

ENVIRONMENTAL PRODUCT DECLARATION

FIBERGLAS™ PIPE INSULATION

OWENS CORNING



Owens Corning® FIBERGLAS™ Pipe Insulation



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. 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.

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FIBERGLAS™ Pipe Insulation
No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

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

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 333 Pfingsten Road Northbrook, IL 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	4789384355.101.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Fiberglass Pipe Insulation material with a length of 1 m
REFERENCE PCR AND VERSION NUMBER	Part B: Mechanical, Specialty, Thermal, and Acoustic Insulation Product EPD Requirements, UL 10010-03
DESCRIPTION OF PRODUCT APPLICATION/USE	FIBERGLAS™ Pipe Insulation is molded of heavy density resin bonded inorganic glass fibers that come in one-piece, 36" long, hinged sections, tailored to fit for copper and iron pipe applications.
PRODUCT RSL DESCRIPTION (IF APPL.)	75 years
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	July 1, 2020
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-Specific
RANGE OF DATASET VARIABILITY	N/A
EPD SCOPE	Cradle to gate with options (A4, A5, C1-C4)
YEAR(S) OF REPORTED PRIMARY DATA	2019
LCA SOFTWARE & VERSION NUMBER	SimaPro 9.0.0.35
LCI DATABASE(S) & VERSION NUMBER	ecoinvent 3.5
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1 v1.05; Cumulative Energy Demand LHV (CED) V1.00

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

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

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1. Product Definition and Information

1.1. Description of Company/Organization

Founded in 1938, Owens Corning has been a leader in insulation, roofing and fiberglass composites. It has a global presence with 20,000 people in 33 countries. This Environmental Product Declaration is representative of product produced at the locations listed below.

Newark Plant Newark, OH 43055	Mexico City Insulation Plant Mexico City, CDMX 14-813 07360, Mexico

1.2. Product Description

Product Identification

FIBERGLAS™ Pipe Insulation is a family of glass wool pipe insulation products consisting of a cylindrical form molded of heavy density resin bonded inorganic glass fibers produced in one-piece, 36" (914mm) long, hinged sections; it is used in a variety of mechanical applications, including HVAC and plumbing, in both commercial and industrial buildings, requiring the use of pipe insulation. FIBERGLAS™ Pipe Insulation products are made either with FlexCore technology enabling a core with greater flexibility, which more easily compresses over pipe fittings, or with RigidCore technology enabling a core with greater rigidity, which permits fast and easy fabrication on larger pipes. It comes either jacketed with factory-applied ASJ Max or as unjacketed No-Wrap. To meet the needs of different types of piping applications, FIBERGLAS™ Pipe Insulation is available in a wide range of inside diameters and insulation wall thicknesses.



Product Availability†

Insulation Thickness	Iron Pipe Sizes‡		Copper Tubing Sizes‡	
	NPS	[OD]	CTS	[OD]
½"	½" - 2½"	[0.84" - 2½"]	½" - 2½"	[¾" - 2¾"]
1"	½" - 36"	[0.84" - 36"]	½" - 6"	[¾" - 6¾"]
1½"	½" - 36"	[0.84" - 36"]	½" - 6"	[¾" - 6¾"]
2"	½" - 36"	[0.84" - 36"]	½" - 6"	[¾" - 6¾"]
2½"	1½" - 36"	[1.90" - 36"]	3" - 6"	[3¾" - 6¾"]
3"	1½" - 36"	[1.90" - 36"]	3" - 6"	[3¾" - 6¾"]
3½"	1½" - 35"	[1.90" - 35"]	3" - 6"	[3¾" - 6¾"]
4"	1½" - 34"	[1.90" - 34"]	3" - 6"	[3¾" - 6¾"]
4½"	1½" - 33"	[1.90" - 33"]	3" - 6"	[3¾" - 6¾"]
5"	1½" - 32"	[1.90" - 32"]	3" - 6"	[3¾" - 6¾"]

‡. Additional sizes are MTO and available upon request; refer to [FIBERGLAS™ Pipe Insulation Sizing Manual](#) (Pub. No. 10018078).

†. For additional information, visit www.owenscorning.com.



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Product Specification

	SSL II® with ASJ Max FIBERGLAS™ Pipe Insulation	Large Diameter FIBERGLAS™ Pipe Insulation SSL® with ASJ Max	Metric FIBERGLAS™ Pipe Insulation SSL II® with ASJ Max	No-Wrap FIBERGLAS™ Pipe Insulation
Density (size dependent) ASTM C302	3.5 to 5.5 pcf	3.5 to 5.5 pcf	3.5 to 5.5 pcf	3.5 to 5.5 pcf
Operating Temperature Range ¹ ASTM C411	0°F to 1,000°F (-18°C to 538°C)	0°F to 1,000°F (-18°C to 538°C)	0°F to 1,000°F (-18°C to 538°C)	0°F to 1,000°F (-18°C to 538°C)
Corrosion Resistance ASTM C665	Pass - steel, copper, and aluminum	Pass - steel, copper, and aluminum	Pass - steel, copper, and aluminum	Pass - steel, copper, and aluminum
Corrosion Resistance ASTM C1617	Pass - steel	Pass - steel	Pass - steel	Pass - steel
Water Vapor Sorption ASTM C1104	Less than 5% by weight	Less than 5% by weight	Less than 5% by weight	Less than 5% by weight
Surface Burning Characteristics ² UL 723, ASTM E84 or CAN/ULC-S102	Flame Spread 25 Smoke Developed 50	Flame Spread 25 Smoke Developed 50	Flame Spread 25 Smoke Developed 50	Flame Spread 0 Smoke Developed 0
Jacket Temperature Limitation ASTM C1136	Type I, II, III, IV, X -20°F to 150°F (-29°C to 66°C)	Type I, II, III, IV, X -20°F to 150°F (-29°C to 66°C)	Type I, II, III, IV, X -20°F to 150°F (-29°C to 66°C)	---
Jacket Vapor Permeance ASTM E96, Proc. A	0.01 perm	0.01 perm	0.01 perm	---
Burst Strength, min ASTM D774/D774M	100 psi	100 psi	100 psi	---
Fungi Resistance ASTM C1338	Jacket does not support mold growth.	Jacket does not support mold growth.	Jacket does not support mold growth.	---

1. Requires heat-up schedule when operating temperatures are between 850°F and 1,000°F.

2. The surface burning characteristics of these products have been determined in accordance with UL 723, ASTM E84 or CAN/ULC-S102. Values are reported to the nearest 5 rating. Rating applies to composite surface for ASJ Max FIBERGLAS™ Pipe Insulation.

--- indicates specification is not applicable to product.

Product Average

The results of this declaration represent an average performance for the listed products and manufacturing locations. Reported densities for included products and production locations are from manufacturing, facility-level data to create a production-weighted average, which was used to determine the mass of the declared unit for the LCA.

1.3. Application

- Used to insulate iron, copper, PVC and other polymer pipes with operating temperatures between 0°F (-18°C) to 1,000°F (538°C) in commercial & institutional buildings, and industrial facilities
- When temperatures are above 650°F (454°C), maximum installed insulation thickness shall be no greater than 6" as a single layer or nested
- Rated per ASTM C547, Type I, Grade A - Pipe insulation can be installed on in-service/hot pipes with an operating temperature up to 850°F (454°C)
- Rated per ASTM C547, Type IV, Grade B - When operating temperatures will be between 850°F (454°C) to 1,000°F (538°C), a heat-up schedule needs to be followed per the Installation Instructions, Pub No. 10021355
- Plenum Rated - SSL II® with ASJ Max FIBERGLAS™ Pipe Insulation is fully compliant, UL Listed and Labeled Pipe Insulation under UL File R14111, Category BSMP and carries a designation of "FHC 25/50" for installation over polymer pipes
- When installed outdoors, an additional weather-protective jacket is required



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1.4. Declaration of Methodological Framework

This declaration is a product-specific EPD and is cradle-to-installation with end-of-life. The underlying LCA upon which this EPD is based included the following life cycle modules: *Raw Material supply (A1); Inbound Transportation (A2); Manufacturing (A3); Distribution (A4); Installation (A5); End-of-life, Transport (C2) and End-of-life, Disposal (C4)*. No known flows have been deliberately excluded. The product is expected to perform as claimed for the 75-year reference service life if it remains dry in its installed state.

1.5. Technical Requirements

At a minimum, FIBERGLAS™ Pipe Insulation products meet or exceed the following:

- ❖ **Density and Dimensions**
 - Tested in accordance with ASTM C302, *Standard Test Method for Density and Dimensions of Preformed Pipe-Covering-Type Thermal Insulation*
- ❖ **Operating Temperature Range¹**
 - 0°F to 1,000°F (-18°C to 538°C) when tested in accordance with ASTM C411, *Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation*
- ❖ **Water Vapor Sorption**
 - Absorption of less than 5% by weight when tested in accordance with ASTM C1104, *Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation*
- ❖ **Corrosion Resistance**
 - Pass for steel when tested in accordance with ASTM C1617, *Standard Practice for Quantitative Accelerated Laboratory Evaluation of Extraction Solutions Containing Ions Leached from Thermal Insulation on Aqueous Corrosion of Metals*
- ❖ **Surface Burning Characteristics**
 - Flame Spread 0, Smoke Developed 0 for No-Wrap FIBERGLAS™ Pipe Insulation and Flame Spread 25, Smoke Developed 50 for ASJ Max FIBERGLAS™ Pipe Insulation when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*

ASJ Max FIBERGLAS™ Pipe Insulation products additionally meet or exceed the following:

- ❖ **Jacket Temperature Limitation**
 - -20°F to 150°F (-29°C to 66°C) for Type I, II, III, IV, and X when tested in accordance with ASTM C1136, *Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation*
- ❖ **Jacket Vapor Permeance**
 - 0.01 perm when tested in accordance with ASTM E96, *Standard Test Methods for Water Vapor Transmission of Materials*
- ❖ **Burst Strength**
 - 100 psi when tested in accordance with ASTM D774/D774M, *Standard Test Method for Bursting Strength of Paper*
- ❖ **Fungi Resistance**
 - ASJ Max jacket does not support mold growth when tested in accordance with ASTM C1338, *Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings*

¹ Requires heat-up schedule when operating temperatures are between 850°F and 1,000°F.



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1.6. Properties of Declared Product as Delivered

When installed in typical building and construction assemblies according to all applicable Owens Corning specifications, recommendations and guidelines, FIBERGLAS™ Pipe Insulation delivers its advertised properties.

1.7. Material Composition

FIBERGLAS™ Pipe Insulation consists of two major components, glass fibers and a binder. Glass fibers are made from various inorganic minerals, which make up the batch. The primary material used in the batch is cullet or recycled glass. The reuse of cullet into fiberglass pipe insulation results in a minimum total recycled content of 53% in the final product. The binder, or resin, consists of non-renewable, organic chemicals. Raw materials are sourced locally and transported to manufacturing facilities.

Material Component	Material Component%
FIBERGLAS™ Pipe Insulation	
Batch	
Borates	12-15%
Cullet	50-53%
Oxides	<1%
Sand	19-22%
Silicates	4-7%
Soda ash	5-8%
Binder	
Ammonium hydroxide	1-4%
Coupling agent	<1%
Dust suppressant	<1%
Phenol urea formaldehyde resin	5-8%

FIBERGLAS™ Pipe Insulation is produced either jacketed with factory-applied ASJ Max or as unjacketed No-Wrap. The jacket material, which is adhered to the pipe insulation surface with hot melt adhesive, is a durable, cleanable, poly-encapsulated multi-layered laminated material.

Material Component	Material Component%
ASJ Max Jacket Addon	
Jacketing	
Hot melt adhesive	10-13%
Polymer film	23-26%
Proprietary core	34-37%
Fiberglass mat	21-24%
Aluminum foil	9-12%

1.8. Manufacturing

Manufacturing Locations

Owens Corning North American manufacturing locations can be found across the United States, Canada and Mexico. Primary data from these two manufacturing facilities were used for the underlying life cycle assessment. Results provided in this declaration are based on a production-weighted average of these two manufacturing facilities.

Newark Plant Newark, OH 43055	Mexico City Insulation Plant Mexico City, CDMX 14-813 07360, Mexico
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Manufacturing Process

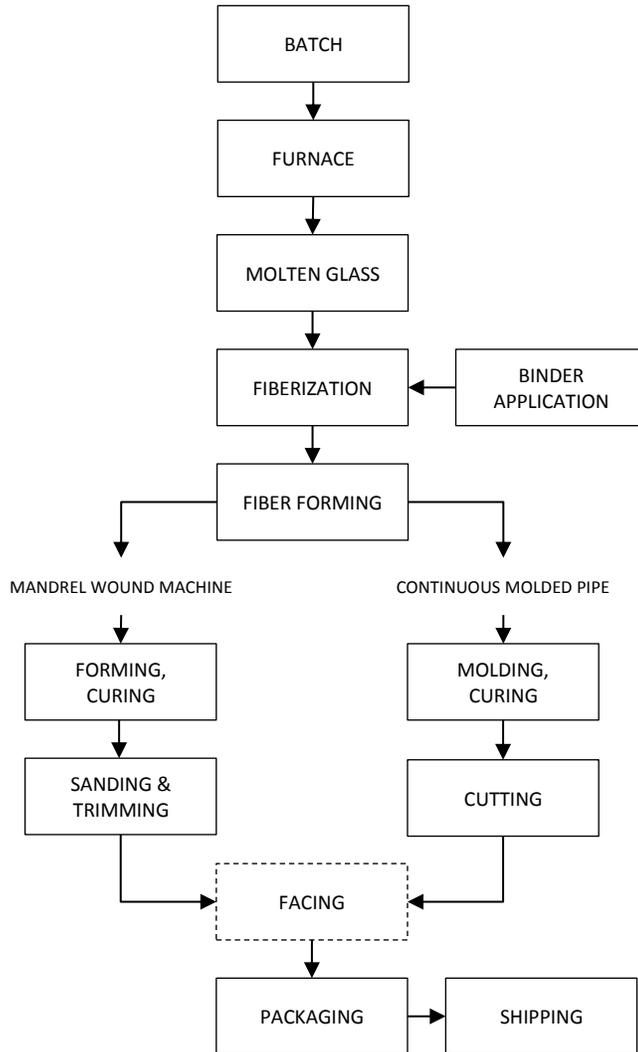


Figure 1. Process Flow Diagram for Manufacturing of FIBERGLAS™ Pipe Insulation

The diagram above for FIBERGLAS™ Pipe Insulation is representative of the processes used by the manufacturing facilities. Although minor differences exist due to the availability of specific suppliers for materials, there are no significant process differences among manufacturing locations.



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1.9. Packaging

FIBERGLAS™ Pipe Insulation products are packaged in either cardboard cartons or polyethylene bags. Regional disposal scenarios for the U.S. were used as a default assumption for the packaging waste generated during installation. Disposal rates used by material type and waste treatment method are shown in the table below.

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%

1.10. Transportation

The product outbound transportation from manufacturing facility is by diesel-truck. The average distance from manufacturing facility to construction site for FIBERGLAS™ Pipe Insulation is 174 mi (280 km).

1.11. Product Installation

No-Wrap:

No-Wrap FIBERGLAS™ Pipe Insulation is designed for field jacketing. The pipe section is opened by the hinged sections, placed over the pipe, carefully aligned, and secured by wires or bands, jacketed and vapor sealed as required by the application. When installed outdoors, an additional weather-protective jacket is required.

ASJ Max:

1. Ambient application temperatures are from 25°F (-4°C) to 110°F (43°C).
2. Open the hinged sections and place the insulation over the pipe, taking care not to get dirt, dust or moisture on the overlap area.
3. Pull the release strip from the lap. While preparing to close the insulation, do not allow the adhesive to contact anything until the insulation is properly lined up and closed over the pipe.
4. Seal the insulation. Start by pulling the lap down at the middle until the adhesive touches the jacket. Press together. Rub firmly with nylon sealing tool or squeegee from the middle of the section toward the end, until the lap is securely adhered to the jacket.
5. Apply the matching butt strip centered over the adjoining pipe sections and rub with firm pressure to complete the positive closure.



Note: After adhesive tack and when the butt strip is applied, it is critical that the closures are not re-opened and repositioned on the facing. Doing so will diminish the bond strength.

For more information, refer to [FIBERGLAS™ Pipe Insulation Installation Instructions](#) (Pub. No. 10021355).



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1.12. Use

Due to its nature, FIBERGLAS™ Pipe Insulation is a passive device requiring no utilities or maintenance over its useful life. Provided the fiberglass pipe insulation is used as intended, during the use phase, reductions in a building's energy consumption do occur; however, the energy savings from the use of pipe insulation have not been included within the system boundaries.

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

FIBERGLAS™ Pipe Insulation may be reused; however, no formal recycling programs currently exist for fiberglass pipe insulation.

1.15. Disposal

The End of Life stage modeled for fiberglass pipe insulation consisted of the transportation by tractor-trailer truck of the insulation for an assumed distance of 100 miles (161 km) to a landfill and the subsequent disposal of the used insulation in the landfill.



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2. Life Cycle Assessment Background Information

2.1. Function and Declared Unit

For FIBERGLAS™ Pipe Insulation, the declared unit is 1 m of pipe insulation material as delivered, with packaging included, with a building service life (ESL) of 75 years. In addition to having a prescribed length of 1 m, the declared unit has a density and wall thickness that were determined using a production-weighted average. These properties were used to calculate the mass reference flow, which was normalized to 1 kg, enabling the reporting of impact results, which can be transparently scaled to pipe insulation of various sizes. In this manner, the declared unit has a length of 1 m at 1 kg. Physical properties of the declared unit of FIBERGLAS™ Pipe Insulation including additional parameters can be found in Table 1 below.

Table 1. Declared Unit Properties of FIBERGLAS™ Pipe Insulation

FIBERGLAS™ Pipe Insulation	
Declared unit	pipe insulation material with a length of 1 m
Mass of Declared unit	1.00E+00 kg
Density of Declared unit	6.93E+01 kg/m ³
Wall thickness of Declared unit	3.58E+00 cm
Outer diameter of Declared unit	1.64E+01 cm

For the declared unit, the amount of pipe insulation material in jacketed FIBERGLAS™ Pipe Insulation is the same as that of unjacketed FIBERGLAS™ Pipe Insulation. However, jacketed FIBERGLAS™ Pipe Insulation has an area of jacket material, which is adhered during manufacture to the fiberglass insulation surface. The jacket is fastened during installation by a pre-applied length of one of two different types of adhesive tape. Scaling factors to one lineal foot have been included for different pipe insulation sizes to allow for the addition of impacts from the jacketing add-ons to the impacts of unjacketed FIBERGLAS™ Pipe insulation. The declared unit of the ASJ Max jacket add-on is 1 m², and the declared unit amount of each adhesive tape add-on is 1 m.

Table 2. Declared Unit Properties of Jacketing Addons for Jacketed FIBERGLAS™ Pipe Insulation

SSL II Adhesive Tape Addon	
Declared unit	1 m of Adhesive Tape Addon
Mass of Declared unit	6.10E-03 kg
Length of Declared unit	1 m
SSL I Adhesive Tape Addon	
Declared unit	1 m of Adhesive Tape Addon
Mass of Declared unit	1.13E-02 kg
Length of Declared unit	1 m
ASJ Max Jacket Addon	
Declared unit	1 m ² of Jacket Addon
Mass of Declared unit	1.81E-01 kg
Area of Declared unit	1 m ²



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2.2. System Boundary

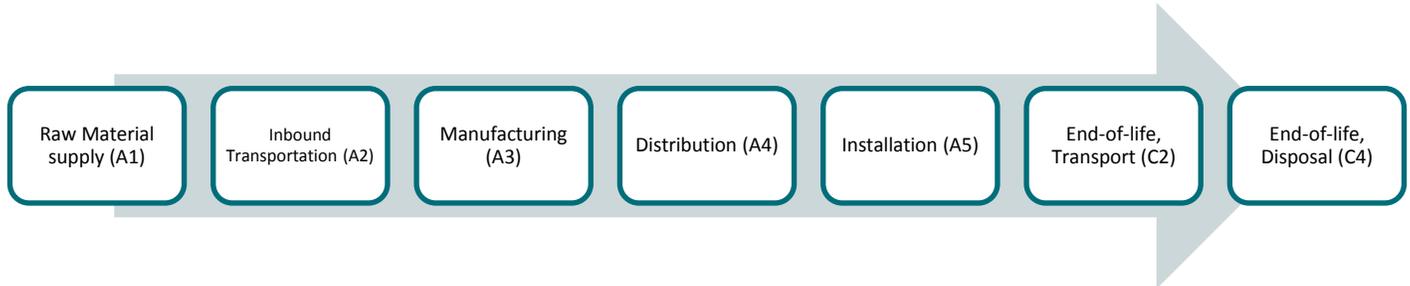


Figure 2. System Boundary of FIBERGLAS™ Pipe Insulation

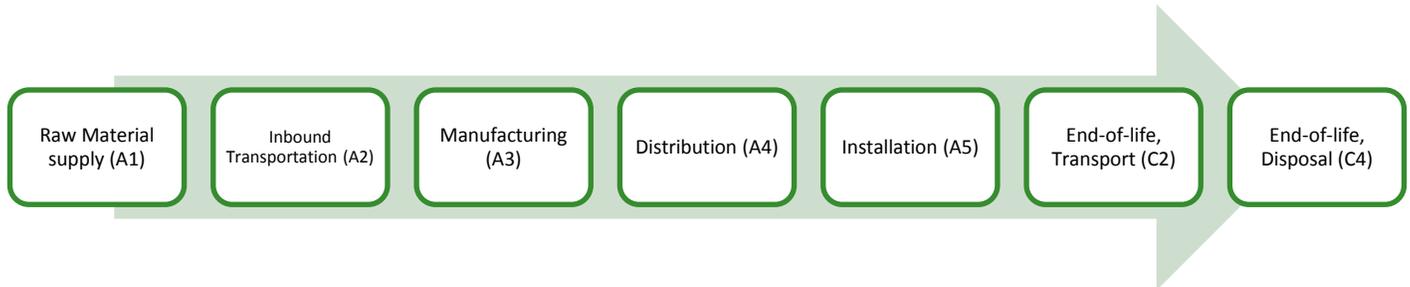


Figure 3. System Boundary of Jacketing Addons for Jacketed FIBERGLAS™ Pipe Insulation

The system boundaries for this study include inputs and outputs for the following life cycle stages for fiberglass pipe insulation:

- ❖ Raw Material supply (A1) – applicable to FIBERGLAS™ Pipe Insulation and Jacketing Addons
 - extraction of resources and production of raw materials
 - collection and processing of recycled materials
 - extraction of resources and production of packaging materials for finished goods
- ❖ Inbound Transportation (A2) – applicable to FIBERGLAS™ Pipe Insulation and Jacketing Addons
 - transportation of all input materials to manufacturing facilities
- ❖ Manufacturing (A3) – applicable to FIBERGLAS™ Pipe Insulation and Jacketing Addons
 - electricity and water use and combustion of natural gas (consumption and associated emissions)
 - transportation of fuels and consumable materials used in manufacturing
 - transportation of waste materials for recycling externally
 - transportation of waste-to-landfill waste to landfill as well as disposal in landfill
 - air emissions from fiber collection as well as from curing, cutting, sanding and trimming fiberglass pipe insulation and other releases to environmental media
- ❖ Distribution (A4) – applicable to FIBERGLAS™ Pipe Insulation and Jacketing Addons
 - transportation from manufacturing facilities to distribution centers
 - transportation from distribution centers to construction site
- ❖ Installation (A5) – applicable to FIBERGLAS™ Pipe Insulation and Jacketing Addons
 - transportation and disposal of packaging waste
- ❖ End-of-life, Transport (C2) – applicable to FIBERGLAS™ Pipe Insulation and Jacketing Addons
 - transportation from deconstruction site to landfill
- ❖ End-of-life, Disposal (C4) – applicable to FIBERGLAS™ Pipe Insulation and Jacketing Addons
 - disposal in landfill



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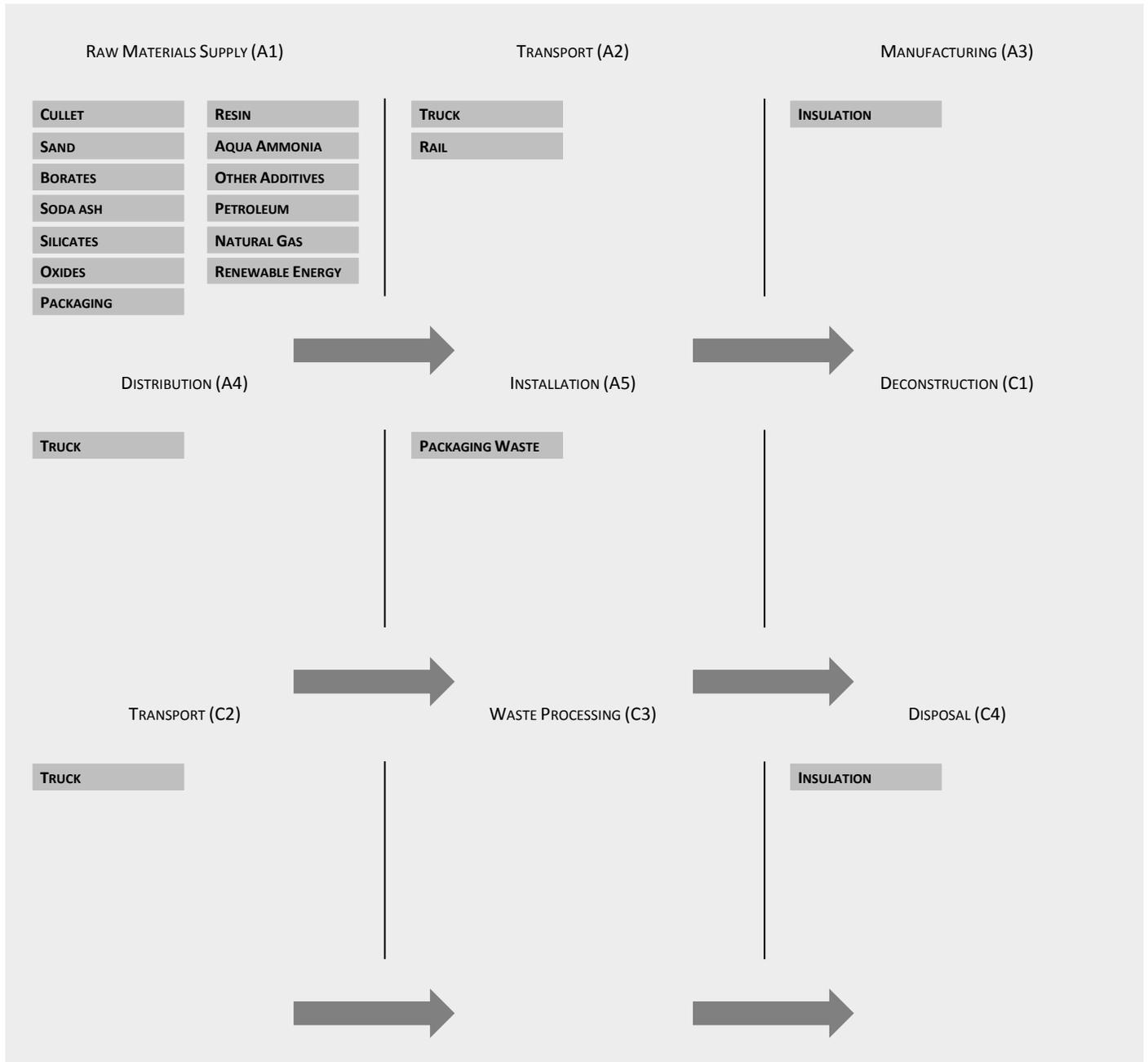


Figure 4. Flow Diagram of FIBERGLAS™ Pipe Insulation



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2.3. Estimates and Assumptions

FIBERGLAS™ Pipe Insulation is a passive device requiring no utilities or maintenance over its useful life; it is assumed that the product remains in service for the 75-year reference service life.

2.4. Cut-off Criteria

Per section 2.9 of the governing PCR, the procedure detailed in ISO 21930, section 7.1.8 was followed regarding the exclusion of inputs and outputs. For energy, mass and environmental impacts, the cut-off criteria were 1% per the standard. Per the standard "the total of neglected input flows per module shall be a maximum of 5% of energy usage, mass and environmental impacts." Flows excluded for this study include infrastructure, capital goods and workforce burdens. Inputs and outputs associated with infrastructure (construction, maintenance and demolition of buildings/plants, road surfaces, transport equipment, etc.) are not included. This choice is based on experience from previous LCAs where the contribution from these items was negligible due to the long lifetime of the equipment compared to the high production volume of material during that lifetime.

2.5. Data Sources

Primary data was collected from the locations listed in the Manufacturing section. Life-cycle modeling and calculation of potential environmental impacts were conducted using the LCA software SimaPro 9, version 9.0.0.35, developed by PRé Consultants bv. The LCI database used for secondary data was the ecoinvent 3.5 database, provided with the Developer version of the software. 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 fiberglass pipe 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.

2.6. Data Quality

To determine how representative the data used to model the life-cycle of Owens Corning® FIBERGLAS™ Pipe Insulation manufactured in 2019 is, the temporal, geographical and technological aspects of the data were assessed. For the Owens Corning facilities analyzed in the underlying LCA study, the data used adequately represents the technology used in 2019 in North America.

2.7. Period under Review

For the manufacturing facilities considered in the LCA, Owens Corning primary data was collected for the 2019 calendar year.

2.8. Allocation

The products studied in this analysis are all members of the FIBERGLAS™ Pipe Insulation product family. Plants reported the total amount of pipe insulation produced as well as the amount produced of each individual product. In general, the characteristics that differentiate one product from another within the family are its density, core flexibility and dimensional size. Particular product application can be considered another differentiating characteristic; however, these three attributes are the main physical properties that distinguish one product from another.

Exceptions to this are jacketed FIBERGLAS™ Pipe Insulation. For these products, it was possible to avoid allocation by treating the jacketing materials as separate modular processes, the LCIs of which were analyzed separately. Aside from those mentioned, no other allocation modeling considerations were necessary.

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3. Life Cycle Assessment Scenarios

Table 3. Transport to the building site (A4)

	FIBERGLAS™ Pipe Insulation (1 m at 1 kg)	Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)	ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)	
	FPI	[SSL II, SSL I]	ASJ Max	
Fuel type	diesel, low-sulfur	diesel, low-sulfur	diesel, low-sulfur	
Liters of fuel	4.54E-03	[2.77E-05, 5.12E-05]	8.20E-04	l/100km
Vehicle type	Transport, freight, lorry 16-32 metric ton, EURO3	Transport, freight, lorry 16-32 metric ton, EURO3	Transport, freight, lorry 16-32 metric ton, EURO3	
Transport distance	2.80E+02	[2.80E+02, 2.80E+02]	2.80E+02	km
Capacity utilization (including empty runs, mass based) [†]	63%	63%	63%	%
Gross density of products transported	6.93E+01	[1.05E+03, 1.69E+03]	8.15E+02	kg/m ³
Weight of products transported (if gross density not reported)	1.00E+00	[6.10E-03, 1.13E-02]	1.81E-01	kg
Volume of products transported (if gross density not reported)	1.44E-02	[5.83E-06, 6.68E-06]	2.22E-04	m ³
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	1	1	1	-

[†] EcoTransIT. 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)



ENVIRONMENTAL PRODUCT DECLARATION



FIBERGLAS™ Pipe Insulation
No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

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

Table 4. Installation into the building (A5)

	FIBERGLAS™ Pipe Insulation (1 m at 1 kg)	Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)	ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)	
	FPI	[SSL II, SSL I]	ASJ Max	
Ancillary materials	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	m³
Other resources	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	kWh
Other energy carriers	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	kg
Waste materials at the construction site before waste processing, generated by product installation	5.72E-01	[0.00E+00, 0.00E+00]	0.00E+00	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	kg
Biogenic carbon contained in packaging	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	kg
VOC content [†]	0.00E+00	[0.00E+00, 0.00E+00]	0.00E+00	µg/m³

[†] VOC content determined in accordance to "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers - version 1.2." CA Specification 01350.



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FIBERGLAS™ Pipe Insulation
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According to ISO 14025,
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Table 5. Reference Service Life

RSL	75 years
Declared product properties (at the gate) and finishes, etc.	Not applicable (Insulation properties require installation onto iron, copper, PVC and other polymer pipes.)
Design application parameters (if instructed by the manufacturer), including references to the appropriate practices and application codes)	Install per instructions
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Not applicable (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	When installed outdoors, an additional weather-protective jacket is required. (Indoor or covered in outdoor applications)
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.	The product has a maximum operating temperature of 1,000°F (538°C) (with heat-up schedule). (Insulation is a passive product which is not used directly during life)
Maintenance, e.g. required frequency, type and quality of replacement components	None needed (Insulation does not need maintenance during its use)



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No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

According to ISO 14025,
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Table 6. End-of-life, Transport (C2)

		FIBERGLAS™ Pipe Insulation (1 m at 1 kg)	Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)	ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)	
		FPI	[SSL II, SSL I]	ASJ Max	
Assumptions for scenario development (description of deconstruction, collection, recovery, disposal method and transportation)	Although reuse and recycling of fiberglass pipe 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	kg
	Collected with mixed construction waste	1.00E+00	[6.10E-03, 1.13E-02]	1.81E-01	kg
Recovery (specified by type)	Reuse	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	kg
	Landfill	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	kg
	Incineration with energy recovery	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	
Disposal (specified by type)	Product or material for final deposition	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	kg CO ₂



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FIBERGLAS™ Pipe Insulation
No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

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

Table 7. End-of-life, Disposal (C4)

		FIBERGLAS™ Pipe Insulation (1 m at 1 kg)	Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)	ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)	
		FPI	[SSL II, SSL I]	ASJ Max	
Assumptions for scenario development (description of deconstruction, collection, recovery, disposal method and transportation)	Although reuse and recycling of fiberglass pipe 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	kg
	Collected with mixed construction waste	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	kg
	Recycling	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	kg
	Incineration	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	kg
	Energy conversion efficiency rate	0.00E+00	[0.00E+00, 0.00E+00]	0.00E+00	
Disposal (specified by type)	Product or material for final deposition	1.00E+00	[6.10E-03, 1.13E-02]	1.81E-01	kg
Removals of biogenic carbon (excluding packaging)		0.00E+00	[0.00E+00, 0.00E+00]	0.00E+00	kg CO ₂



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FIBERGLAS™ Pipe Insulation
No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

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

4. Life Cycle Assessment Results

Table 8. 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	Reference Service Life
FIBERGLAS™ Pipe Insulation (1 m at 1 kg)	x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	MND	x	MND	75 years
Adhesive Tape Addon for ASJ Max FBERGLAS™ Pipe Insulation (1 m)	x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	MND	x	MND	75 years
ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)	x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	MND	x	MND	75 years
EPD Type: Cradle to installation with end of life	Required					Optional (Based on scenarios)							Required				Required	



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FIBERGLAS™ Pipe Insulation
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According to ISO 14025,
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4.1. Life Cycle Impact Assessment Results

Table 9 LCIA Results for North America (TRACI) for FIBERGLAS™ Pipe Insulation (1 m at 1 kg)

FIBERGLAS™ Pipe Insulation (1 m at 1 kg)								
TRACI v2.1	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
GWP 100 [kg CO2 eq]	6.13E+00	4.59E-02	8.88E-03	MND	MND	2.64E-02	MND	5.25E-03
ODP [kg CFC-11 eq]	7.11E-07	1.13E-08	1.88E-09	MND	MND	6.52E-09	MND	2.54E-09
AP [kg SO2 eq]	4.03E-02	2.86E-04	4.91E-05	MND	MND	1.64E-04	MND	4.59E-05
EP [kg N eq]	4.68E-02	5.70E-05	8.59E-05	MND	MND	3.28E-05	MND	9.80E-06
POCP [kg O3 eq]	3.11E-01	7.75E-03	1.32E-03	MND	MND	4.46E-03	MND	1.09E-03
ADP _{fossil} [MJ, LHV]	8.90E+00	1.02E-01	1.70E-02	MND	MND	5.86E-02	MND	2.35E-02

[GWP 100 - Global Warming Potential]; [ODP - Ozone Depletion Potential]; [AP - Acidification Potential]; [EP - Eutrophication Potential]; [POCP - Smog Formation Potential]; [ADP_{fossil} - Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources]

Table 10 LCIA Results for North America (TRACI) for ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)

ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m ²)								
TRACI v2.1	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
GWP 100 [kg CO2 eq]	6.50E-01	8.35E-03	0.00E+00	MND	MND	4.80E-03	MND	9.48E-04
ODP [kg CFC-11 eq]	3.50E-08	2.06E-09	0.00E+00	MND	MND	1.18E-09	MND	4.58E-10
AP [kg SO2 eq]	3.49E-03	5.20E-05	0.00E+00	MND	MND	2.99E-05	MND	8.30E-06
EP [kg N eq]	1.77E-03	1.04E-05	0.00E+00	MND	MND	5.96E-06	MND	1.77E-06
POCP [kg O3 eq]	4.54E-02	1.41E-03	0.00E+00	MND	MND	8.10E-04	MND	1.97E-04
ADP _{fossil} [MJ, LHV]	9.44E-01	1.85E-02	0.00E+00	MND	MND	1.07E-02	MND	4.25E-03

[GWP 100 - Global Warming Potential]; [ODP - Ozone Depletion Potential]; [AP - Acidification Potential]; [EP - Eutrophication Potential]; [POCP - Smog Formation Potential]; [ADP_{fossil} - Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources]

Table 11 LCIA Results for North America (TRACI) for Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)

Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)								
SSL II Adhesive Tape Addon (1 m)								
TRACI v2.1	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
GWP 100 [kg CO2 eq]	1.47E-02	2.82E-04	0.00E+00	MND	MND	1.62E-04	MND	3.20E-05
ODP [kg CFC-11 eq]	1.85E-09	6.95E-11	0.00E+00	MND	MND	4.00E-11	MND	1.55E-11
AP [kg SO2 eq]	6.44E-05	1.75E-06	0.00E+00	MND	MND	1.01E-06	MND	2.80E-07
EP [kg N eq]	5.04E-05	3.50E-07	0.00E+00	MND	MND	2.01E-07	MND	5.97E-08
POCP [kg O3 eq]	1.05E-03	4.76E-05	0.00E+00	MND	MND	2.73E-05	MND	6.66E-06
ADP _{fossil} [MJ, LHV]	3.04E-02	6.26E-04	0.00E+00	MND	MND	3.60E-04	MND	1.44E-04
SSL I Adhesive Tape Addon (1 m)								
TRACI v2.1	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
GWP 100 [kg CO2 eq]	1.78E-02	5.21E-04	0.00E+00	MND	MND	3.00E-04	MND	5.92E-05
ODP [kg CFC-11 eq]	2.12E-09	1.29E-10	0.00E+00	MND	MND	7.40E-11	MND	2.86E-11
AP [kg SO2 eq]	9.35E-05	3.25E-06	0.00E+00	MND	MND	1.87E-06	MND	5.18E-07
EP [kg N eq]	6.51E-05	6.47E-07	0.00E+00	MND	MND	3.72E-07	MND	1.11E-07
POCP [kg O3 eq]	1.49E-03	8.80E-05	0.00E+00	MND	MND	5.06E-05	MND	1.23E-05
ADP _{fossil} [MJ, LHV]	3.06E-02	1.16E-03	0.00E+00	MND	MND	6.65E-04	MND	2.66E-04

[GWP 100 - Global Warming Potential]; [ODP - Ozone Depletion Potential]; [AP - Acidification Potential]; [EP - Eutrophication Potential]; [POCP - Smog Formation Potential]; [ADP_{fossil} - Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources]



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FIBERGLAS™ Pipe Insulation
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According to ISO 14025,
EN 15804 and ISO 21930:2017

4.2. Life Cycle Inventory Results

Table 12 Resource Use for FIBERGLAS™ Pipe Insulation (1 m at 1 kg)

Parameter	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
RPRE [MJ, LHV]	1.46E+00	6.98E-03	1.22E-03	MND	MND	4.01E-03	MND	1.33E-03
RPRM [MJ, LHV]	3.88E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRPRE [MJ, LHV]	1.14E+02	7.12E-01	1.18E-01	MND	MND	4.09E-01	MND	1.62E-01
NRPRM [MJ, LHV]	2.30E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
SM [kg]	4.79E-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 [m3]	3.22E-02	1.27E-04	4.37E-05	MND	MND	7.29E-05	MND	1.69E-04

[RPRE - Renewable primary energy used as energy carrier (fuel)]; [RPRM - Renewable primary resources with energy content used as material]; [NRPRE - Non-renewable primary resources used as an energy carrier (fuel)]; [NRPRM - 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 13 Resource Use for ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)

Parameter	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
RPRE [MJ, LHV]	2.08E+00	1.27E-03	0.00E+00	MND	MND	7.30E-04	MND	2.40E-04
RPRM [MJ, LHV]	9.95E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRPRE [MJ, LHV]	7.20E+00	1.29E-01	0.00E+00	MND	MND	7.44E-02	MND	2.93E-02
NRPRM [MJ, LHV]	2.37E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
SM [kg]	0.00E+00	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 [m3]	8.07E-03	2.30E-05	0.00E+00	MND	MND	1.32E-05	MND	3.06E-05

Table 14 Resource Use for Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)

SSL II Adhesive Tape Addon (1 m)								
Parameter	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
RPRE [MJ, LHV]	8.06E-02	4.28E-05	0.00E+00	MND	MND	2.46E-05	MND	8.09E-06
RPRM [MJ, LHV]	3.93E-02	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRPRE [MJ, LHV]	1.69E-01	4.37E-03	0.00E+00	MND	MND	2.51E-03	MND	9.90E-04
NRPRM [MJ, LHV]	9.26E-02	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
SM [kg]	0.00E+00	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 [m3]	3.26E-04	7.78E-07	0.00E+00	MND	MND	4.47E-07	MND	1.03E-06
SSL I Adhesive Tape Addon (1 m)								
Parameter	A1 - A3	A4	A5	B1 - B7	C1	C2	C3	C4
RPRE [MJ, LHV]	2.14E-01	7.93E-05	0.00E+00	MND	MND	4.56E-05	MND	1.50E-05
RPRM [MJ, LHV]	1.32E-01	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
NRPRE [MJ, LHV]	2.08E-01	8.08E-03	0.00E+00	MND	MND	4.64E-03	MND	1.83E-03
NRPRM [MJ, LHV]	7.70E-02	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
SM [kg]	0.00E+00	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 [m3]	5.51E-04	1.44E-06	0.00E+00	MND	MND	8.27E-07	MND	1.91E-06



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According to ISO 14025,
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Table 15 Output Flows and Waste Categories for FIBERGLAS™ Pipe Insulation (1 m at 1 kg)

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]	5.35E-01	0.00E+00	5.69E-02	MND	MND	0.00E+00	MND	1.00E+00
HLRW [kg] or [m3]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
ILLRW [kg] or [m3]	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]	3.50E-02	0.00E+00	1.88E-01	MND	MND	0.00E+00	MND	0.00E+00
MER [kg]	0.00E+00	0.00E+00	1.42E-02	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]; [MR - Materials for recycling]; [MER - Materials for energy recovery]; [EE - Exported energy];

Table 16 Output Flows and Waste Categories for ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)

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]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	1.81E-01
HLRW [kg] or [m3]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
ILLRW [kg] or [m3]	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

Table 17 Output Flows and Waste Categories for Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)

SSL II Adhesive Tape Addon (1 m)								
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]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	6.10E-03
HLRW [kg] or [m3]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
ILLRW [kg] or [m3]	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
SSL I Adhesive Tape Addon (1 m)								
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]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	1.13E-02
HLRW [kg] or [m3]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
ILLRW [kg] or [m3]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
R [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00
EE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00



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No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

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

Table 18 Carbon Emissions and Removals for FIBERGLAS™ Pipe Insulation (1 m at 1 kg)

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]	0.00E+00	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 - Carbonation Carbon Removals]; [CWNR - Carbon Emissions from Combustion of Waste from Non- Renewable Sources used in Production Processes]

Table 19 Carbon Emissions and Removals for ASJ Max Jacket Addon for FIBERGLAS™ Pipe Insulation (1 m²)

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]	0.00E+00	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

Table 20 Carbon Emissions and Removals for Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)

Adhesive Tape Addon for ASJ Max FIBERGLAS™ Pipe Insulation (1 m)								
SSL II Adhesive Tape Addon (1 m)								
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]	0.00E+00	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
SSL I Adhesive Tape Addon (1 m)								
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]	0.00E+00	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



ENVIRONMENTAL PRODUCT DECLARATION



FIBERGLAS™ Pipe Insulation
No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

According to ISO 14025,
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4.3. Calculating Impact Category Results for Products with Specific Performance Properties

FIBERGLAS™ Pipe Insulation is manufactured in a wide range of inside diameters and insulation wall thicknesses and comes either jacketed with factory-applied ASJ Max or as unjacketed No-Wrap. Environmental impact assessment results have been calculated for unjacketed FIBERGLAS™ Pipe Insulation as well as for the jacketing addons, which consist of ASJ Max jacket material and a pre-applied adhesive tape closure. These results, found in [Table 9](#), [Table 10](#), and, [Table 11](#), respectively, are for declared unit amounts. In order to calculate impact values for FIBERGLAS™ Pipe Insulation having a specific inside diameter and wall thickness with or without jacketing, the following equation can be used:

$$\text{Impact} = \left[\begin{array}{c} \text{Pipe} \\ \text{Insulation} \\ \text{Impact}^{\text{A}} \end{array} \right] \times \left[\begin{array}{c} \text{Pipe} \\ \text{Insulation} \\ \text{Scaling} \\ \text{Factor}^{\text{B}} \end{array} \right] + \left[\begin{array}{c} \text{Jacket} \\ \text{Addon} \\ \text{Impact}^{\text{C}} \end{array} \right] \times \left[\begin{array}{c} \text{Jacket} \\ \text{Addon} \\ \text{Scaling} \\ \text{Factor}^{\text{D}} \end{array} \right] + \left[\begin{array}{c} \text{Adhesive} \\ \text{Tape} \\ \text{Addon} \\ \text{Impact}^{\text{E}} \end{array} \right] \times \left[\begin{array}{c} \text{Adhesive} \\ \text{Tape} \\ \text{Addon} \\ \text{Scaling} \\ \text{Factor}^{\text{F}} \end{array} \right]$$

Notes:

- A. *Pipe Insulation* impact values can be found in [Table 9](#).
- B. *Pipe Insulation* scaling factors can be found in [Table 21](#).
- C. *Jacket Addon* impact values can be found in [Table 10](#).
- D. *Jacket Addon* scaling factors can be found in [Table 22](#).
- E. *Adhesive Tape Addon* impact values can be found in [Table 11](#).
- F. *Adhesive Tape Addon* scaling factor of 0.3048 is used with either SSL II Adhesive Tape Addon or SSL I Adhesive Tape Addon.



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According to ISO 14025,
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Table 21 Pipe Insulation Scaling Factors to One Lineal Foot for the Declared Unit - FIBERGLAS™ Pipe Insulation (1 m at 1 kg)

Thickness →	½"	1"	1 ½"	2"	2 ½"	3"	3 ½"	4"	4 ½"	5"
Inside Diameter										
½"	0.021	0.064	0.128	0.214	0.321	0.449	0.599	0.770	0.963	1.177
¾"	0.024	0.070	0.136	0.225	0.334	0.465	0.618	0.792	0.987	1.203
¾"	0.027	0.075	0.144	0.235	0.348	0.481	0.636	0.813	1.011	1.230
1"	0.032	0.086	0.160	0.257	0.374	0.513	0.674	0.856	1.059	1.284
1 ¼"	0.037	0.096	0.177	0.278	0.401	0.546	0.711	0.899	1.107	1.337
1 ½"	0.043	0.107	0.193	0.300	0.428	0.578	0.749	0.941	1.155	1.391
2"	0.053	0.128	0.225	0.342	0.481	0.642	0.824	1.027	1.252	1.498
2 ⅙"	0.056	0.134	0.233	0.353	0.495	0.658	0.842	1.048	1.276	1.524
2 ½"	0.064	0.150	0.257	0.385	0.535	0.706	0.899	1.112	1.348	1.605
2 ⅔"	0.067	0.155	0.265	0.396	0.548	0.722	0.917	1.134	1.372	1.631
3"	0.075	0.171	0.289	0.428	0.588	0.770	0.973	1.198	1.444	1.712
3 ⅙"	0.078	0.177	0.297	0.439	0.602	0.786	0.992	1.219	1.468	1.738
3 ½"	0.086	0.193	0.321	0.471	0.642	0.834	1.048	1.284	1.540	1.819
3 ⅔"	0.088	0.198	0.329	0.481	0.655	0.850	1.067	1.305	1.564	1.845
4"	0.096	0.214	0.353	0.513	0.695	0.899	1.123	1.369	1.637	1.925
4 ⅙"	0.099	0.219	0.361	0.524	0.709	0.915	1.142	1.391	1.661	1.952
4 ½"	0.107	0.235	0.385	0.556	0.749	0.963	1.198	1.455	1.733	2.032
5"	0.118	0.257	0.417	0.599	0.802	1.027	1.273	1.540	1.829	2.139
5 ⅙"	0.120	0.262	0.425	0.610	0.816	1.043	1.292	1.562	1.853	2.166
6"	0.139	0.300	0.481	0.685	0.909	1.155	1.423	1.712	2.022	2.353
6 ⅙"	0.142	0.305	0.489	0.695	0.923	1.171	1.441	1.733	2.046	2.380
7"	0.160	0.342	0.546	0.770	1.016	1.284	1.572	1.883	2.214	2.567
8"	0.182	0.385	0.610	0.856	1.123	1.412	1.722	2.054	2.407	2.781
9"	0.203	0.428	0.674	0.941	1.230	1.540	1.872	2.225	2.599	2.995
10"	0.225	0.471	0.738	1.027	1.337	1.669	2.022	2.396	2.792	3.209
11"	0.246	0.513	0.802	1.112	1.444	1.797	2.172	2.567	2.984	3.423
12"	0.267	0.556	0.866	1.198	1.551	1.925	2.321	2.738	3.177	3.637
14"	0.310	0.642	0.995	1.369	1.765	2.182	2.621	3.081	3.562	4.065
15"	0.332	0.685	1.059	1.455	1.872	2.311	2.771	3.252	3.755	4.279
16"	0.353	0.727	1.123	1.540	1.979	2.439	2.920	3.423	3.947	4.493
17"	0.374	0.770	1.187	1.626	2.086	2.567	3.070	3.594	4.140	4.707
18"	0.396	0.813	1.252	1.712	2.193	2.696	3.220	3.765	4.332	4.921
19"	0.417	0.856	1.316	1.797	2.300	2.824	3.370	3.937	4.525	5.135
20"	0.439	0.899	1.380	1.883	2.407	2.952	3.519	4.108	4.717	5.349
21"	0.460	0.941	1.444	1.968	2.514	3.081	3.669	4.279	4.910	5.562
22"	0.481	0.984	1.508	2.054	2.621	3.209	3.819	4.450	5.103	5.776
23"	0.503	1.027	1.572	2.139	2.728	3.337	3.969	4.621	5.295	5.990
24"	0.524	1.070	1.637	2.225	2.835	3.466	4.118	4.792	5.488	6.204
25"	0.546	1.112	1.701	2.311	2.942	3.594	4.268	4.963	5.680	6.418
26"	0.567	1.155	1.765	2.396	3.049	3.723	4.418	5.135	5.873	6.632
27"	0.588	1.198	1.829	2.482	3.156	3.851	4.568	5.306	6.065	6.846
28"	0.610	1.241	1.893	2.567	3.263	3.979	4.717	5.477	6.258	7.060
29"	0.631	1.284	1.958	2.653	3.370	4.108	4.867	5.648	6.450	7.274
30"	0.653	1.326	2.022	2.738	3.477	4.236	5.017	5.819	6.643	7.488
31"	0.674	1.369	2.086	2.824	3.584	4.364	5.167	5.990	6.835	7.702
32"	0.695	1.412	2.150	2.910	3.690	4.493	5.316	6.162	7.028	7.916
33"	0.717	1.455	2.214	2.995	3.797	4.621	5.466	6.333	7.221	8.130
34"	0.738	1.498	2.278	3.081	3.904	4.750	5.616	6.504	7.413	8.344
35"	0.759	1.540	2.343	3.166	4.011	4.878	5.766	6.675	7.606	8.558
36"	0.781	1.583	2.407	3.252	4.118	5.006	5.915	6.846	7.798	8.772



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According to ISO 14025,
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Table 22 Jacket Scaling Factors to One Lineal Foot for the Declared Unit - ASJ Max Jacket Addon (1 m²)

Thickness → Inside Diameter	½"	1"	1 ½"	2"	2 ½"	3"	3 ½"	4"	4 ½"	5"
½"	0.036	0.061	0.085	0.109	0.134	0.158	0.182	0.207	0.231	0.255
¾"	0.040	0.064	0.088	0.112	0.137	0.161	0.185	0.210	0.234	0.258
¾"	0.043	0.067	0.091	0.116	0.140	0.164	0.188	0.213	0.237	0.261
1"	0.049	0.073	0.097	0.122	0.146	0.170	0.195	0.219	0.243	0.268
1 ¼"	0.055	0.079	0.103	0.128	0.152	0.176	0.201	0.225	0.249	0.274
1 ½"	0.061	0.085	0.109	0.134	0.158	0.182	0.207	0.231	0.255	0.280
2"	0.073	0.097	0.122	0.146	0.170	0.195	0.219	0.243	0.268	0.292
2 ⅝"	0.076	0.100	0.125	0.149	0.173	0.198	0.222	0.246	0.271	0.295
2 ½"	0.085	0.109	0.134	0.158	0.182	0.207	0.231	0.255	0.280	0.304
2 ¾"	0.088	0.112	0.137	0.161	0.185	0.210	0.234	0.258	0.283	0.307
3"	0.097	0.122	0.146	0.170	0.195	0.219	0.243	0.268	0.292	0.316
3 ⅝"	0.100	0.125	0.149	0.173	0.198	0.222	0.246	0.271	0.295	0.319
3 ½"	0.109	0.134	0.158	0.182	0.207	0.231	0.255	0.280	0.304	0.328
3 ¾"	0.112	0.137	0.161	0.185	0.210	0.234	0.258	0.283	0.307	0.331
4"	0.122	0.146	0.170	0.195	0.219	0.243	0.268	0.292	0.316	0.341
4 ⅝"	0.125	0.149	0.173	0.198	0.222	0.246	0.271	0.295	0.319	0.344
4 ½"	0.134	0.158	0.182	0.207	0.231	0.255	0.280	0.304	0.328	0.353
5"	0.146	0.170	0.195	0.219	0.243	0.268	0.292	0.316	0.341	0.365
5 ⅝"	0.149	0.173	0.198	0.222	0.246	0.271	0.295	0.319	0.344	0.368
6"	0.170	0.195	0.219	0.243	0.268	0.292	0.316	0.341	0.365	0.389
6 ⅝"	0.173	0.198	0.222	0.246	0.271	0.295	0.319	0.344	0.368	0.392
7"	0.195	0.219	0.243	0.268	0.292	0.316	0.341	0.365	0.389	<u>0.413</u>
8"	0.219	0.243	0.268	0.292	0.316	0.341	0.365	0.389	<u>0.413</u>	<u>0.438</u>
9"	0.243	0.268	0.292	0.316	0.341	0.365	0.389	<u>0.413</u>	<u>0.438</u>	<u>0.462</u>
10"	0.268	0.292	0.316	0.341	0.365	0.389	<u>0.413</u>	<u>0.438</u>	<u>0.462</u>	<u>0.486</u>
11"	0.292	0.316	0.341	0.365	0.389	<u>0.413</u>	<u>0.438</u>	<u>0.462</u>	<u>0.486</u>	<u>0.511</u>
12"	0.316	0.341	0.365	0.389	<u>0.413</u>	<u>0.438</u>	<u>0.462</u>	<u>0.486</u>	<u>0.511</u>	<u>0.535</u>
14"	0.365	0.389	0.413	<u>0.438</u>	<u>0.462</u>	<u>0.486</u>	<u>0.511</u>	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>
15"	0.389	0.413	<u>0.438</u>	<u>0.462</u>	<u>0.486</u>	<u>0.511</u>	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>
16"	0.413	<u>0.438</u>	<u>0.462</u>	<u>0.486</u>	<u>0.511</u>	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>
17"	<u>0.438</u>	<u>0.462</u>	<u>0.486</u>	<u>0.511</u>	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>
18"	<u>0.462</u>	<u>0.486</u>	<u>0.511</u>	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>
19"	<u>0.486</u>	<u>0.511</u>	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>
20"	<u>0.511</u>	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>
21"	<u>0.535</u>	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>
22"	<u>0.559</u>	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>
23"	<u>0.584</u>	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>
24"	<u>0.608</u>	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>
25"	<u>0.632</u>	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>
26"	<u>0.657</u>	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>
27"	<u>0.681</u>	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>
28"	<u>0.705</u>	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>
29"	<u>0.730</u>	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>
30"	<u>0.754</u>	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>	<u>0.973</u>
31"	<u>0.778</u>	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>	<u>0.973</u>	<u>0.997</u>
32"	<u>0.803</u>	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>	<u>0.973</u>	<u>0.997</u>	<u>1.022</u>
33"	<u>0.827</u>	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>	<u>0.973</u>	<u>0.997</u>	<u>1.022</u>	<u>1.046</u>
34"	<u>0.851</u>	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>	<u>0.973</u>	<u>0.997</u>	<u>1.022</u>	<u>1.046</u>	<u>1.070</u>
35"	<u>0.876</u>	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>	<u>0.973</u>	<u>0.997</u>	<u>1.022</u>	<u>1.046</u>	<u>1.070</u>	<u>1.094</u>
36"	<u>0.900</u>	<u>0.924</u>	<u>0.949</u>	<u>0.973</u>	<u>0.997</u>	<u>1.022</u>	<u>1.046</u>	<u>1.070</u>	<u>1.094</u>	<u>1.119</u>

Factors without underline indicate ASJ Max for insulation size is pre-applied with SSL II.
Factors with single-underline indicate ASJ Max for insulation size is pre-applied with SSL I.



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FIBERGLAS™ Pipe Insulation
No-Wrap and ASJ Max FIBERGLAS™ Pipe Insulation

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

5. LCA Interpretation

The underlying LCA upon which this EPD is based considered the following six environmental impact categories: Global Warming Potential (GWP 100); Ozone Depletion Potential (ODP); Acidification Potential (AP); Eutrophication Potential (EP); Smog Formation Potential (POCP); and Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources (ADP_{fossil}). The impact assessment results indicate that among the life cycle modules declared for FIBERGLAS™ Pipe Insulation, the *Manufacturing* (A3) life cycle module accounted for the majority of the potential environmental impact of each of these six impact categories.

Provided the fiberglass pipe insulation is used as intended, during the use phase, reductions in a building's energy consumption do occur; however, the energy savings afforded by the use of pipe insulation were not included in the *Use* life cycle stage.

6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

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

6.2. Energy Savings During Use

Insulation is a passive device that requires no extra utilities to operate over its useful life. Insulation of a mechanical system is responsible for reducing the energy burden associated with heating and cooling of the fluid or media handled by the system. In the following examples, the 3E Plus® Computer Program was used to model pipes both with and without SSL II® with ASJ Max FIBERGLAS™ Pipe Insulation. [Table 23](#) provides an example of net energy savings (energy saved minus life-cycle energy of jacketed pipe insulation) from using the insulation on different pipe sizes, conveying a cold fluid. [Table 24](#) provides an example of net energy savings from using the insulation on different pipe sizes, conveying a hot fluid. In addition, the two examples provide the time period SSL II® with ASJ Max FIBERGLAS™ Pipe Insulation must be in service in order to recover the energy spent in manufacturing it.

Table 23 Days to Recover Primary Energy Demand Based on Electricity Savings

Pipe Diameter	Process Temperature	Insulation Thickness	Pipe Insulation Scaling Factor	ASJ Max Scaling Factor	SSL II Adhesive Tape Scaling Factor	Energy Savings (MJ/hr-ft)	Avoided PED (MJ-eq/hr-ft)	Insulation PED (MJ-eq)	Payback Period (days)
2"	50°F	1"	0.128	0.097	0.3048	0.021	0.066	17	11
4"	50°F	1"	0.214	0.146	0.3048	0.039	0.122	28	10
6"	50°F	1"	0.300	0.195	0.3048	0.056	0.174	40	9

Table 24 Days to Recover Primary Energy Demand Based on Natural Gas Savings

Pipe Diameter	Process Temperature	Insulation Thickness	Pipe Insulation Scaling Factor	ASJ Max Scaling Factor	SSL II Adhesive Tape Scaling Factor	Energy Savings (MJ/hr-ft)	Avoided PED (MJ-eq/hr-ft)	Insulation PED (MJ-eq)	Payback Period (days)
2"	350°F	5"	1.498	0.292	0.3048	0.537	0.582	189	14
4"	350°F	5"	1.925	0.341	0.3048	0.991	1.073	242	9
6"	350°F	5"	2.353	0.389	0.3048	1.440	1.558	295	8



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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 WHMIS Regulatory Status This product is considered an article per the Canadian Hazardous Products Regulation SOR/2015-17.

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

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

Certifications and Sustainable Features

- Certified by SCS Global Services to contain an average of 53% recycled glass content, 31% pre-consumer and 22% post-consumer
- ASJ Max FIBERGLAS™ Pipe Insulation is certified to meet indoor air quality standards under the GREENGUARD Certification Program and has achieved GREENGUARD Gold Certification.
- Health Product Declaration



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Made with Wind Energy and Reduced Carbon Footprint

FIBERGLAS™ Pipe Insulation products are available upon request in the U.S. carrying SCS Global Services certification for "Made with Wind Energy" and "Reduced Carbon Footprint". Impact category results when electricity used during manufacturing is matched with wind energy produced as part of Owens Corning's Power Purchase Agreement can be found in the table below. Cradle-to-gate (A1 - A3) values shown are based on the results from this EPD, which reflect the 2019 production year and are based on NERC regional grid values from the ecoinvent 3.5 LCI database implemented in SimaPro. Dataset and other methodological differences introduce a degree of variability leading to the reduction values shown below to differ from those that appear on certificates.

FIBERGLAS™ Pipe Insulation (1 m at 1 kg)			
TRACI v2.1	A1 - A3 STANDARD PRODUCT	A1 - A3 CERTIFIED PRODUCT	% CHANGE
GWP 100 [kg CO ₂ eq]	6.13E+00	1.73E+00	-72%
ODP [kg CFC-11 eq]	7.11E-07	3.79E-07	-47%
AP [kg SO ₂ eq]	4.03E-02	2.38E-02	-41%
EP [kg N eq]	4.68E-02	6.38E-03	-86%
POCP [kg O ₃ eq]	3.11E-01	2.00E-01	-36%
ADP _{fossil} [MJ, LHV]	8.90E+00	7.07E+00	-21%

6.7. Further Information

Additional information may be found at www.owenscorning.com



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EN 15804 and ISO 21930:2017

7. References

Product Category Rules (PCR) Guidance for Building-Related Products and Services - Part B: Mechanical, Specialty, Thermal, and Acoustic Insulation Product EPD Requirements, UL 10010-03 Version 1.0, First Edition, UL Environment, September 3, 2019.

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

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

BS EN 15804:2012, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

ISO 21930:2017(E), Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services

PRé Consultants: SimaPro 9.0.0.35 LCA Software. 2020. The Netherlands.

ASTM C547-19: Standard Specification for Mineral Fiber Pipe Insulation

ASTM C665-18: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers - version 1.2, CA Specification 01350, January 2017.

North American Insulation Manufacturers Association (NAIMA) - 3E Plus® Version 4.1

