

ENVIRONMENTAL PRODUCT DECLARATION

AISLHOGAR® INSULATION



Owens Corning® Residential Insulation products manufactured in Mexico (Aislhogar®) are designed for use in walls, ceilings, and under certain types of flooring.



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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Aislhogar® Insulation



According to ISO 14025,
EN 15804, and ISO21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL ENVIRONMENT 333 PFINGSTEN RD, NORTHBROOK, IL 60062	WWW.UL.COM WWW.SPOT.UL.COM
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	Program Operator Rules v 2.7 2022	
MANUFACTURER NAME AND ADDRESS	Owens Corning Mexico, S. de R.L. de C.V. Acueducto 1555 San Rafael Ticoman, C.P. 07359, Gustavo A Madero, Ciudad de México	
DECLARATION NUMBER	4790365982.101.1	
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	1 m ² insulation at R _{SI} =1	
REFERENCE PCR AND VERSION NUMBER	Part B: Building Envelope Thermal Insulation EPD Requirements, UL 10010-1, version 2.0	
DESCRIPTION OF PRODUCT APPLICATION/USE	Aislhogar® Insulation products are installed in walls and ceilings to provide thermal insulation.	
PRODUCT RSL DESCRIPTION (IF APPL.)	75 years	
MARKETS OF APPLICABILITY	North America	
DATE OF ISSUE	December 1, 2022	
PERIOD OF VALIDITY	5 Years	
EPD TYPE	Product-specific	
RANGE OF DATASET VARIABILITY	NA	
EPD SCOPE	Cradle to gate with options (A1-A3, A4, A5, C2, C4)	
YEAR(S) OF REPORTED PRIMARY DATA	2021	
LCA SOFTWARE & VERSION NUMBER	SimaPro 9.4	
LCI DATABASE(S) & VERSION NUMBER	ecoinvent 3.8	
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1 v1.05; CML I-A baseline v4.7, IPCC (2021)	

The PCR review was conducted by:

UL Environment

PCR Review Panel

epd@ul.com

This declaration was independently verified in accordance with ISO 14025: 2006.

☐ INTERNAL ☒ EXTERNAL

Cooper McC

Cooper McCollum, UL Environment

This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:

Aspire Sustainability

This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:

Thomas P. Gloria

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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Aishogor® Insulation



According to ISO 14025
and ISO 21930:2017

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 location:

Mexico City Plant
Mexico City, Mexico 07359

1.2. Product Description

Product Identification

Owens Corning® Aishogor® products manufactured in Mexico City are light-density fibrous glass blankets with excellent recovery, designed to be installed with or without an asphalt kraft paper facing for use in walls and ceilings to provide thermal and acoustic insulation in lighthframe construction and manufactured housing. Aishogor® is available from Mexico in standard R-values of 8, 10, 11, 13, 15, 19, 21, and 30. Standard roll widths are 41.0 cm and 61.0 cm (16" and 24", respectively). Aishogor® products are available in a variety of densities, thicknesses, and R-values to meet a variety of building needs and code requirements.

Product Specification

Table 1. Physical Properties of Aishogor®

PROPERTY	TEST METHOD	VALUE
Surface Burning (non-faced material)	ASTM E 84 / UL 723*	Flame spread index ≤ 25 Smoke developed index ≤ 50
Critical radiant flux (W/cm ²) (non-faced material)	ASTM E970	≥ 0.12
Water Vapor Sorption (non-faced material)	ASTM C 1104	≤ 5% on volume
Fungi Resistance	ASTM C 1338	Passes
Corrosiveness	ASTM C 665	Does not accelerate corrosion of copper, aluminum, or steel
	ASTM C 1617	Passes
Odor Emission	ASTM C 1304	Passes

*This standard is not intended to address all safety concerns associated with the use of these products. It is the responsibility of the user of these products to establish appropriate safety and health practices and act in accordance with all applicable regulatory limitations.

Table 2. Acoustic Properties of Aishogor® (ASTM C 423 Test Method)

R VALUE	FREQUENCY (Hz)	125	250	500	1000	2000	4000
	NRC	ABSORPTION COEFFICIENT					
R-8	0.9	0.22	0.69	0.95	1.0	0.94	0.98
R-11	1.0	0.34	0.89	1.08	1.01	0.99	1.05
R-19	1.10	0.5	1.17	1.16	1.05	1.08	10.9





Flow Diagram

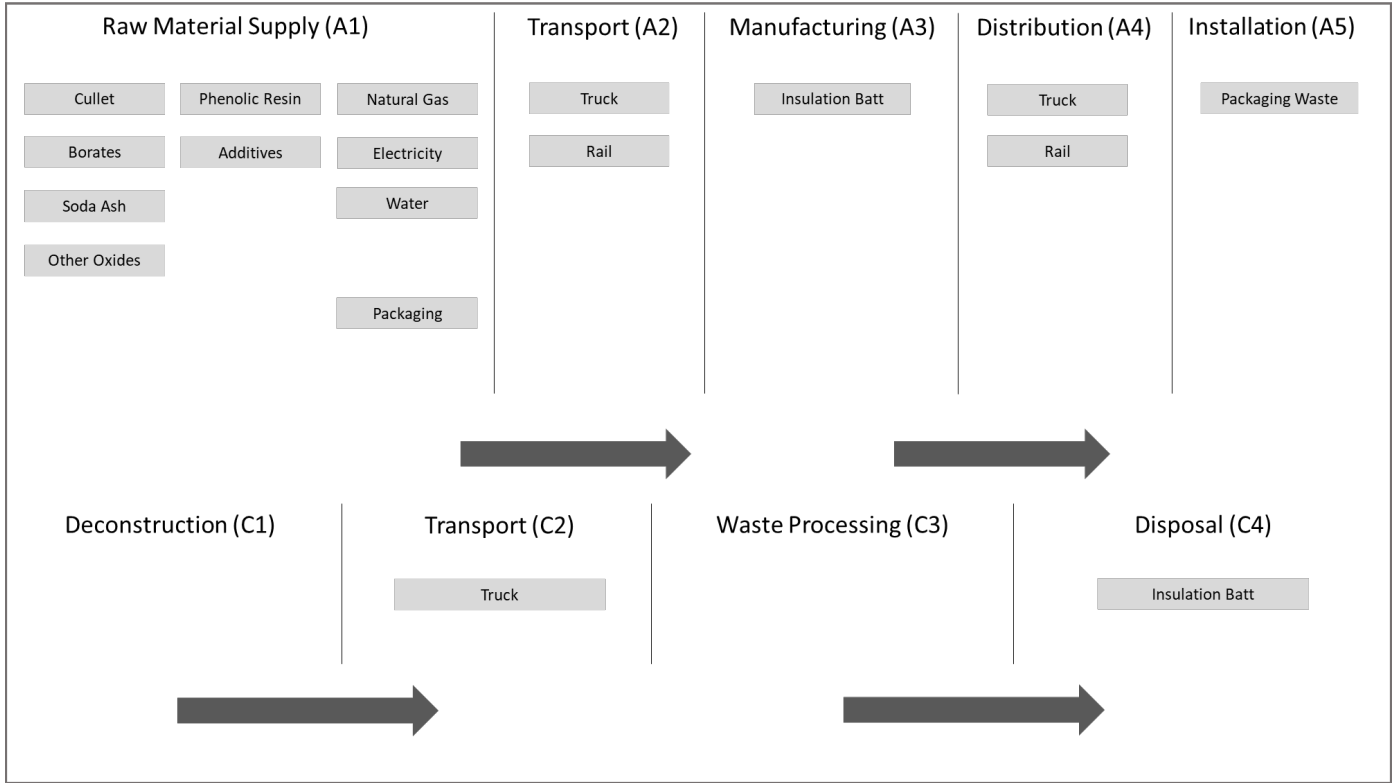


Figure 1. Insulation Flow Diagram

Product Average

The results of this declaration represent an average performance for the listed products. 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.



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1.3. Application

Owens Corning® Aislhogar® is used for thermal and acoustical insulation in walls and ceilings of residential buildings and light frame construction. The finished product may be laminated with an asphalt kraft paper facing.

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 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

- Aislhogar® is manufactured in compliance with ASTM C665-12, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing, Type I Class A for unfaced material.
- Aislhogar® R-8 and R-11 meet the requirements to comply with Mexican regulation NOM-018-ENER-2011: Thermal insulation for buildings, characteristics, limits, and test terms.

1.6. Properties of Declared Product as Delivered

Aislhogar® is delivered, either unfaced or with an asphalt kraft paper facing, in compression packaged batts and rolls. Once removed from the packaging, the product will recover to the needed thickness to deliver the advertised R-value.



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1.7. Material Composition

Aislhogar® Insulation products consist of two major components: fiberglass (nominally ≥ 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 organic materials.

The Aislhogar® products included in this study use phenol-urea-formaldehyde (PUF) binder.

Table 3. Material Content for Aislhogar® Insulation

MATERIALS	FUNCTION	QUANTITY (% BY MASS)
Cullet	Glass Batch	40-85%
Borates	Glass Batch	5-15%
Soda Ash	Glass Batch	<10%
Other Oxides	Glass Batch	<5%
Resin	Binder	<5%
Urea	Binder	<5%
Additives	Binder	<1%

Aislhogar® can be laminated with an asphalt kraft paper facing material prior to delivery to customers.

Table 4. Material Content for Facing

MATERIALS	FUNCTION	QUANTITY (% BY MASS)
Kraft Paper	Facer	55-75%
Asphalt Coating	Facer Adhesive	25-45%





Aishogor® Insulation



According to ISO 14025
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1.8. Manufacturing

Owens Corning North American Insulation manufacturing locations can be found across the United States. However, the scope of this study includes only Aishogor® manufactured at the following location:

Mexico City Plant
Mexico City, Mexico 07359

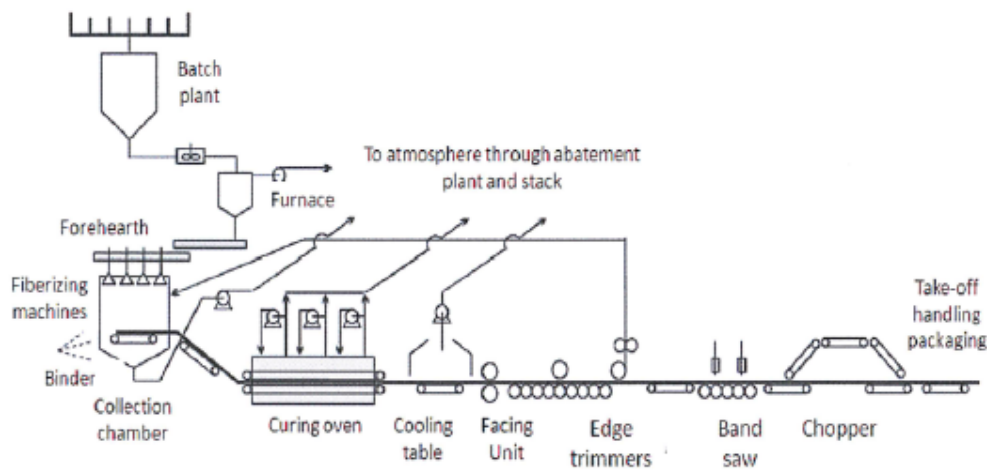


Figure 2. Insulation Manufacturing Process

The diagram above is representative for the manufacturing of bonded fiberglass insulation product.

1.9. Packaging

Aishogor® products are packaged in two different standard packaging depending on it's presentation: unfaced Aishogor® is packaged on a printed polypropylene raffia and asphalt kraft paper faced products are packaged on a transparent low-density polyethylene bag, only for faced R-11 standard package also includes also an additional raffia to optimize product compression. Due to a lack of a disposal scenario specific to Mexico in the PCR, the United States scenario was chosen as the best representation from North America. The following packaging disposal scenarios are assumed, in accordance with the PCR.

Table 5. Packaging Material Disposal Scenarios (North America)

COUNTRY/ REGION	MATERIAL TYPE	RECYCLING RATE	LANDFILL RATE	INCINERATION RATE
United States	Plastics	15%	68%	17%
	Metals	57%	34%	9%
	Pulp (cardboard, paper)	75%	20%	5%



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1.10. Transportation

The outbound transportation or distribution includes the transportation of the finished product to customers primarily by diesel semi-truck. The weighted average distance from the manufacturing sites to the customer is 924 km.

1.11. Product Installation

Aislhogar® is easy to handle and install. It is sized to be installed in residential walls, in the open space between wood or metal studs. Aislhogar® may also be installed within false ceilings and wood framed floors to provide thermal and acoustic insulation.

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

Aislhogar® can be reused if it remains clean and dry. Recycling programs do not currently exist for fiberglass insulation.

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 161 km (100 miles) as the average distance to landfill.



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2. Life Cycle Assessment Background Information

2.1. Functional and Declared Unit

The functional unit is 1 m² of insulation material with a thickness that gives an average thermal resistance R_{SI}=1 m²K/W and with a building service life of 75 years. Faced insulation additionally has 1 m² of a facing which is applied to the top surface of the insulation material. For this study, the declared unit for facing is 1 m² for the 1 m² functional unit of insulation.

Table 6. Functional Unit Specifications for Unfaced* Aislhogar®

NAME	AISLHOGAR®	
Functional Unit	1 m ² of insulation material with a thickness that gives an average thermal resistance R _{SI} =1 m ² K/W	
Mass	4.18E-01	kg
Thickness to achieve Functional Unit	3.90E-02	m

Table 7. Declared Unit Specifications for Facing

NAME	FACING	
Declared Unit	1 m ² of facing	
Mass	8.14E-02	kg
Thickness	1.27E-04	m





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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.

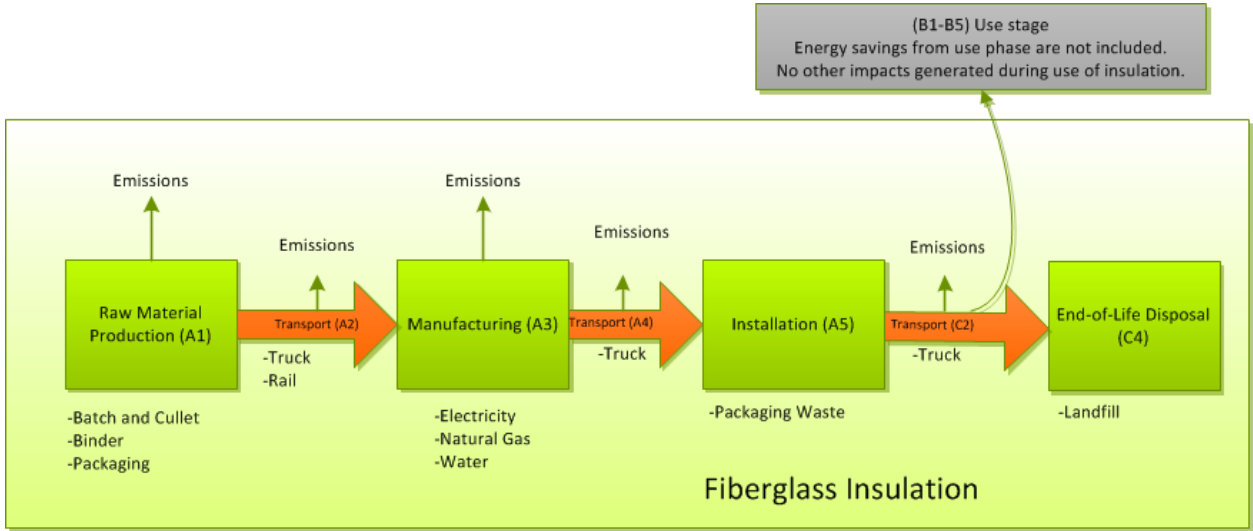


Figure 3. Insulation System Boundary

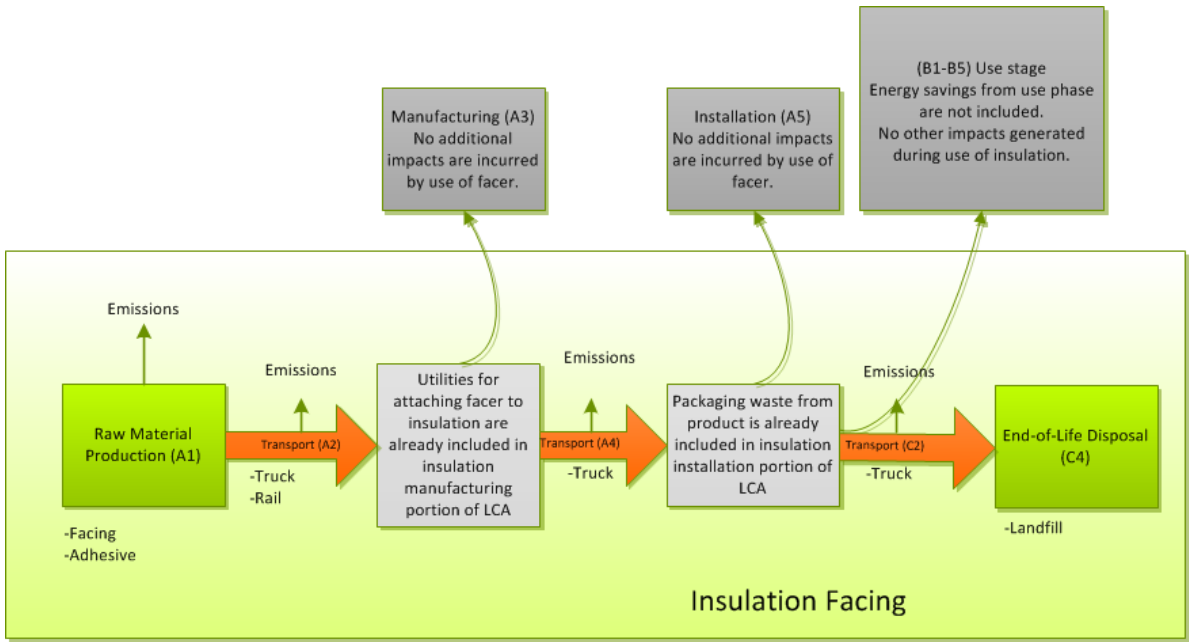


Figure 4. Insulation Facing System Boundary



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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. It is assumed the product remains in service for the 75-year reference service life.

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 location listed in the Manufacturing section. Secondary data primarily references the ecoinvent 3.8 database.

2.6. Data Quality

Primary data was based on measured and calculated data from the Owens Corning plant in Mexico City and reflects production of the included products between January 1, 2021 and December 31, 2021. It meets requirements for completeness along with temporal, geographical and technological representativeness. Background data was taken primarily from the ecoinvent 3.8 database, which is on the approved database list in the PCR. As much as reasonable, selected background datasets represent the situation in 2021 and are no more than ten years old. In practice, older data have been used where more recent data were not available. In such cases the datasets were evaluated for reasonableness and deemed suitable for this LCA study given that technology advances have likely not occurred for these specific materials and processes.

2.7. Period under Review

Owens Corning manufacturing data reflects production of the included products between January 1, 2021 and December 31, 2021.

2.8. Allocation

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

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3. Life Cycle Assessment Scenarios

Table 8. Aislhogar® (Unfaced) Product Transport to the building site (A4)

NAME	AISLHOGAR®	UNIT
Fuel type	Low-sulfur diesel	
Liters of fuel	1.82E-03	l/100km
Vehicle type	Transport, freight, lorry >32 metric ton, EURO5 {RoW} transport, freight, lorry >32 metric ton, EURO5	
Transport distance	9.24E+02	km
Capacity utilization (including empty runs, mass based) ¹	63	%
Gross density of products transported	1.07E+01	kg/m ³
Weight of products transported (if gross density not reported)	4.18E-01	kg
Volume of products transported (if gross density not reported)	3.90E-02	m ³
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	1	-

¹EcoTransIT. World. Ecological Transport Information Tool for Worldwide Transports Methodology and Data - Update 4th December 2014. (https://www.ecotransit.org/download/EcoTransIT_World_Methodology_Report_2014-12-04.pdf)

Table 9. Facing Addon Transport to the building site (A4)

NAME	ASPHALT-COATED KRAFT FACING	UNIT
Fuel type	Low-sulfur diesel	
Liters of fuel	3.54E-04	l/100km
Vehicle type	Transport, freight, lorry >32 metric ton, EURO5 {RoW} transport, freight, lorry >32 metric ton, EURO5	
Transport distance	9.24E+02	km
Capacity utilization (including empty runs, mass based) ¹	63	%
Gross density of products transported	6.41E+02	kg/m ³
Weight of products transported (if gross density not reported)	8.14E-02	kg
Volume of products transported (if gross density not reported)	1.27E-04	m ³
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	1	-

¹EcoTransIT. World. Ecological Transport Information Tool for Worldwide Transports Methodology and Data - Update 4th December 2014. (https://www.ecotransit.org/download/EcoTransIT_World_Methodology_Report_2014-12-04.pdf)



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Table 10. Installation into the building (A5)

NAME	AISLHOGAR®	UNIT
Ancillary materials	0.00E+00	kg
Net freshwater consumption	0.00E+00	m³
Other resources	0.00E+00	kg
Electricity consumption	0.00E+00	kWh
Other energy carriers	0.00E+00	MJ
Product loss per functional unit	0.00E+00	kg
Waste materials at the construction site before waste processing, generated by product installation	3.31E-06	kg
Output materials resulting from on-site waste processing	0.00E+00	kg
Biogenic carbon contained in packaging	0.00E+00	kg CO ₂
Direct emissions to ambient air, soil and water	0.00E+00	kg
VOC content	Unknown	µg/m³

Table 11. Reference Service Life for Aislhogar®

REFERENCE SERVICE LIFE	VALUE	UNIT	COMMENT
RSL	75	years	
Declared product properties (at gate) and finishes, etc.	Not applicable		Insulation properties require installation.
Design application parameters	Install per instructions		
An assumed quality of work, when installed in accordance with manufacturer's instructions	Will meet R-value		Installer should install per manufacturer instructions
Outdoor environment	Not applicable		Indoor application
Indoor environment	Product should be kept dry		
Use conditions	Not applicable		Insulation is a passive product which is not used directly during life
Maintenance	None needed		Insulation does not need maintenance during its use

Table 12. End of Life Transport (C2) and Landfill Disposal (C4) of Unfaced Aislhogar®

		AISLHOGAR®	UNIT
Collection process	Collected separately	0.00E+00	kg
(specified by type)	Collected with mixed construction waste	4.18E-01	kg
Disposal (Landfill)	Product or material for final deposition	4.18E-01	kg
Transport to Disposal	Diesel Powered Truck	1.61E+02	km
Removals of biogenic carbon (excluding packaging)		0.00E+00	kg CO ₂ eq

Table 13. End of Life Transport (C2) and Landfill Disposal (C4) of Insulation Facing

		FACING	UNIT
Collection process	Collected separately	0.00E+00	kg
(specified by type)	Collected with mixed construction waste	8.14E-02	kg
Disposal (Landfill)	Product or material for final deposition	8.14E-02	kg
Transport to Disposal	Diesel Powered Truck	1.61E+02	km
Removals of biogenic carbon (excluding packaging)		0.00E+00	kg CO ₂ eq



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4. Life Cycle Assessment Results

Table 14. 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: Cradle to Installation with End of Life	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

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

These six impact categories are globally deemed mature enough to be included in Type III environmental declarations.

Table 15. North American Impact Assessment Results for 1 m² Unfaced Aislhogar® from Mexico City at R_{SI} = 1

NORTH AMERICA	A1 - C4	A1 - A3	A4	A5	C2	C4
GWP 100 [kg CO ₂ eq] ¹	1.50E+00	1.20E+00	2.82E-02	1.55E-03	4.47E-03	2.59E-01
ADP _{fossil} [MJ, LHV]	1.15E+01	1.10E+01	3.92E-01	8.56E-04	6.21E-02	5.90E-02
ODP [kg CFC-11 eq]	8.65E-08	7.81E-08	6.78E-09	1.34E-11	1.07E-09	5.38E-10
AP [kg SO ₂ eq]	2.81E-03	2.65E-03	8.59E-05	5.01E-07	1.36E-05	5.83E-05
EP [kg N eq]	8.89E-04	3.03E-04	1.26E-05	3.90E-07	2.00E-06	5.71E-04
SFP [kg O ₃ eq]	6.03E-02	5.72E-02	1.93E-03	1.35E-05	3.05E-04	8.45E-04
IPCC GWP 100a (2021) [kg CO ₂ e] ²	1.49E+00	1.20E+00	2.82E-02	1.55E-03	4.47E-03	2.54E-01

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

¹The GWP 100 impacts from TRACI v2.1 (July 2012) are based on 100-year time horizon GWP factors provided by the IPCC 2007 Fourth Assessment Report (AR4).

²100-year time horizon GWP factors as provided by the Fifth Assessment Report (AR5) shall be used for conformance with ISO 21930, Section 7.3.



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Table 16. North American Impact Assessment Results for 1 m² Facing

NORTH AMERICA	A1 - C4	A1 - A3	A4	A5	C2	C4
GWP 100 [kg CO ₂ eq] ¹	7.43E-02	6.77E-02	5.50E-03	0.00E+00	8.69E-04	2.02E-04
ADP _{fossil} [MJ, LHV]	9.66E-01	8.75E-01	7.64E-02	0.00E+00	1.21E-02	2.73E-03
ODP [kg CFC-11 eq]	1.21E-08	1.06E-08	1.32E-09	0.00E+00	2.09E-10	4.49E-11
AP [kg SO ₂ eq]	3.97E-04	3.76E-04	1.67E-05	0.00E+00	2.64E-06	1.94E-06
EP [kg N eq]	1.06E-04	1.03E-04	2.46E-06	0.00E+00	3.89E-07	1.67E-07
SFP [kg O ₃ eq]	7.24E-03	6.74E-03	3.76E-04	0.00E+00	5.94E-05	5.86E-05
IPCC GWP 100a (2021) [kg CO ₂ e] ²	7.43E-02	6.77E-02	5.50E-03	0.00E+00	8.69E-04	2.02E-04

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

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²100-year time horizon GWP factors as provided by the Fifth Assessment Report (AR5) shall be used for conformance with ISO 21930, Section 7.3.

4.2. Life Cycle Inventory Results

Table 17. Resource Use Results for 1 m² Unfaced Aishogor® at R_{SI} = 1 manufactured in Mexico City

RESOURCE USE	A1-A3	A4	A5	C2	C4
RPR _E [MJ, LHV]	3.50E-01	5.08E-04	1.36E-05	8.04E-05	5.04E-03
RPR _M [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E [MJ, LHV]	1.14E+01	3.92E-01	8.72E-04	6.22E-02	6.61E-02
NRPR _M [MJ, LHV]	7.99E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	3.49E-01	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	0.00E+00
NRSF [MJ, LHV]	0.00E+00	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	0.00E+00
FW [m ³]	3.00E-03	7.94E-06	1.93E-06	1.26E-06	2.41E-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 18. Waste and Output Flow Indicator Results for 1 m² Unfaced Aishogor® at R_{SI} = 1 manufactured in Mexico City

OUTPUTS & WASTES	A1-A3	A4	A5	C2	C4
HWD [kg]	3.91E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD [kg]	4.92E-02	0.00E+00	0.00E+00	0.00E+00	4.18E-01
HLRW [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW [kg]	0.00E+00	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	0.00E+00
MR [kg]	5.73E-03	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	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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 19. Resource Use Indicator Results for 1 m² Facing

RESOURCE USE	A1-A3	A4	A5	C2	C4
RPR _E [MJ, LHV]	2.01E+00	9.90E-05	0.00E+00	1.56E-05	1.15E-05
RPR _M [MJ, LHV]	9.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E [MJ, LHV]	9.10E-01	7.65E-02	0.00E+00	1.21E-02	2.74E-03
NRPR _M [MJ, LHV]	1.04E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	0.00E+00	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	0.00E+00
NRSF [MJ, LHV]	0.00E+00	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	0.00E+00
FW [m ³]	6.51E-04	1.55E-06	0.00E+00	2.45E-07	5.85E-08

[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 20. Waste and Output Flow Indicator Results for 1 m² Facing

OUTPUTS & WASTES	A1-A3	A4	A5	C2	C4
HWD [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.14E-02
HLRW [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW [kg]	0.00E+00	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	0.00E+00
MR [kg]	0.00E+00	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	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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 21. Carbon Emissions and Removal Indicator Results for 1 m² Unfaced Aislhogar® at R_{SI} = 1

CARBON INDICATORS	A1-A3	A4	A5	C2	C4
BCRP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO ₂]	8.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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]



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Table 22. Carbon Emissions and Removal Indicator Results for 1 m² Facing

CARBON INDICATORS	A1-A3	A4	A5	C2	C4
BCRP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO ₂]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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]

4.3. Calculating Impact Category Results for Products Other Than the Reference Version

The environmental impact assessment results have been calculated for a reference product for Aislhogar®.

Functional Unit Scaling Factors for Aislhogar® products

Functional Unit scaling factors have been provided in Table 23 to assist in understanding the impacts for the individual products being produced at the functional unit of 1 m² of product at R_{SI} = 1. The scaling factor can be multiplied by the results for any of the impact categories to convert the results to the chosen product at the functional unit of 1 m² of product at R_{SI} = 1.

Product Scaling Factors for Aislhogar® products

The product scaling factors in Table 23 below can be multiplied by the results for any of the impact categories to convert the results from the reported functional unit to 1 m² of the chosen product and thickness. Environmental impacts for products at the supplied R-values can be calculated using the same method mentioned above.

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Sample Functional Unit scaling calculation for Aislhogar®:

SCALING FACTORS ^a			IMPACT CATEGORY DATA FOR REFERENCE PRODUCT ^b		IMPACT CATEGORY DATA FOR FACING ADDON ^c		RESULT CALCULATED FOR R-30 AISLHOGAR® AT R _{SI} = 1	
PRODUCT	R-VALUE	FUNCTIONAL UNIT SCALING FACTOR 1M ² AT R _{SI} = 1	NORTH AMERICA	A1 - C4	NORTH AMERICA	A1 - C4	NORTH AMERICA	A1 - C4
AISLHOGAR®	R-30	1.23	X	GWP 100 [KG CO ₂ EQ]	1.50E+00	+	GWP 100 [KG CO ₂ EQ]	1.92E+00
				ADP _{FOSSIL} [MJ, LHV]	1.15E+01		ADP _{FOSSIL} [MJ, LHV]	1.51E+01
				ODP [KG CFC-11 EQ]	8.65E-08		ODP [KG CFC-11 EQ]	1.18E-07
				AP [KG SO ₂ EQ]	2.81E-03		AP [KG SO ₂ EQ]	3.85E-03
				EP [KG N EQ]	8.89E-04		EP [KG N EQ]	1.20E-03
				SFP [KG O ₃ EQ]	6.03E-02		SFP [KG O ₃ EQ]	8.14E-02

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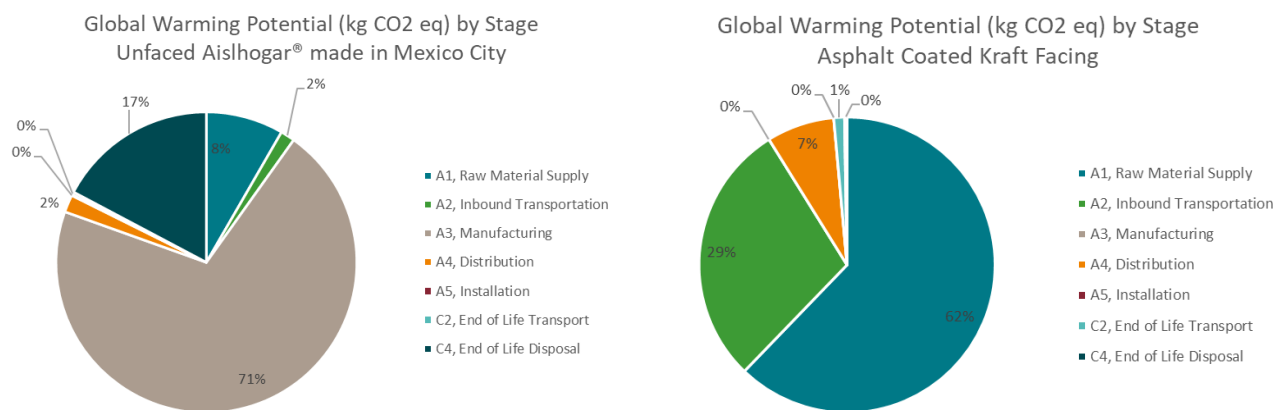
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5. LCA Interpretation

In the production of Aishogor®, the fiberglass insulation manufacturing stage drives most of the environmental impact categories, although eutrophication potential is also highly influenced by the end of life disposal stage. Manufacturing impacts are primarily driven by energy use (electricity and natural gas) for glass melting. For the asphalt coated kraft facing, the raw material supply stage drives most of the environmental impact categories.



6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

Owens Corning manufacturing facilities of Aishogor® products maintain quality management systems.

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.

6.3. Extraordinary Effects

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

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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 an average 53% recycled glass content, 31% pre-consumer and 22% post-consumer.
- Health Product Declaration



6.6. Further Information

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

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According to ISO 14025
and ISO 21930:2017

7. References

Product Category Rules for Building-Related Products and Services – Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Standard 10010, Version 3.2, UL Environment, December 12, 2018.

Product Category Rules (PCR) Guidance for Building-Related Products and Services - Part B: Building Envelope Thermal Insulation EPD Requirements, UL 10010-1 Version 2.0, UL Environment, April 10, 2018.

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 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 C423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

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

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

NOM-018-ENER-2011, Thermal Insulation for Buildings, Characteristics, Limits and Test terms

