material or cavity heights exceed 8', supplemental support such as wire or metal straps should be used to hold insulation in place.

With EcoTouch® Faced Insulation which includes stapling flanges, the flanges can be stapled to either the face or side of the stud, or left unfolded when installing via friction fit. Care should be taken to prevent gaping or "fishmouthing" of the flanges when stapled. Any tears to the facing should be repaired with the appropriate tape.

Cathedral ceiling products are intended to be friction-fit between rafters. Cathedral ceiling insulation when installed per manufacturer's instructions is designed to provide a minimum of 1" ventilation passageway between the roof deck and insulation.

Between Metal Studs

For metal studs, EcoTouch® Insulation can be friction-fit in place until the interior finish is applied. For applications where extra support is desired, or when applied in heights exceeding 8', supplementary support should be provided to hold the product in place until the interior finish can be applied. For faced insulation, any tears to the facing should be repaired with the appropriate tape.

Furring Strips

EcoTouch® Insulation can be applied between furring strips, hat channels, or Z-shaped furring in areas where a finished surface will be installed. Contact furring strip manufacturer for appropriate fastening system. NOTE: in applications where the thickness of the insulation exceeds the depth of the space between the furring strips, the insulation will be compressed and experience some reduction in R-value. For faced insulation, any tears to the facing should be repaired with the appropriate tape.

Exposed Masonry Walls

Flame Spread 25 insulation can be applied by impaling on stick pins or other similar attachments and then affixing a locking washer on the pin to hold the insulation in place. Caps to cover the ends of the pins should be specified for areas where people may come into contact with them. Any tears to the facing should be repaired with the appropriate tape.

Under Roof Decks

Flame Spread 25 insulation may be wired, pinned or stapled into position. Consult an insulation contractor for preferred installation methods. Be sure to follow the stick pin manufacturer's recommendations in regard to surface prepartion and attachment of the fastener to the wall and under roof decks. For wall and under roof deck applications, the minimum number of stick pins and the placement needed for Flame Spread 25 insulation batts and blankets can be found in the manufacturer's installation instructions.

1.12. Use

Insulation is a passive device that requires no extra utlities 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

EcoTouch® 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.

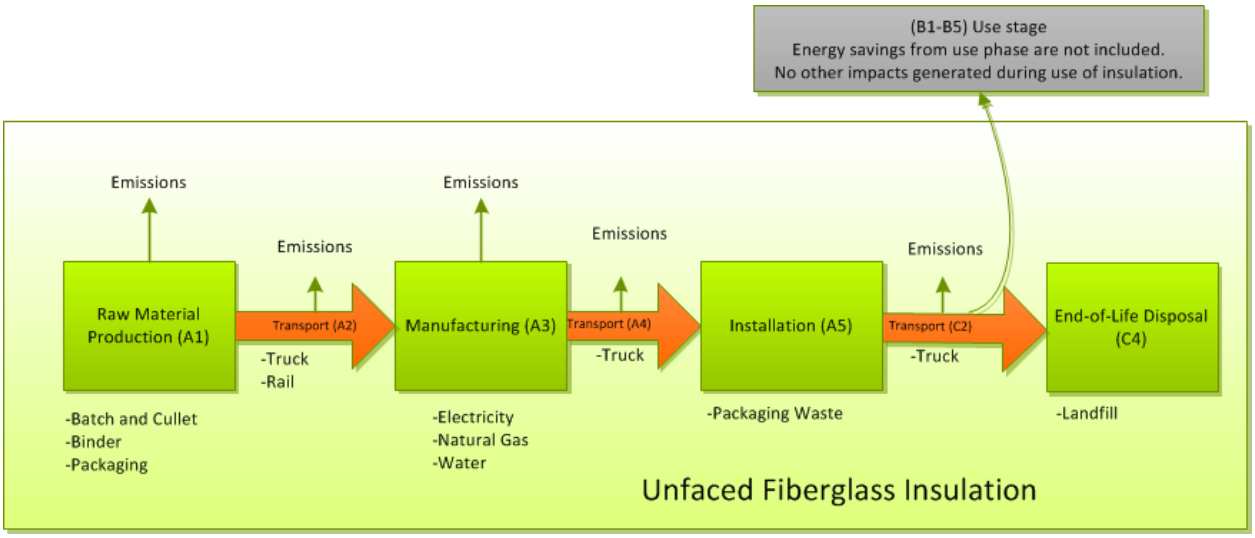
2. Life Cycle Assessment Background Information

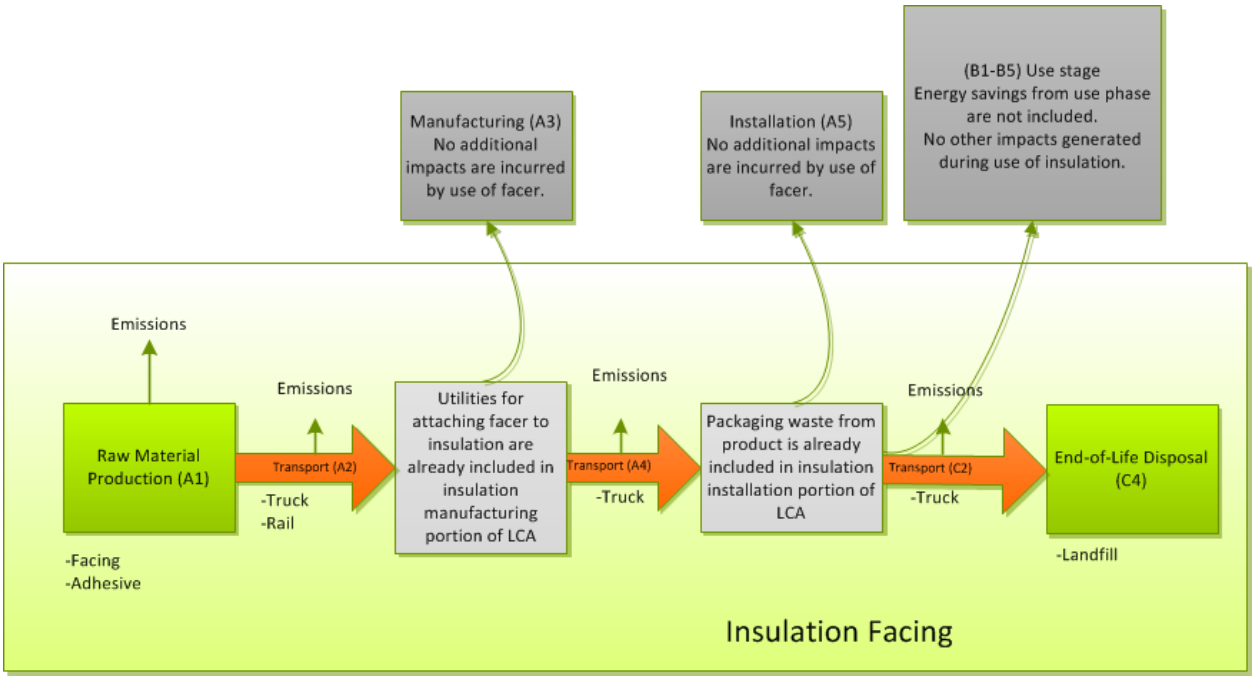
2.1. Functional Unit

The functional unit for this study is the amount of material required to insulate 1 m^2 to RSI=1.

2.2. System Boundary

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





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.

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 3.3 database.

2.6. Data Quality

Primary data was based on measured and calculated data from the North American Owens Corning plants which produced over 88% of the product in calendar year 2016. It meets requirements for completeness along with temporal, geographical and technological representativeness. Background data was taken from the ecoinvent database which is on the approved database list in the PCR.

2.7. Period under Review

Owens Corning manufacturing data is for calendar year 2016. Ecoinvent datasets were valid through 2016.

2.8. Allocation

Where it was not possible to avoid allocation, allocation was made based on product mass.

3. Life Cycle Assessment Scenarios

Table 1. Transport to the building site (A4)

Name	Unfaced	Unfaced + Kraft Facing	Unfaced + Foil Facing	Unfaced + FSK Facing	Unfaced + PSK Facing	Unit
Fuel type	Low-sulfur diesel					
Liters of fuel	1.61E-03	2.21E-03	2.58E-03	2.76E-03	2.94E-03	l/100km
Vehicle type	EURO3, 16-32 metric ton lorry					
Transport distance	5.47E+02	5.47E+02	5.47E+02	5.47E+02	5.47E+02	km
Capacity utilization (including empty runs, mass based	50	50	50	50	50	%
Gross density of products transported	8.17E+00	1.04E+01	1.12E+01	1.17E+01	1.23E+01	kg/m^3
Weight of products transported (if gross density not reported)	3.61E-01	4.61E-01	4.93E-01	5.19E-01	5.42E-01	kg
Volume of products transported (if gross density not reported)	4.42E-02	4.42E-02	4.42E-02	4.42E-02	4.42E-02	m^3
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	≥ 1	≥ 1	≥ 1	≥ 1	≥ 1	-

Table 2. Installation into the building (A5)

NAME	UNFACED	UNFACED + KRAFT FACING	UNFACED + FOIL FACING	UNFACED + FSK FACING	UNFACED + PSK FACING	UNIT
Ancillary materials	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	m^3
Other resources	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
Electricity consumption	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kWh
Other energy carriers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MJ
Product loss per functional unit	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
Waste materials at the construction site before waste processing, generated by product installation	5.64E-03	5.64E-03	5.64E-03	5.64E-03	5.64E-03	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	0.00E+00	0.00E+00	kg
Biogenic carbon contained in packaging	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	kg
VOC content	None detected					µg/m^3

Table 3. Reference Service Life

NAME	VALUE	UNIT
RSL	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 passive product which is not used directly	
Maintenance, e.g. required frequency, type and quality of replacement components	None needed	

Table 4. End of life (C2)

NAME		UNFACED	UNFACED + KRAFT FACING	UNFACED + FOIL FACING	UNFACED + FSK FACING	UNFACED + PSK FACING	UNIT
Although reuse and recycling of fiberglass insulation at its end of life is 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	0.00E+00	0.00E+00	kg
	Collected with mixed construction waste	3.61E-01	4.61E-01	4.93E-01	5.19E-01	5.42E-01	kg
Recovery (specified by type)	Reuse	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Recycling	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Landfill	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration with energy recovery	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Energy conversion efficiency rate	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	kg
Removals of biogenic carbon (excluding packaging)		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg CO_2

Table 5. End of life (C4)

NAME		UNFACED	UNFACED + KRAFT FACING	UNFACED + FOIL FACING	UNFACED + FSK FACING	UNFACED + PSK FACING	UNIT
Although reuse and recycling of fiberglass insulation at its end of life is 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	0.00E+00	0.00E+00	kg
	Collected with mixed construction waste	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
Recovery (specified by type)	Reuse	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Recycling	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Landfill	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Incineration with energy recovery	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
	Energy conversion efficiency rate	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Disposal (specified by type)	Product or material for final deposition	3.61E-01	4.61E-01	4.93E-01	5.19E-01	5.42E-01	kg
Removals of biogenic carbon (excluding packaging)		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg CO_2

4. Life Cycle Assessment Results

Table 6. Description of the system boundary modules

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

MND – Module Not Declared

4.1. Life Cycle Impact Assessment Results

Table 7. North American Impact Assessment Results for 1 m² unfaced insulation at RSI=1

TRACI v2.1	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	4.64E-01	2.95E-02	2.06E-03	MND	MND	8.63E-03	MND	0.00E+00
ODP [kg CFC-11 eq]	6.30E-08	7.66E-09	3.67E-11	MND	MND	2.24E-09	MND	0.00E+00
AP [kg SO_2 eq]	2.02E-03	1.86E-04	1.08E-06	MND	MND	5.42E-05	MND	0.00E+00
EP [kg N eq]	2.20E-03	2.53E-05	4.73E-07	MND	MND	7.40E-06	MND	0.00E+00
POCP [kg O_3 eq]	2.06E-02	5.25E-03	3.14E-05	MND	MND	1.53E-03	MND	0.00E+00
ADP_{fossil} [MJ, LHV]	7.01E-01	6.77E-02	3.28E-04	MND	MND	1.98E-02	MND	0.00E+00

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

Table 8. EU Impact Assessment Results for 1 m² unfaced insulation at RSI=1

CML v4.2	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	4.68E-01	2.96E-02	2.06E-03	MND	MND	8.65E-03	MND	0.00E+00
ODP [kg CFC-11 eq]	4.90E-08	5.75E-09	2.77E-11	MND	MND	1.68E-09	MND	0.00E+00
AP [kg SO_2 eq]	2.08E-03	1.50E-04	8.61E-07	MND	MND	4.40E-05	MND	0.00E+00
EP [kg PO_4^{-3} eq]	1.03E-03	3.23E-05	3.00E-07	MND	MND	9.43E-06	MND	0.00E+00
POCP [kg ethene eq]	1.05E-04	4.90E-06	2.45E-08	MND	MND	1.43E-06	MND	0.00E+00
$ADP_{element}$ [kg Sb-eq]	1.83E-07	7.12E-10	7.04E-12	MND	MND	2.08E-10	MND	0.00E+00
ADP_{fossil} [MJ, LHV]	6.44E+00	4.79E-01	2.32E-03	MND	MND	1.40E-01	MND	0.00E+00

[GWP – Global Warming Potential, ODP – Depletion potential of the stratospheric ozone layer, AP – Acifdification 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 9. North American Impact Assessment Results for 1 m² facing material option

TRACI v2.1	KRAFT FACING	FOIL FACING	FSK FACING	PSK FACING
GWP 100 [kg CO_2 eq]	1.35E-01	5.39E-01	7.46E-01	3.77E-01
ODP [kg CFC-11 eq]	5.19E-08	1.37E-07	6.18E-08	5.60E-08
AP [kg SO_2 eq]	9.23E-04	3.37E-03	4.35E-03	2.09E-03
EP [kg N eq]	3.84E-04	1.39E-03	2.27E-03	1.28E-03
POCP [kg O_3 eq]	1.58E-02	4.15E-02	5.53E-02	3.86E-02
ADP_{fossil} [MJ, LHV]	4.69E-01	8.21E-01	8.68E-01	7.53E-01

Table 10. EU Impact Assessment Results for 1 m² facing material option

CML v4.2	KRAFT FACING	FOIL FACING	FSK FACING	PSK FACING
GWP 100 [kg CO_2 eq]	1.36E-01	5.46E-01	7.55E-01	3.79E-01
ODP [kg CFC-11 eq]	3.91E-08	1.15E-07	4.76E-08	4.40E-08
AP [kg SO_2 eq]	8.78E-04	3.26E-03	4.21E-03	1.95E-03
EP [kg PO_4^{-3} eq]	2.43E-04	7.72E-04	1.21E-03	7.26E-04
POCP [kg ethene eq]	3.91E-08	1.15E-07	4.31E-04	3.60E-04
$ADP_{element}$ [kg Sb-eq]	4.05E-07	4.83E-07	7.35E-07	6.99E-07
ADP_{fossil} [MJ, LHV]	3.60E+00	8.27E+00	9.25E+00	6.02E+00

4.2. Life Cycle Inventory Results

Table 11. Resource Use for 1 m² unfaced insulation at RSI=1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
RPR_E [MJ, LHV]	4.73E-01	2.60E-03	1.45E-05	MND	MND	7.60E-04	MND	0.00E+00
RPR_M [MJ, LHV]	3.66E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
RPR_T [MJ, LHV]	8.39E-01	2.60E-03	1.45E-05	MND	MND	7.60E-04	MND	0.00E+00
$NRPR_E$ [MJ, LHV]	7.69E+00	4.82E-01	2.34E-03	MND	MND	1.41E-01	MND	0.00E+00
$NRPR_M$ [MJ, LHV]	2.29E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
$NRPR_T$ [MJ, LHV]	7.92E+00	4.82E-01	2.34E-03	MND	MND	1.41E-01	MND	0.00E+00
SM [kg]	1.96E-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]	5.82E-03	6.16E-05	5.42E-07	MND	MND	1.80E-05	MND	0.00E+00

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

Table 12. Output Flows and Waste Categories for 1 m² unfaced insulation at RSI=1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
HWD [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NHWD [kg]	1.44E-02	0.00E+00	5.64E-03	MND	MND	0.00E+00	MND	3.61E-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]

Table 13. Carbon Emissions and Removals for 1 m² unfaced insulation at RSI=1

PARAMETER	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
BCRP [kg CO2]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEP [kg CO2]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCRK [kg CO2]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEK [kg CO2]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
BCEW [kg CO2]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCE [kg CO2]	1.04E-03	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CCR [kg CO2]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CWNR [kg CO2]	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 14. Resource Use for 1 m² facing material option

PARAMETER	KRAFT FACING	FOIL FACING	FSK FACING	PSK FACING
RPR_E [MJ, LHV]	1.57E+00	1.85E+00	1.84E+00	1.50E+00
RPR_M [MJ, LHV]	9.69E-01	9.14E-01	7.81E-01	7.81E-01
RPR_T [MJ, LHV]	2.54E+00	2.77E+00	2.62E+00	2.28E+00
$NRPR_E$ [MJ, LHV]	2.29E+00	6.48E+00	9.82E+00	6.62E+00
$NRPR_M$ [MJ, LHV]	1.59E+00	2.29E+00	2.00E-01	1.30E-01
$NRPR_T$ [MJ, LHV]	3.88E+00	8.77E+00	1.00E+01	6.75E+00
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW [m^3]	3.57E-03	5.69E-03	7.74E-03	6.05E-03

Table 15. Output Flows and Waste Categories for 1 m² facing material option

PARAMETER	KRAFT FACING	FOIL FACING	FSK FACING	PSK FACING
HWD [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD [kg]	1.00E-01	1.32E-01	1.56E-01	1.81E-01
HLRW [kg] or [m³]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW [kg] or [m³]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
R [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 16. Carbon Emissions and Removals for 1 m² facing material option

PARAMETER	KRAFT FACING	FOIL FACING	FSK FACING	PSK FACING
BCRP [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

4.3. How to Calculate Environmental Impact Values for "R" Values other than the Functional Unit

The functional unit for the study is in metric units of RSI=1, which is equivalent to R=5.68 in U.S. Customary Units, which is the value one would find stated on the label of an insulation package as sold in North America. In order to determine the impact for the desired R-value of product sold, the scaling factor of the appropriate R-value as listed in the charts below should be used to multiply the impact category value as listed for the functional unit in the Impact Assessment Results tables above.

Table 17. Scaling Factors

Impacts =

CUSTOMARY R-VALUE	R-VALUE SCALING FACTOR
Products Sold in US	
13	2.91
15	4.86
19	3.22
20	4.06
21	4.89
23	6.77
25	4.47
30	5.48
30C	6.50
38	6.51
38C	8.53
49	9.89
Products Sold in Canada	
12	2.39
14	3.86
20	3.77
22	5.88
24	8.11
28	5.30
31	6.86
40	8.30

X

FROM TABLE 7	
ENVIRONMENTAL IMPACT	TOTAL IMPACT FOR RSI=1
Global warming (kg CO_2 eq)	5.04E-01
Ozone depletion (kg CFC-11 eq)	7.30E-08
Acidification (kg SO_2 eq)	2.26E-03
Eutrophication (kg N eq)	2.24E-03
Smog (kg O_3 eq)	2.74E-02
Fossil fuel depletion (MJ surplus)	7.88E-01

+ Facing Environmental Impact for 1m²

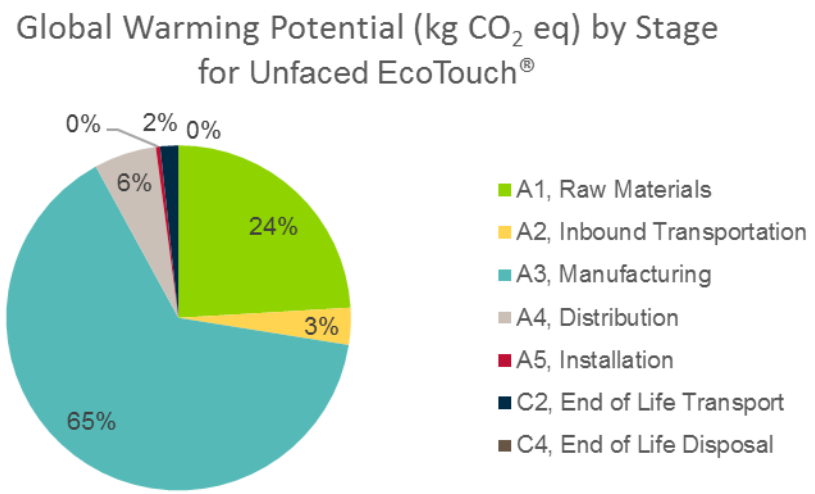
(see Table 9)

4.4. Example: Environmental Impact Values for R-13 Fiberglass Insulation with Kraft Facing

TRACI v2.1	FUNCTIONAL UNIT, RSI=1, UNFACED	R-13	KRAFT FACING	R-13 WITH KRAFT FACING
GWP 100 [kg CO_2 eq]	5.04E-01	1.47E+00	1.35E-01	1.60E+00
ODP [kg CFC-11 eq]	7.30E-08	2.12E-07	5.19E-08	2.64E-07
AP [kg SO_2 eq]	2.26E-03	6.58E-03	9.23E-04	7.50E-03
EP [kg N eq]	2.24E-03	6.52E-03	3.84E-04	6.90E-03
POCP [kg O_3 eq]	2.74E-02	7.97E-02	1.58E-02	9.55E-02
ADP_{fossil} [MJ, LHV]	7.88E-01	2.29E+00	4.69E-01	2.76E+00

5. LCA Interpretation

The manufacturing stage drives most of the environmental impact categories. Manufacturing impacts are primarily driven by energy use (electricity and natural gas) for glass melting.



A comparison was made with EcoTouch® product manufactured in 2011. In order to ensure consistency between the datasets, the 2011 data model was updated to use the same LCI dataset used as the 2016 data model. Both datasets were analyzed using the same software and impact assessment versions. An additional manufacturing location, Delmar Plant, was included in the 2016 dataset.

TRACI v2.1	2011 Dataset	2016 Dataset	% Change from 2011 to 2016 Dataset
GWP 100 [kg CO_2 eq]	6.10E-01	5.04E-01	-17%
ODP [kg CFC-11 eq]	7.25E-08	7.30E-08	1%
AP [kg SO_2 eq]	2.54E-03	2.26E-03	-11%
EP [kg N eq]	2.80E-03	2.24E-03	-20%
POCP [kg O_3 eq]	3.32E-02	2.74E-02	-17%
ADP_{fossil} [MJ, LHV]	9.25E-01	7.88E-01	-15%

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, scrubber and/or fabric filter (baghouse).

6.2. Energy Savings During Use

Insulation is a passive device that requires no extra utilities to operate over its useful life. Insulation of a building is responsible for reducing the energy burden associated with heating and cooling of a building. The example below provides the net energy savings (energy saved minus life cycle energy of fiberglass).

Example Basis:

- A two-story 2400 square foot home located in Chicago, Illinois and insulated with batt and roll and unbonded loosefill insulations to meet the 2015 International Energy Conservation Code. The methodology used for the energy analysis is ASHRAE Standard 90.2.
- A one-story 2400 square foot home located in Phoenix, Arizona and insulated with batt and roll and unbonded loosefill insulations to meet the 2015 International Energy Conservation Code. The methodology used for the energy analysis is ASHRAE Standard 90.2.

Table 18. Energy Save in Homes for First Year and 75 Year Life

Home Location	Total Life Cycle MJ for Insulation Products used in Home	Total Annual MJ Energy Saved for an Insulated Home vs. Non-Insulated Home	Net MJ Saved = Total Annual MJ saved minus Total LC MJ	Payback Time (Days) for Energy Saved	MJ Saved over the 75 Year Use Phase of building
Chicago, Illinois	**29,608**	**280,685**	**251,077**	**38.5**	**2.10E+07**
Phoenix, Arizona	**21,859**	**134,976**	**113,117**	**59.1**	**1.01E+07**

The energy saved for a properly insulated home over a non-insulated home has a 38.5-day payback for a home in Chicago and a 59.1-day payback for a home in Phoenix for the life cycle energy burden associated with manufacturing the insulation.

Based on the US EPA Greenhouse Gas Equivalent Calculator, for each of the 75 years of use, the annual energy savings for Chicago (i.e. the energy savings due to the fiberglass insulation) is equivalent to the annual savings of greenhouse gases from 12 automobiles. For Phoenix, for each of the 75 years of use, the annual energy savings due to the fiberglass insulation is equivalent to the annual savings of greenhouse gases from 6 automobiles.

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

6.4. Extraordinary Effects

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

6.5. Delayed Emissions

No delayed emissions are expected from this product.

6.6. Environmental Activities and Certifications

EcoTouch® Insulation products have the following certifications and sustainable features:

- Faced insulation certified by SCS Global Services to contain an average of 55% recycled glass content, 37% post-consumer and balance 18% pre-consumer
- Unfaced insulation certified by SCS Global Services to contain an average of 65% recycled glass content, 47% post-consumer and balance 18% pre-consumer
- GREENGUARD Gold: Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage.
- Material Health Certificate from Cradle to Cradle Products Innovation Institute
- Declare
- UL Formaldehyde Free Validated Certification
- Seal and Insulate with ENERGY STAR

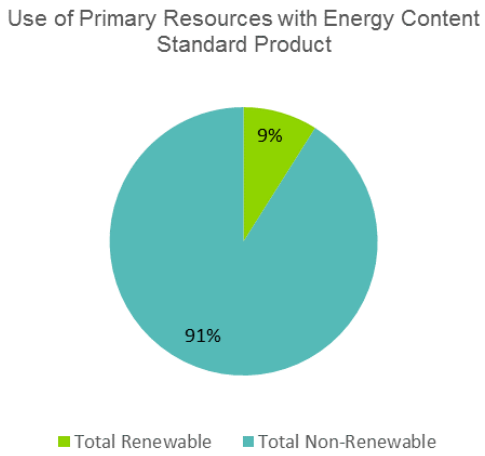
Made with Wind Energy and Reduced Carbon Footprint

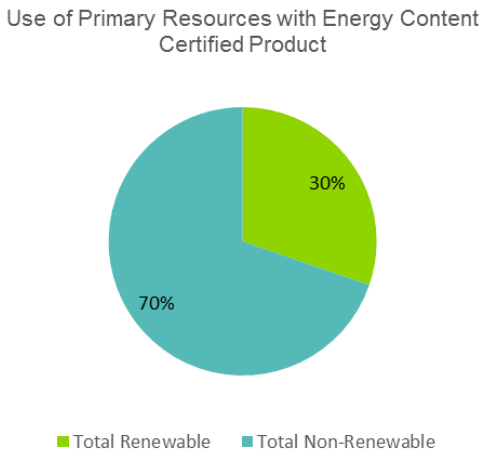
EcoTouch® Insulation products are available upon request in the US with SCS Global Services certification for “Made with Wind Energy” and “Reduced Carbon Footprint”. The updated environmental impacts for the products by matching the amount of electricity used in manufacturing with wind energy produced as part of Owens Corning’s Power Purchase Agreement were calculated and can be found in the tables below. The values for life cycle stages A1-A3 below reflect calculations based on the 2016 US plant dataset and 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 certifcation guideline, so variation between the values is expected.

TRACI v2.1	A1-A3 Standard US Product	A1-A3 Certified US Product	% Change
GWP 100 [kg CO_2 eq]	4.71E-01	2.68E-01	-43%
ODP [kg CFC-11 eq]	7.03E-08	4.70E-08	-33%
AP [kg SO_2 eq]	2.14E-03	1.44E-03	-33%
EP [kg N eq]	2.09E-03	5.01E-04	-76%
POCP [kg O_3 eq]	2.10E-02	1.60E-02	-24%
ADP_{fossil} [MJ, LHV]	7.41E-01	5.66E-01	-24%

CML v4.2	A1-A3 Standard US Product	A1-A3 Certified US Product	% Change
GWP 100 [kg CO_2 eq]	4.76E-01	2.71E-01	-43%
ODP [kg CFC-11 eq]	5.47E-08	3.64E-08	-33%
AP [kg SO_2 eq]	2.20E-03	1.47E-03	-33%
EP [kg PO_4^{-3} eq]	9.86E-04	2.92E-04	-70%
POCP [kg ethene eq]	1.11E-04	7.80E-05	-30%
$ADP_{element}$ [kg Sb-eq]	1.91E-07	1.86E-07	-3%
ADP_{fossil} [MJ, LHV]	6.73E+00	4.20E+00	-38%

When comparing the use of primary resources with energy content, the certified product shows a 21% decrease in the total non-renewable content used during the product's material and manufacturing stages (A1-A3).





6.7. 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 (February 2018, version 3.1)

Part B: Building Envelope Thermal Insulation EPD Requirements, UL Environment, UL 10010-1 (April 2018, version 2.0)

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: 2012 – Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products

ASHRAE 90.2 Energy-Efficient Design of Low-Rise Residential Buildings

IECC-2015, International Energy Conservation Code

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

ASTM C518-17 Standard Test Method for Stead-State Thermal Transmission Properties by Means of the heat Flow Meter Apparatus

ASTM E136-16a Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750C

ASTM C1104/C1104M-13a Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation

ASTM C1338-14 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 E970-17 Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source

ASTM C1304-08(2013) Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials

ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials

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

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