ENVIRONMENTAL PRODUCT DECLARATION

ECOTOUCH® FOIL FACED INSULATION

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, is a leading global producer of residential and commercial building materials, glass-fiber reinforcements, and engineered materials for composite systems. Founded in 1938, Owens Corning has earned its reputation as a market-leading innovator of glass-fiber technology by consistently providing new solutions that deliver a strong combination of quality and value to its customers across the world.

Building Materials products – primarily roofing and insulation – are focused on making new and existing homes and buildings energy efficient, comfortable, and attractive. Owens Corning is committed to balancing economic growth with social progress and sustainable solutions to its building materials and composites customers around the world.

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

UL CERTIFIED
ENVIRONMENTAL
PRODUCT DECLARATION
UL.COM/EPD

EcoTouch® PINK® FIBERGLAS™ Insulation with PureFiber® Technology
Foil Faced Fiberglass Insulation Batts

According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Owens Corning
DECLARATION NUMBER	4786077032.103.1
DECLARED PRODUCT	EcoTouch® PINK® FIBERGLAS™ Foil Faced Insulation with PureFiber® Technology
REFERENCE PCR	PCR for Building Envelope Thermal Insulation v1.2
DATE OF ISSUE	June 13, 2014
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	UL Environment
	PCR was approved by Panel
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This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	
	Wade Stout, ULE EPM
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	
	Thomas Gloria, Life-Cycle Services, LLC

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Product Definition and Information

Product Description

EcoTouch® PINK® FIBERGLAS™ Foil Faced Insulation with PureFiber® Technology is flexible insulation designed to improve the thermal performance of wall and roof/ceiling assemblies.

EcoTouch® Foil Faced Insulation has an aluminum foil kraft facing on one side, with stapling flanges provided.

The insulation is manufactured in thicknesses from 3½" to 9½". Table 1 below shows the available R-values and dimensions EcoTouch® Foil Faced Insulation is manufactured.

Table 1: EcoTouch® Foil Faced Technical Data and Specifications

R-value	Width	Length	Thickness
Metal Frame Construction			
11	16"	24" 96"	3½"
13	16"	24" 96"	3½"
19	16"	24" 96"	6¼"
Floor/Roof/Ceiling Construction			
19	16"	24" 96"	6¼"
30	16"	24" 48"	9½"

The functional unit of the product as defined by the PCR is 1 m^2 of insulation material with a thickness that gives an average thermal resistance R_{SI} = 1 m^2·K/W and with a building service life of 60 years.

Manufacturing Locations

EcoTouch® Foil Faced FIBERGLAS™ Insulation is manufactured at Owens Corning Insulating Systems, LLC Santa Clara facility located at 960 Central Expressway, Santa Clara, CA 95050.

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Application and Uses

EcoTouch® Foil Faced Insulation can be used in a wide range of exterior wall, roof and ceiling applications for residential and commercial applications when a vapor retarder is required.

With the range of R-values and thicknesses available, EcoTouch® Insulation can meet most thermal specifications with ease and provides excellent thermal control.

EcoTouch® Insulation enhances interior noise control by improving the Sound Transmission Class (STC) of walls and floor/ceiling assemblies.

Installation

Between Wood Studs/Rafters

EcoTouch® Foil Faced Insulation can be friction fit between studs, or the flanges can be stapled to either the face or the side of the stud. For cavity heights exceeding 8' supplemental support should be provided for friction fit applications. 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.

Between Metal Studs

EcoTouch® Insulation can be friction-fit in place until the interior finish is applied. Insulation should fill the cavity and the wall should eventually be closed on both sides. In areas where it will be applied in heights over 8', use wire or metal straps to hold the product in place until the interior finish is applied. The attachment flanges may be taped to the face of the metal stud prior to applying the interior finish. Wire or metal straps should also be used to hold the product in place in applications without a cover material. 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. NOTE: compression of the insulation will reduce its R-value. Any tears to the facing should be repaired with the appropriate tape.

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Material Content

Table 2: Material Content of EcoTouch® Foil Faced Insulation

Material	Function	Quantity (wt%)	Renewable	Recycled	Transportation		
					Origin	Mode	Distance (Miles)
Cullet	Batch	25-75%			North America	Rail/Truck	10-800
Sand	Batch	8-25%			North America	Truck	10-250
Borates	Batch	10-30%			Global	Ship/Rail/Truck	350-6200
Soda Ash	Batch	0.5-6%			North America	Rail/Truck	350-2000
Other Oxides	Batch	1-3%			North America	Rail/Truck	225-2000
Limestone	Batch	0-5%			North America	Truck	125-200
Carbohydrate Polyol	Binder	2-10%			North America	Truck	500-2200
Polycarboxylic Acid	Binder	1-6%			North America	Truck	200-2000
Cure Accelerator	Binder	0.2-2%			North America	Truck	250-2300
Surfactant	Binder	0-0.1%			North America	Truck	400-2300
Vegetable Oil	Binder	0-3.5%			North America	Truck	500-2200
Silane	Binder	0.03-.1%			North America	Truck	250-2700
Pink Colorant	Binder	0.1-0.3%			North America	Truck	350-2800
Emulsifier	Binder	0.1-0.3%			North America	Truck	350-2800
Foil Laminate	Facing	†			North America	Rail/Truck	700-3000
Glue Adhesive	Facing	†			North America	Truck	25-400

† Material percentage for the Functional Unit R_{SI}=1 is not applicable and would distort the data. For faced products, the percent of facing material varies as a function of Product R-value and square foot weight.

Manufacturing Process

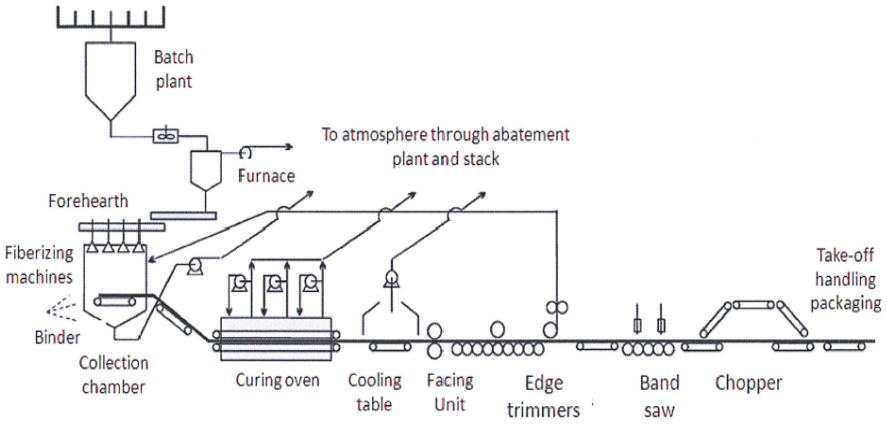

Figure 1: Manufacturing Process of EcoTouch® Foil Faced Insulation

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Environmental Product Declaration

Use of Material and Energy Resources

Table 3: Primary Energy Use for EcoTouch® Foil Faced Insulation by Resource

Resource Category	Primary energy sources	Energy (MJ eq)	%Resource category subtotal	%Total
Nonrenewable Sources	Fossil oil	5.47	36.9%	29.4%
	Natural gas	4.96	33.5%	26.6%
	Coal	3.49	23.6%	18.8%
	Nuclear	0.883	6.0%	4.7%
Nonrenewable subtotal		**14.80**	**100.0%**	**79.5%**
Renewable Sources	Hydropower	0.959	25.2%	5.2%
	Wind	3.21E-3	0.1%	0.0%
	Solar	1.04E-4	0.0%	0.0%
	Biomass	2.84	74.7%	15.3%
Renewable subtotal		**3.81**	**100.0%**	**20.5%**
Total		18.60		100.0%

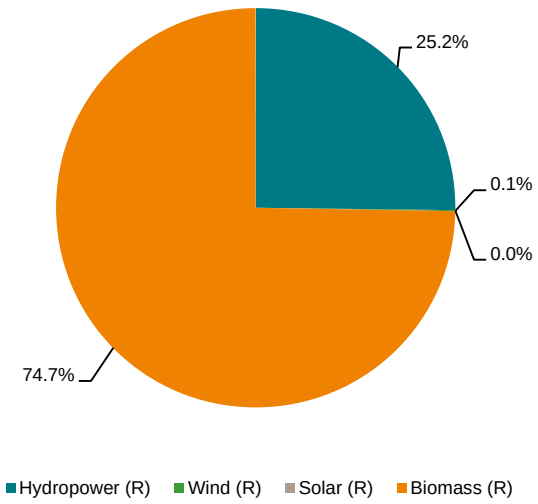

Figure 2: Renewable Primary Energy Sources

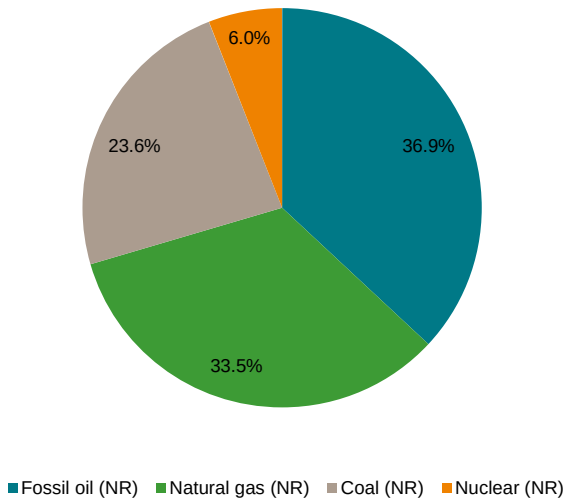

Figure 3: Nonrenewable Primary Energy Sources

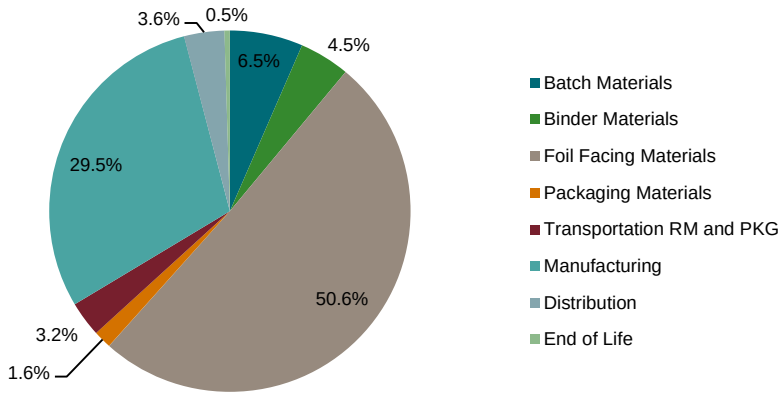

Figure 4: Primary Energy Use for EcoTouch® Foil Faced Insulation by Life Cycle Stage

Life Cycle Assessment - Product System and Modeling of Life Cycle

Functional Unit

The functional unit of the product as defined by the PCR is 1 m^2 of insulation material with a thickness that gives an average thermal resistance R_{SI} = 1 $m^{2\cdot}$·K/W and with a building service life of 60 years.

Life Cycle Stages Assessed

The EcoTouch® Insulation study for the manufacturing of foil faced fiberglass batts was a cradle-to grave analysis, which included the following:

- Raw material production which includes: extraction and processing of primary raw materials, manufacturing of input raw materials and packaging, and collection and processing of recycled cullet
- Inbound transportation of all raw materials, packaging materials and recycled cullet to the manufacturing facility
- Manufacturing of fiberglass batts
- Packaging of the finished goods
- Finished goods transportation from the manufacturing facility to distribution center and retailers
- End of life of the product, which includes transportation of decommissioned material as waste to landfill

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System Boundaries

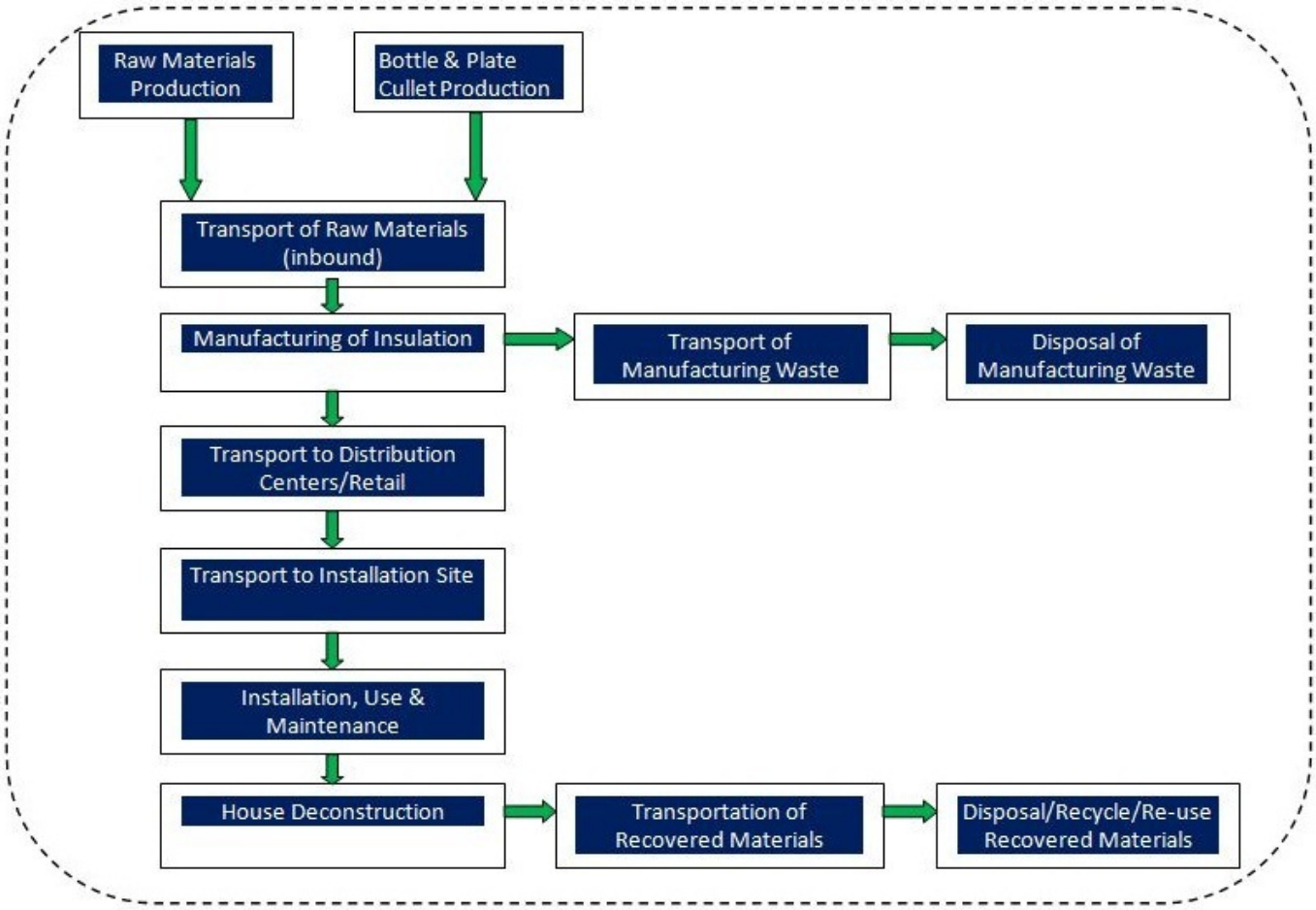

Figure 5: Process Flow Diagram for EcoTouch® Foil Faced Insulation Manufacturing

Assumptions

Assumptions are critical in conducting a life cycle assessment. For this cradle-to-grave life cycle assessment, major assumptions are made for the installation, use and maintenance phases. Installation of foil faced fiberglass insulation batts is performed by hand. They are unwrapped, cut to appropriate size and friction fit into wall cavities between studs. In wood frame construction, the facing flanges may be stapled to the studs. Once the batt is installed, the interior wall is finished and the batt is completely encased and protected. During the sixty-year life of the building, as defined in the study, the batt does not require any utility source to operate (i.e., fiberglass insulation is a passive device). Finally, unless serious damage occurs to the wall of a building, maintenance of fiberglass batts is not required. These assumptions are key in the study. Although installation, use and maintenance phases were modeled and assessed, their impacts were determined to be zero. The major benefit of insulation is that it does save energy over the life of a building.

Cut-Off Criteria

The cut-off criteria for the study are as follows:

- Mass - If a flow is less than 2% of the cumulative mass of the model, it may be excluded, providing its environmental relevance is not a concern.
- Energy - If a flow is less than 1% of the cumulative energy of the model, it may be excluded, provided its environmental relevance is not a concern.
- Environmental Relevance - Materials of omission that may have a relevant contribution will be justified, if applicable, by a sensitivity analysis.
- The sum of the excluded material flows must not exceed 5% of mass, energy or environmental relevance.

Transportation

Owens Corning Insulating Systems, LLC sourcing and logistics personnel provided the data used to calculate the transportation distances for both the inbound raw materials and packaging to the manufacturing facility as well as the distribution of the outbound finished goods from the facility to distribution centers and retailers.

Period Under Consideration

All Owens Corning Insulating Systems, LLC primary data for the Santa Clara facility were from the fiscal year 2011.

Secondary (Background) Data

Life-cycle modeling and calculation of potential environmental impacts were conducted using the LCA software SimaPro 7, version 7.3.2, developed by PRé Consultants bv. The LCI database library, provided with the Analyst version of the software, was used as the source of the secondary data used in the study. Of the various databases available, the LCI database used primarily for secondary data was the US-EI LCI database. In situations where LCI databases did not contain life-cycle inventory data for certain specific materials or processes used in either the manufacturing of precursor, input raw materials or the manufacturing of the foil faced fiberglass insulation itself, LCI data for a similar material or process was used as a substitute. In order to determine the most representative substitute, preliminary analyses were conducted.

Data Quality

To determine how representative the data used to model the life-cycle of EcoTouch® Foil Faced Insulation manufactured in 2011 is, the temporal, geographical and technological aspects of the data were assessed. For the Owens Corning Insulating Systems, LLC Santa Clara facility analyzed in the underlying LCA study, the data used adequately represents the technology used in 2011 in the United States and Canada. The secondary data used from the SimaPro database was the most appropriate and current data available. When production data was not available for a specific material in use, available LCI data on similar materials were analyzed to determine the best surrogate.

Allocation

Allocation where applicable was carried out by mass, except in transportation where the product is volume limited and not mass limited. Sensitivity analysis should be initiated if a deviation of 20% is foreseen. Since fiberglass products are volume limited for finished goods transportation, a sensitivity analysis was performed for this study. The finish good transportation (ton-miles) was changed by +/- 25% for the sensitivity analysis. All of the environmental impact

categories changed by less than 1% except for the impact category of smog potential. With a 25% increase in finished good transportation ton-miles, there is a 2% increase in the impact category value for smog potential.

Installation, Use and Maintenance

As stated in the *Assumptions* section above, the environmental impacts due to the installation, use and maintenance life cycle stages were assessed and it was determined that these stages have a negligible negative environmental impact.

End of Life

For the end-of-life stage, it was assumed that all materials removed from the decommissioning of a building were taken to a local construction waste landfill and that 100 miles is the average distance to a landfill. At this time, there are no formal end-of-life recycling programs for fiberglass insulation. There are, however, some documented cases where removed fiberglass was re-used in Habitat for Humanity (HFH) projects and re-sold in HFH stores.

Life Cycle Impact Assessment - Product

The LCA Results are documented separately for the following stages

- Batch Materials: mining and manufacturing of batch minerals used in the glass batch
- Binder Materials: extraction and manufacturing of the chemicals used in binder system
- Facing Materials: extraction and manufacturing of the glue adhesive and laminate facing materials
- Packaging Materials: extraction and manufacturing of the packaging materials
- Transportation RM and PKG: Transportation of the batch, binder, facing and packaging materials to the Santa Clara facility
- Manufacturing: energy use and environmental flows associated with the conversion of the batch and binder materials into fiberglass batts, the application of the facing materials and the packaging of the finished goods
- Distribution: transportation of the packaged finished goods to distribution centers and retailers
- End of life: transportation of decommissioned fiberglass insulation and its subsequent disposition as landfill waste

Table 4: Life Cycle Impact Assessment Results for the Functional Unit of 1 m^2 of EcoTouch® Foil Faced Insulation, R_{SI} = 1

Impact category	Unit	Total	Batch Materials	Binder Materials	Foil Facing Materials	Packaging Materials	Transportation RM and PKG	Manufacturing	Distribution	End of Life
Global warming	kg CO2 eq	8.72E-1	7.42E-2	2.97E-2	2.91E-1	1.14E-2	4.77E-2	3.57E-1	5.43E-2	7.38E-3
Acidification	mol H+ eq	3.22E-1	1.55E-2	9.64E-3	9.77E-2	4.78E-3	1.60E-2	1.58E-1	1.81E-2	2.46E-3
Eutrophication	kg N eq	6.01E-4	4.41E-5	2.40E-4	2.42E-4	4.37E-6	1.54E-5	3.48E-5	1.75E-5	2.38E-6
Smog	kg O3 eq	5.96E-2	3.48E-3	1.63E-3	1.94E-2	1.16E-3	7.79E-3	1.61E-2	8.86E-3	1.20E-3
Ozone depletion	kg CFC-11 eq	8.36E-8	8.14E-9	3.21E-9	7.20E-8	1.21E-10	2.49E-11	6.46E-11	2.33E-12	3.17E-13
Respiratory effects	kg PM2.5 eq	1.42E-2	7.64E-4	5.57E-5	1.06E-3	2.71E-5	1.26E-4	1.09E-2	1.11E-3	1.51E-4
Waste to Landfill	kg	5.39E-1	5.64E-3	2.81E-3	3.08E-2	2.29E-4	1.50E-6	4.10E-3	0.00E+0	4.95E-1
Metered Water	kg	17.84	1.24E+0	9.33E-1	1.43E+1	7.04E-1	1.31E-3	6.63E-1	0.00E+0	0.00E+0
Energy	MJ-Eq	18.60	1.21E+0	8.38E-1	9.41E+0	2.97E-1	5.89E-1	5.49E+0	6.69E-1	9.08E-2

Table 5: Life Cycle Impact Assessment Results for the Functional Unit of 1 m^2 of EcoTouch® Unfaced Insulation, R_{SI} = 1

Impact category	Unit	Total	Batch Materials	Binder Materials	Packaging Materials	Transportation RM and PKG	Manufacturing	Distribution	End of Life
Global warming	kg CO2 eq	0.618	0.113	3.54E-2	1.08E-2	1.41E-2	0.403	3.60E-2	5.42E-3
Acidification	mol H+ eq	0.237	2.46E-2	1.11E-2	4.38E-3	6.04E-3	0.177	1.20E-2	1.80E-3
Eutrophication	kg N eq	3.82E-4	6.50E-5	2.53E-4	3.90E-6	5.90E-6	4.11E-5	1.14E-5	1.72E-6
Smog	kg O3 eq	3.81E-2	5.96E-3	1.90E-3	1.05E-3	2.95E-3	1.95E-2	5.86E-3	8.83E-4
Ozone depletion	kg CFC-11 eq	1.70E-8	1.25E-8	4.18E-9	1.06E-10	7.52E-11	1.36E-10	1.57E-12	2.37E-13
Respiratory effects	kg PM2.5 eq	1.46E-2	1.55E-3	4.97E-5	2.45E-5	3.96E-5	1.28E-2	9.50E-5	1.43E-5
Waste to Landfill	kg	0.398	1.90E-2	3.34E-3	2.23E-4	5.74E-6	1.19E-2	0.00	0.363
Metered Water	kg	4.76	1.86	1.11	0.691	4.67E-3	1.09	0.00	0.00
Energy	MJ-Eq	9.92	1.81	0.956	0.365	0.176	6.10	0.445	6.71E-2

Calculating Environmental Impact Values for Different R-values

The functional unit of the product, as defined in the PCR, has its physical properties reported in metric units (i.e., 1 m^2 of insulation material with a thickness that gives an average thermal resistance R_{SI} = 1 $m^2 \cdot K/W$)

In US customary units, which is the system in which the thermal resistance is stated on an insulation packaging label in North America, R_{SI} = 1 is equivalent to 5.68 with units of $hr \cdot ft^2 \cdot °F/BTU$.

In order to determine the potential environmental impacts for R-values other than that of the functional unit, the scaling factors for various R-values, which are listed in Table 6, can be used.

Scaling Factors for Determining Impact Category Values for Commercial R-values in North America

Table 6: R-value Scaling Factors

R-value	R-factor to Multiply Impact per m^2 of R_{SI}=1 (dimensionless)
R-11	2.07
R-13	3.07
R-19	3.43
R-30	5.78

The formula for determining the environmental burden of a given R-value of EcoTouch® Foil Faced Insulation is the following:

Impact value =
(Impact value of unfaced product in Table 5) x R-factor in Table 6 + (Impact value of the *Foil Facing Materials* in Table 4)

N.B. The impacts of the *Foil Facing Materials* are constant and do not change with R-value.

Example: Environmental Impact of R-13 EcoTouch® Foil Faced Insulation Based on Functional Unit of R_{SI} = 1

In the table below, the LCIA results of the study's functional unit are multiplied by 3.07 and then added to the impact values listed in the column for *Foil Facing Materials* in Table 4 above in order to obtain the impact category values for R-13 foil faced fiberglass insulation.

Table 7: Environmental Impact of R-13 EcoTouch® Foil Faced Insulation Based on Functional Unit of R_{SI} = 1

Impact category	Unit	Functional Unit R_{SI} = 1 (Unfaced)	Values for R-13	Foil Facing Materials	R-13 Foil Faced Values
Global warming	kg CO2 eq	0.618	1.90	0.291	2.19
Acidification	mol H+ eq	0.237	0.728	9.77E-02	0.825
Eutrophication	kg N eq	3.82E-4	1.17E-03	2.42E-04	1.41E-03
Smog	kg O3 eq	3.81E-2	0.117	1.94E-02	0.136
Ozone depletion	kg CFC-11 eq	1.70E-8	5.22E-08	7.20E-08	1.24E-07
Respiratory effects	kg PM2.5 eq	1.46E-2	4.48E-02	1.06E-03	4.59E-02
Waste to Landfill	kg	0.398	1.22	3.08E-02	1.25
Metered Water	kg	4.76	14.61	14.30	28.91
Energy	MJ-Eq	9.92	30.45	9.41	39.86

Non-hazardous Waste and Water Consumption

Table 8: Non-hazardous Waste and Water Consumption for EcoTouch® Foil Faced Insulation

	Raw Materials Production	Fiberglass Production	End of life
Non-Hazardous Waste (kg/m^2)	3.95E-2	4.10E-3	0.495
Water Consumption (kg/m^2)	17.17	0.663	0

Optional Environmental Information

Indoor Environmental

EcoTouch® Foil Faced Insulation has achieved GREENGUARD GOLD Certification

Other Environmental

Product recycled content for all North American facilities is SCScertified™ at 58% minimum overall and 36% from post consumer

EcoTouch® Foil Faced Insulation contains 56% USDA certified biobased content by weight

References

- Product Category Rules for Preparing an Environmental Product Declaration (EPD) for Product Group: Building Envelope Thermal Insulation, Version 1.2, 29 October 2013
- ISO 14025:2006(E), Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 14040:2006(E), Environmental management – Life cycle assessment – Principles and framework
- ISO 14044:2006(E), Environmental management – Life cycle assessment – Requirements and guidelines
- ASTM Standard Specification C665 - 12, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- ASTM Standard Specification C518 - 10, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- EcoTouch® Foil Faced Insulation complies with ASTM C665, Type II, Class B and C