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Products
Fiberglas™ Pipe Insulation

Declared Unit
Pipe insulation material as delivered with a length of 1 m

EPD Number and Period of Validity
SCS-EPD-10450
EPD Valid: June 25, 2025 through June 24, 2030

Product Category Rule
PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 4.0. March 2022.

PCR Guidance for Building-Related Products and Services Part B: Mechanical, Specialty, Thermal, and Acoustic Insulation Product EPD Requirements. Version 1.0. September 2019.

Program Operator
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Address:	One Owens Corning Parkway, Toledo, OH, USA
Declaration Number:	SCS-EPD-10450
Declaration Validity Period:	June 25, 2025 through June 24, 2030
Version:	June 25, 2025
Product:	Fiberglas™ Pipe Insulation
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
Declared Unit:	Pipe insulation material as delivered with a length of 1 m
RSL:	75 Years
Market of Applicability:	North America
EPD Type:	Product-specific
Range of Dataset Variability:	N/A
EPD Scope:	Cradle to gate with options (A1-A5, C2, C4)
Reference Year of Manufacturer Data:	2023
LCA Practitioner:	Aspire Sustainability LLC
LCA Software:	SimaPro 9.6.0.0
LCI Database:	EcoInvent 3.10.0
LCIA Methodology:	TRACI 2.1 v1.09; CML I-A baseline v4.7; IPCC (2013)
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒external
LCA Reviewer:	Beth Cassese, SCS Global Services
Part A Product Category Rule:	PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 4.0. UL Environment. Mar. 2022.
PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
Part B Product Category Rule:	PCR Guidance for Building-Related Products and Services Part B: Mechanical, Specialty, Thermal, and Acoustic Insulation Product EPD Requirements. Version 1.0. September 2019.
Part B PCR Review conducted by:	Hugues Imbeault-Tetreault (Chair), Group AGECO; Thomas Gloria, Industrial Ecology Consultants; Andre Omer Desjarlais, Oak Ridge National Laboratory
Independent verification of the declaration and data, according to ISO 14025, ISO 21930, and the PCR	☐ internal ☒external
EPD Verifier:	Beth Cassese, SCS Global Services
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and 21930.*
Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*
Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*
Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.*

1. About Owens Corning

Founded in 1938, Owens Corning is a residential and commercial building products leader committed to building a sustainable future through material innovation. Our products provide durable, sustainable, energy-efficient solutions that leverage unique capabilities and market-leading positions to help customers win and grow. We are global in scope, human in scale with more than 25,000 employees in 31 countries dedicated to generating value for our customers and shareholders and making a difference in the communities where we work and live. This Environmental Product Declaration is representative of the products produced at the location listed below.

Mexico City Plant Mexico City, Mexico
Newark Plant Newark, OH, UA

2. Product

2.1 Product Identification and Specification

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" (914 mm) long, hinged sections; it is used in a variety of mechanical applications, including HVAC and plumbing, in both commercial and industrial applications.

The Construction Specification Institute (CSI) codes covered by the subcategory PCR applicable to Fiberglas™ Pipe Insulation are listed below.

- 22 07 00
  - 22 07 19 Plumbing Piping Insulation
- 23 07 00 HVAC Insulation
  - 23 07 19 HVAC Piping Insulation

2.2 Flow Diagram

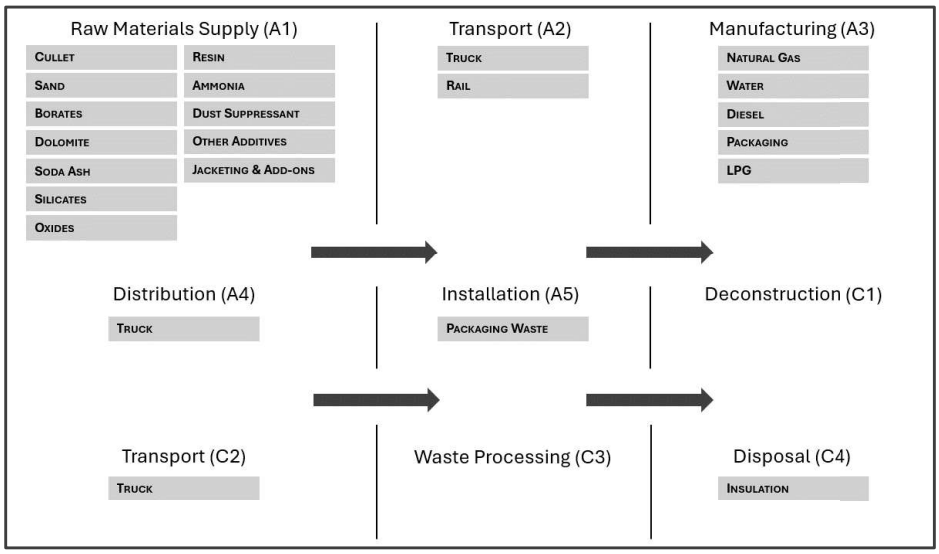

Figure 1. Flow diagram.

2.3 Product Average

This Environmental Product Declaration reflects production of Fiberglas™ Pipe Insulation at Owens Corning sites located in Mexico City, Mexico and Newark, Ohio, USA. Products are manufactured at both locations using consistent batch and additive materials, and manufacturing processes, making it appropriate to group them within a single EPD. This EPD provides environmental impact category results for each manufacturing location.

2.4 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 and institutional buildings, and industrial facilities
- The Owens Corning® Pipe Insulation Flex Core and Rigid Core products meet the requirements of ASTM C547 Type I, Grade A and can be installed directly on a hot pipe operating up to 850ºF (454 ºC) with no special heat up procedure with insulation thickness less than 6”. For other application temperature requirements, refer to Owens Corning publication no. 10021355, titled "Fiberglas™ Pipe Insulation Installation Instructions."
- When installed outdoors, an additional weather-protective jacket is required
- No-Wrap is intended for field installation with jacketing appropriate to the vapor control, damage, or corrosion-resistance requirements of the application

2.5 Material Composition

Fiberglas™ Pipe Insulation consists of two major components, glass fibers and a binder. Glass fibers are produced from various inorganic minerals which make up the batch. The primary material used in the batch is glass cullet, which results in recycled content in the final products – actual recycled content amounts are available through the SCS Global Services Certified Green Products Guide (https://www.scsglobalservices.com/certified-green-products-guide). The binder, or resin, consists of non-renewable, organic chemicals.

Table 1. Batch and Binder Composition.

Component	Composition % (by Mass)
Batch	
Cullet	25 - 75%
Sand	25 - 50%
Silicates	<10%
Dolomite	<10%
Borates	<5%
Soda Ash	<5%
Other Oxides	1 - 2%
Binder	
Phenol Urea Formaldehyde Resin	<10%
Ammonia	<1%
Dust Suppressant	<1%
Additives	<1%

*No substances required to be reported as hazardous or substances of very high concern are associated with the production of this product.

Fiberglas™ Pipe Insulation is produced either jacketed with factory-applied ASJ Max, foil-scrim-Kraft (FSK, Mexico only), 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. The jacketed Fiberglas™ Pipe Insulation products are hinged and come with a manufacturer-applied SSL I® or SSL II® adhesive closure system to secure around the pipe during installation.

Table 2. ASJ Max Jacket Addon Composition.

Component	Composition % (by Mass)
ASJ Max Jacket Addon	
Proprietary Core	30 - 40%
Polymer Film	20 - 30%
Fiberglass Mat	20 - 30%
Adhesive	5 – 20%
Aluminum Foil	5 – 15%

Table 3. FSK Jacket Addon Composition.

Component	Composition % (by Mass)
FSK Jacket Addon	
Kraft Paper	50 – 60%
Fiberglass Mat	20 - 30%
Aluminum Foil	10 - 20%
Adhesive (Emulsion)	5 – 10%
Barrier Coating (Elastomeric Polymer)	2 – 5%

Table 4. SSL I® Adhesive Addon Composition.

Component	Composition % (by Mass)
SSL I® Adhesive Addon	
Kraft Release Paper	35 - 45%
Adhesive (Acrylic)	30 - 40%
Adhesive (Polyester)	10 - 15%
Film (Polyester)	5 - 10%

Table 5. SSL II® Adhesive Addon Composition.

Component	Composition % (by Mass)
SSL II® Adhesive Addon	
Kraft Release Paper	70 - 80%
Adhesive (Acrylic)	15 - 25%
Film (Polyester)	5 - 10%

2.6 Technical Data

The following table provides technical specifications for Fiberglas™ Pipe Insulation.

Table 6. Physical properties.

Property[1]	Test Method	Result
Density (size dependent)	ASTM C303	3.5 to 5.5 pcf
Operating Temperature Range[1,2]	ASTM C411	Flex Core and Rigid Core[1]: 0°F to 1,000°F (-18°C to 538°C)
Water Vapor Sorption	ASTM C1104	Less than 5% by weight
Jacket Temperature Limitation	ASTM C1136	-20°F to 150°F (-29°C to 66°C)
Jacket Permeance	ASTM E96, Proc. A	0.01 perm
Burst Strength, min	ASTM D774/D774M	100 psi
Corrosion Resistance	**Test Method**	**Value**
Corrosion to Copper and Aluminum	ASTM C665	Pass – copper and aluminum
Corrosion to Steel	ASTM C1617	Pass
Stress Corrosion Evaluation on External Stress Corrosion Cracking Tendency of Austenitic Stainless Steel	ASTM C795 and ASTM C6922	Pass
Chemical Analysis for Cl-, Fl-, Na+, SiO3	ASTM C795 and ASTM C871[2]	Results fall within acceptability limits
Fire	**Test Method**	**Value**
Composite Surface Burning Characteristics[3] (value for No-Wrap)	UL 723, ASTM E84, or CAN/ULC-S102	Flame Spread 25 (0) Smoke Developed 50 (0)

[1]Jacket-related properties are not applicable to No-Wrap Fiberglas™ Pipe Insulation

[2]With heat-up schedule when operating temperatures between 850°F and 1,000°F

[3]Preproduction qualification testing complete and on file. Chemical analysis of each production lot required for total conformance. Certification needs to be specified at time of order.

[4]The surface burning characteristics of this product have been determined in accordance with UL 723, ASTM E84, and CAN/ULC-S102. Values are reported to the nearest five rating.

Table 7. Thermal conductivity.

Mean Temperature °F	k Btu·in/hr·ft²·°F	Mean Temperature °C	λ W/M·°C
50	0.22	10	0.032
75	0.23	25	0.034
100	0.24	50	0.037
150	0.27	100	0.043
200	0.29	125	0.047
250	0.32	150	0.051
300	0.35	175	0.056
350	0.39	200	0.062
400	0.43	225	0.068
450	0.48	250	0.075
500	0.54	275	0.082

Apparent thermal conductivity values determined in accordance with ASTM practice C1045 with data obtained by ASTM Test Method C335. Values are nominal, subject to normal testing and manufacturing tolerances.

Standards, Codes Compliance

- ASTM C547, Mineral Fiber Pipe Insulation:
- Flex Core Type I, Grade A
- Rigid Core Type IV, Grade B
- ASTM C585, Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing
- ASTM C1136, Flexible Low Permeance Vapor Retarders for Thermal Insulation: Types I, II, III, IV, X
- UL Labeled for Flame Spread Index of 25 or less and Smoke Developed Index of 50, and is fully building code compliant
- UL Listed and Labeled for use over PVC and other polymer pipes; UL Category BSMP
- ASTM C795, Thermal Insulation for Use in Contact with Austenitic Stainless Steel
- Nuclear Regulatory Commission Guide 1.36, Non-Metallic Thermal Insulation
- NFPA 90A and 90B

2.7 Properties of Declared Product as Delivered

When installed according to all applicable Owens Corning specifications, recommendations, and guidelines, Fiberglas™ Pipe Insulation delivers its advertised properties. The Fiberglas™ Pipe Insulation portfolio is available in thicknesses up to 5 inches. For additional product property details, visit the specific product pages through www.owenscorning.com.

3. LCA: Calculation Rules

3.1 Declared Unit

The declared unit for Fiberglas™ Pipe Insulation is 1 m of pipe insulation material as delivered, with packaging included, and with a building estimated service life (ESL) of 75 years. In addition to having a prescribed length of 1 m, the declared unit density and wall thickness represent a product-weighted average for each of the manufacturing locations. 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. Properties for the declared unit can be found in the tables below for Fiberglas™ Pipe Insulation and the jacketing addons.

Table 8. Declared unit and reference flows for Fiberglas™ Pipe Insulation.

Name	Unit	Mexico Pipe Insulation	Newark Pipe Insulation
Declared Unit	m	Pipe insulation material as delivered with a length of 1 m	
Mass of Declared Unit	kg	1.00E+00	1.00E+00
Density of Declared Unit	kg/m^3	5.36E+01	6.27E+01
Wall Thickness of Declared Unit	cm	4.27E+00	3.20E+00
Outer Diameter of Declared Unit	cm	2.42E+01	1.37E+01

Table 9. Declared unit and reference flows for Fiberglas™ Pipe Insulation Jacketing Addons.

SSL II® Adhesive Tape Addon		
Declared Unit	1 m of Adhesive Tape Addon	
Mass of Declared Unit	kg	6.10E-03
Length of Declared Unit	m	1.00E+00
SSL I® Adhesive Tape Addon		
Declared Unit	1 m of Adhesive Tape Addon	
Mass of Declared Unit	kg	1.13E-02
Length of Declared Unit	m	1.00E+00
ASJ Max Jacket Addon		
Declared Unit	1 m^2 of Jacket Addon	
Mass of Declared Unit	kg	1.81E-01
Area of Declared Unit	m^2	1.00E+00
FSK Jacket Addon		
Declared Unit	1 m^2 of Jacket Addon	
Mass of Declared Unit	kg	1.03E-01
Area of Declared Unit	m^2	1.00E+00

3.2 System Boundary

This declaration is a product-specific EPD and represents cradle-to-installation with end-of-life. Details of the system boundaries may be found in the diagrams below.

Table 10. System boundary.

Product			Construction Process		Use							End-of-life				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 extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X	MND

x = Included in system boundary | MND = Module not declared

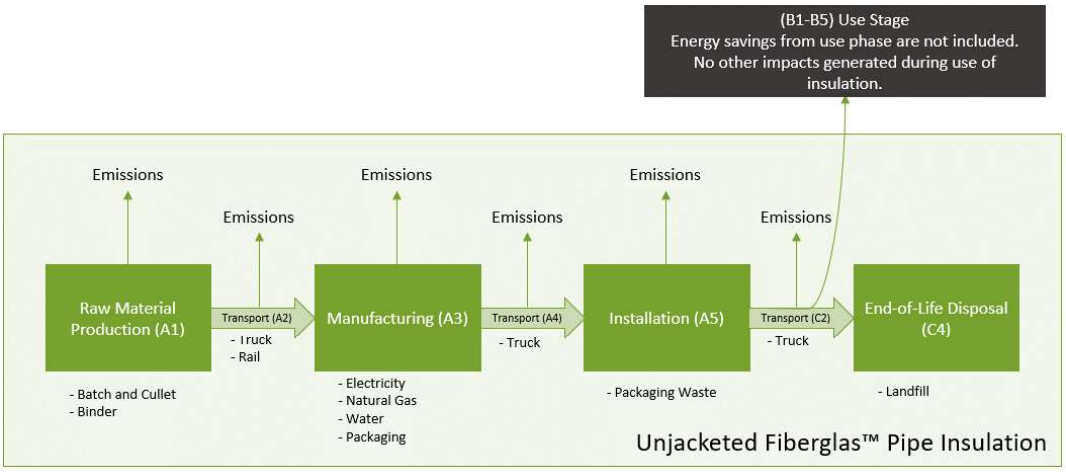

Figure 2. Flow diagram/system boundary for unjacketed Fiberglas™ Pipe Insulation.

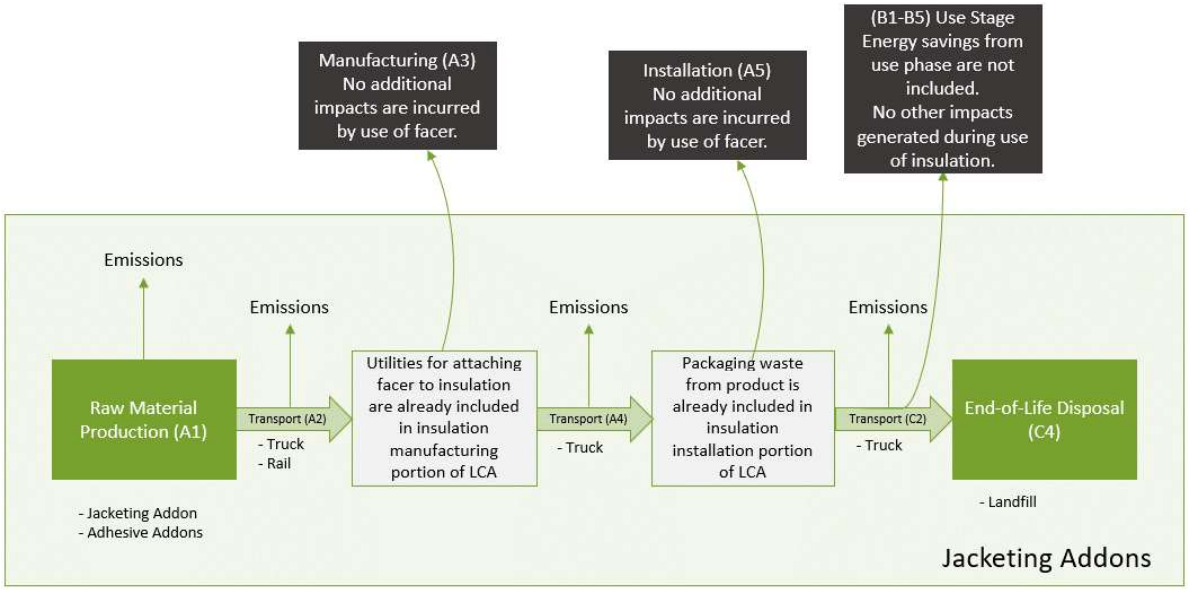

Figure 3. Flow diagram/system boundary for Jacketing Addons.

3.3 Reference Service Life and Estimated Building Service Life

As prescribed in the applicable PCR, the Reference Service Life (RSL) of the insulation product is 75 years, which aligns with an assumed building Estimated Service Life (ESL) of 75 years, for the purposes of this study.

3.4 Allocation

Allocation of primary data was used in this study. In some cases, primary data collected from the manufacturing site were provided on a facility-wide basis and then allocated to the specific insulation product based on production volume (by mass). The types of production activities for the products manufactured at the given manufacturing facility are similar, so mass allocation is considered an acceptable allocation strategy.

3.5 Cut-off criteria

The underlying LCA study is in compliance with the cutoff criteria specified in the PCR, and provided below. 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. No known flows have beeen deliberately excluded.

- Mass – if a flow is less than 1% of the cumulative mass of the model it may be excluded, providing its environmental relevance is not a concern.
- Energy – If a flow is less than 1% of the primary renewable energy or 1% of the primary non-renewable energy of the model it may be excluded, providing its environmental relevance is not a concern.
- Relevance – Substances with hazardous and toxic properties that can be of concern for human health and/or the environment shall be identified and declared even though they are under the cut-off criterion of 1% of total mass.

The sum of the excluded material flows must not exceed 5% of mass, energy usage, or environmental impacts.

3.6 Data Sources

Primary manufacturing data were collected from the included manufacturing locations listed in the Manufacturing section. Secondary data primarily reference the ecoinvent 3.10.0 database. Table 8 provides LCA modeling data sources. Third-party verified ISO 14040/44 secondary LCI data sets contribute more than 80% of total impact to the required impact categories identified by the PCR. Minor components that have a negligible effect on impact category results are omitted from this table.

Table 11. Data sources.

Modules	Flow / Modeled Unit Process	Ecoinvent 3.10.0 Process Dataset(s)	Reference Year
Product Materials			
	Batch Materials		
A1 - - - - - -	Borate	Borax, anhydrous, powder {RoW}| borax production	2023
A1 - - - - - -	Cullet	Glass cullet, sorted {RoW}| treatment of waste glass from unsorted public collection, sorting	2015
A1 - - - - - -	Dolomite	Dolomite {RoW}| dolomite production	2022
A1 - - - - - -	Manganese dioxide	Manganese dioxide {GLO}| manganese dioxide production	2023
A1 - - - - - -	Sand	Silica sand {RoW}| silica sand production	2023
A1 - - - - - -	Alumina Feldspar	Feldspar {RoW}| feldspar production	2023
A1 - - - - - -	Soda Ash	Soda ash, dense {GLO}| soda ash production, dense, Hou's process	2012
	Binder Materials		
A1 - - - - - -	Phenolic resin	Phenolic resin {RoW}| phenolic resin production	2023
A1 - - - - - -	Urea	Urea {RoW}| urea production	2020
A1 - - - - - -	Lubricant oil	Lubricating oil {RoW}| lubricating oil production	2023
	Packaging Materials		
- - A3 - - - -	Polybag (LDPE)	Packaging film, low density polyethylene {RoW}| packaging film production	2023
- - A3 - - - -	Cartons/Cardboard – US	Corrugated board box {US}| corrugated board box production	2023
- - A3 - - - -	Cartons/Cardboard – RoW	Corrugated board box {RoW}| corrugated board box production	2023
	Jacketing Materials		
A1 - - - - - -	Adhesive, Acrylic	Acrylic binder, with water, in 54% solution state {RoW}| market for acrylic binder	2023
A1 - - - - - -	Adhesive, Polyester	Polyester resin, unsaturated {RoW}| polyester resin production	2023
A1 - - - - - -	Hot Melt Adhesive	Acrylic binder, with water, in 54% solution state {RoW}| market for acrylic binder	2023
A1 - - - - - -	Carrier Film, Polyester	Polyester resin, unsaturated {RoW}| polyester resin production	2023
A1 - - - - - -	Fiberglass	Glass fibre {RoW}| production	2023
A1 - - - - - -	Aluminum Foil	Aluminium, primary, ingot {RoW}| market for	2023
		Sheet rolling, aluminium {RoW}| processing	2023
A1 - - - - - -	Kraft Release Paper	Kraft paper {RoW}| kraft paper production	2023
A1 - - - - - -	Natural Kraft	Kraft paper {RoW}| kraft paper production	2023
A1 - - - - - -	White Polypropylene Film	Polypropylene, granulate {RoW}| production	2019
		Extrusion, plastic film {RoW}| extrusion, plastic film	2020
A1 - - - - - -	Adhesive, Emulsion	Polyester resin, unsaturated {RoW}| polyester resin production	2023
A1 - - - - - -	Barrier Coating, Elastomeric Polymer	Polybutadiene {RoW}| polybutadiene production	2023
Electricity/Heat/Resources for Manufacturing			
- - A3 - - - -	Electricity - Newark	Electricity, medium voltage {Newark 2025 - RFC}| market for electricity	2025
- - A3 - - - -	Electricity - Mexico City	Electricity, medium voltage {Mexico City-MX 2025}| market for electricity	2025

Modules	Flow / Modeled Unit Process	Ecoinvent 3.10.0 Process Dataset(s)	Reference Year
- - A3 - - - -	Water	Tap water {RoW}| tap water production, conventional treatment	2020
- - A3 - - - -	Natural Gas - combusted (energy)	Heat, district or industrial, natural gas {GLO}| market group for heat, district or industrial, natural gas	2023
- - A3 - - - -	Natural Gas - combusted (volume)	Heat, district or industrial, natural gas {GLO}| market group for heat, district or industrial, natural gas	2023
- - A3 - - - -	Diesel - combusted (mass)	Diesel, burned in building machine {GLO}| diesel, burned in building machine	2023
- - A3 - - - -	Diesel - combusted (volume)	Diesel, burned in building machine {GLO}| diesel, burned in building machine	2023
- - A3 - - - -	LPG	Liquefied petroleum gas {RoW}| liquefied petroleum gas production, petroleum refinery operation	2019
Transportation			
- A2 - - - - -	Rail - US	Transport, freight train {US}| diesel	2023
- A2 - - - - -	Rail - RoW	Transport, freight train {RoW}| market for transport, freight train	2023
- A2 - A3 - A4 - A5 - C2 -	Truck (1 tkm)	Transport, freight, lorry >32 metric ton, EURO5 {RoW}| transport, freight	2023

3.7 Data Quality

Primary data were based on measured and calculated data from the Mexico City, Mexico and Newark, OH, USA Owens Corning plants and reflect calendar year 2023 production. It meets requirements for completeness along with temporal, geographical and technological representativeness. Background data were taken from the ecoinvent database, which is on the approved database list in the PCR.

Table 12. Data quality assessment.

Data Quality Parameter	Data Quality Discussion
Time-related Coverage: Age of data and the minimum length of time over which data is collected	Primary data were based on Owens Corning's annual operations during calendar year 2023, consistent with the goal and scope of this analysis. The time coverage of secondary data is provided in the Background Data section. Time-related coverage is considered very good quality.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The geographical coverage for this study is Mexico City, Mexico and Newark, OH, USA. As such, primary data were sourced directly from this manufacturing location. The geographical coverage of secondary data is provided in the Background Data section. Geographical coverage is considered very good quality.
Technology Coverage: Specific technology or technology mix	Technological representativeness was based on primary manufacturing data from the Owens Corning facilities included in the study. Owens Corning manufacturing facility teams provided the primary material and resource input and emission data, based on the actual 2023 Fiberglas™ Pipe Insulation production processes. Thus, technology coverage is considered very good quality.
Precision: Measure of the variability of the data values for each data expressed	Primary data were based on measured and calculated data from the two Owens Corning plants which manufacture products covered by this study. The facility data were collected for the reference year 2023, and several sources were used to compare collected values and ensure precision. The data precision is therefore deemed to be of high quality for all measured and calculated data.
Completeness: Percentage of flow that is measured or estimated	Owens Corning manufacturing facility teams provided the primary material and resource input and emission data, based on the actual 2023 FIBERGLAS™ Pipe Insulation production processes. All materials reported in the data were included in the raw materials phase of the LCA. Energy data was provided by the Owens Corning manufacturing facility teams; thus, this is considered 100% measured. All known mass and energy flows have been included in this study.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	All relevant process steps within the system boundary were considered. The primary data provided for fiberglass insulation manufacturing were benchmarked with data collected for previous models which have undergone third party review. Data sets used in the underlying LCA study were selected based on the most appropriate temporal, geographical, and technological representation of the actual processes and technology. These data sets reflect average processes from multiple sources, and thus generally represent the actual technology utilized to produce the materials. Still, it is often unknown the extent to which secondary data sets deviate from the specific system being studied. The representativeness is generally considered high quality.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The same methodology was applied consistently to all stages of the study. Consistency is considered high quality.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	The reproducibility of the study results is merited by the scope information provided in the underlying LCA report. Due to confidentiality of the data values, however, certain details were omitted from this public facing EPD, which may limit reproducibility by the public.
Sources of the Data: Description of all primary and secondary data sources	Owens Corning manufacturing facility teams provided the primary material and resource use input and emission data, material composition, supply chain transport, and measured energy consumption. Secondary data was obtained from the ecoinvent 3.10 database. All data sources used in the study are considered high quality.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	ecoinvent is comprised of industry-average, peer-reviewed data and utilizes the pedigree matrix to assess the uncertainty of all secondary datasets. Key uncertainty assumptions are stated in this EPD.

3.8 Period under review

The period of review is calendar year 2023.

3.9 Comparability

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled. In addition, comparability of EPDs is limited to those applying a functional unit.

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of Mechanical Insulation products using EPD information shall be based on the product's use and impacts at the construction works level, and therefore EPDs may not be used for comparability purposes when not considering the constructions works energy use phase as instructed under this PCR. Full conformance with the PCR for Mechanical Insulation products allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category Part B PCR, and use equivalent scenarios with respect to construction works. However, variation and deviations are possible.

3.10 Estimates and Assumptions

The ability of LCA to consider the entire life cycle of products makes it an attractive tool for the assessment of potential environmental impacts. Nevertheless, similar to other environmental management analysis tools, LCA has several limitations related to data quality and unavailability of potentially relevant data. It should be kept in mind that the impact assessment results are relative expressions and do not predict impacts on category endpoints, exceeding thresholds, or risks.

The study was conducted by including the relevant system boundaries and best available data for Fiberglas™ Pipe Insulation products, using a consistent data collection method and timeframe. In cases where data were reported for the entire facility rather than for the specific insulation materials product, mass allocation was used to allocate the facility-wide impacts to the specific product. This assumes that all products equally consume facility inputs and contribute to facility outputs.

4. LCA: Scenarios and Additional Technical Information

4.1 Manufacture

Fiberglas™ Pipe Insulation consists of two major components, the glass fiber and the binder system. The glass fiber is made from various inorganic materials, which are referred to as batch chemicals. Fiberglas™ Pipe Insulation utilizes a phenol-urea-formaldehyde (PUF) binder system. The diagram below provides an overview of the manufacturing process.

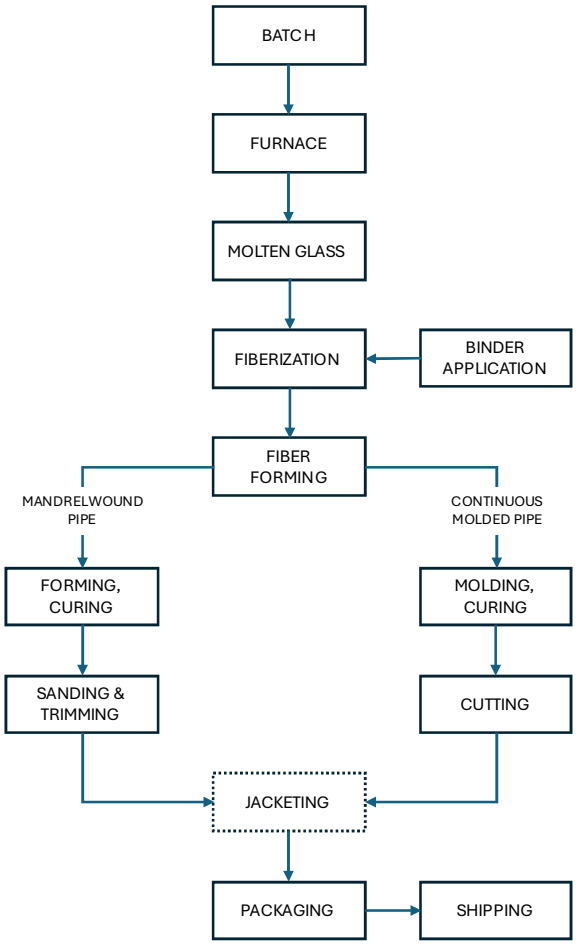

Figure 4. Manufacturing process flow diagram.

4.2 Packaging

Fiberglas™ Pipe Insulation is packaged in low-density polyethylene bags or corrugated boxes.

4.3 Transport to the Building Site (A4)

Fiberglas™ Pipe Insulation is transported away from the manufacturing site by truck. The details for the insulation and facing materials are provided separately in the tables below.

Table 13.Product distribution parameters, per declared unit for Fiberglas™ Pipe Insulation.

Name	Unit	Mexico City	Newark
Vehicle type		Transport, freight, lorry >32 metric ton, EURO5 {RoW}	
Fuel type		Diesel, low-sulfur	
Liters of fuel	l/100km	4.35E-03	4.35E-03
Transport distance	km	9.00E+02	8.82E+02
Capacity utilization	%	63%	63%
Gross density of products transported	kg/m^3	5.36E+01	6.27E+01
Capacity utilization volume factor	-	1	1

Table 14. Product distribution parameters, per declared unit for Jacket Addons.

Name	Unit	ASJ Max	FSK	SSL I®	SSL II®
Vehicle type		Transport, freight, lorry >32 metric ton, EURO5 {RoW}			
Fuel type		Diesel, low-sulfur			
Liters of fuel	l/100km	8.20E-04	4.58E-04	5.12E-05	2.77E-05
Transport distance	km	2.80E+02	1.15E+03	2.80E+03	2.80E+03
Capacity utilization	%	63%	63%	63%	63%
Gross density of products transported	kg/m^3	8.15E+02	5.05E+02	1.69E+03	1.05E+03
Capacity utilization volume factor	-	1	1	1	1

4.4 Installation into the Building (A5)

Ambient application temperatures are from 25°F (-4°C) to 110°F (43°C). Fiberglas™ Pipe Insulation products are provided in hinged sections, 36 inches in length. ASJ Max jacketed products come with a factory-applied SSL® or SSL II® closure system. Outdoor applications must be protected from weather. Full installation instructions, including specific instructions for application on chilled systems and heat-up schedule for installation on pipes that will operate between 850°F (454°C) and 1000°F (538°C), refer to the "Fiberglas™ Pipe Insulation Installation Instructions," which are available through www.owenscorning.com.

Table 15. Installation summary.

Name	Unit	Value
Ancillary materials (per m^2)	kg	0.00E+00
Water consumption specified by water source and fate	m^3	0.00E+00
Other resources	kg	0.00E+00
Electricity consumption	kwh	0.00E+00
Other energy carriers	MJ	0.00E+00
Product loss per functional unit	kg	0.00E+00
Waste materials at the construction site before waste processing, generated by product installation	kg	Mexico City: 6.74E-02 Newark: 1.03E-01
Output materials resulting from on-site waste processing	kg	0.00E+00
Mass of packaging waste specified by type – **Plastics** (Mexico City / Newark)	kg	9.22E-03 / 8.82E-04
Recycle (Mexico City / Newark)	kg	*1.38E-03 / 1.32E-04*
Landfill (Mexico City / Newark)	kg	*6.27E-03 / 6.00E-04*
Incineration (Mexico City / Newark)	kg	*1.57E-03 / 1.50E-02*
Mass of packaging waste specified by type – **Pulp** (Mexico City / Newark)	kg	9.38E-02 / 6.65E-02
Recycle (Mexico City / Newark)	kg	*7.03E-02 / 4.99E-02*
Landfill (Mexico City / Newark)	kg	*1.88E-02 / 1.33E-02*
Incineration (Mexico City / Newark)	kg	*4.69E-03 / 3.33E-03*
Biogenic carbon contained in packaging	kg CO_2	Mexico City: 1.07E-02 Newark: 1.85E-02
Direct emissions to ambient air, soil, and water	kg	0.00E+00
VOC content	$\mu g/m^3$	0.00E+00[1]

[1]ASJ Max Fiberglas™ Pipe Insulation holds UL Greenguard Gold Certification

4.5 Use

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

4.6 Reference Service Life

Table 16. Reference service life.

Name	Value	Comment
RSL	75 years	
Declared product properties (at the gate) and finishes, etc	Will meet declared properties when installed per manufacturer instructions	
Design application parameters (if instructed by the manufacturer), including references to the appropriate practices and application codes	Install per product instructions	
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Will meet R-value and other product specifications when installed per manufacturer instructions	
Outdoor environment, (if relevant for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	Product should be protected from weather if installed in an outdoor environment	
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	N/A	Fiberglas™ Pipe Insulation is a passive product
Maintenance, e.g. required frequency, type and quality of replacement components	N/A	Maintenance is not needed during use

4.7 End-of-Life (C1-C4)

Table 17. End-of-Life Transport (C2) and Landfill Disposal (C4), per declared unit for Fiberglas™ Pipe Insulation.

End-of-life		Unit	Mexico City	Newark
Assumptions for scenario development		Although reuse and recycling of fiberglass insulation at its end of life is possible, there are no formal programs for collection and transport. It is assumed that all product is sent to landfill at end of life.		
Collection process	Collected separately	kg	0.00E+00	0.00E+00
	Collected with mixed construction waste	kg	1.00E+00	1.00E+00
Disposal	Product or material for final disposition (landfill)	kg	1.00E+00	1.00E+00
Transport to Disposal	Diesel Powered Truck	km	1.61E+02	1.61E+02
Removals of biogenic carbon (excluding packaging)		kg CO_2	0.00E+00	0.00E+00

Table 18. End-of-Life Transport (C2) and Landfill Disposal (C4), per declared unit for Jacketing Addons.

End-of-life		Unit	ASJ Max	FSK	SSL I®	SSL II®
Assumptions for scenario development		Although reuse and recycling of fiberglass insulation at its end of life is possible, there are no formal programs for collection and transport. It is assumed that all product is sent to landfill at end of life.				
Collection process	Collected separately	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Collected with mixed construction waste	kg	1.81E-01	1.03E-01	1.13E-02	6.10E-03
Disposal	Product or material for final disposition (landfill)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Transport to Disposal	Diesel Powered Truck	km	1.61E+02	1.61E+02	1.61E+02	1.61E+02
Removals of biogenic carbon (excluding packaging)		kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00

4.8 Re-use Phase

Although reuse and recycling of fiberglass insulation at its end of life is possible, there are no formal programs for collection and transport. It is assumed that all product is sent to landfill at end of life.

Table 19. Reuse, recovery, and/or recycling.

Name	Unit	Value
Net energy benefit from energy recovery from waste treatment as declared as exported energy in C3	MJ	N/A
Net energy benefit from thermal energy due to treatment of waste declared as exported energy in C4	MJ	N/A
Net energy benefit from material flow declared in C3 for energy recovery	MJ	N/A
Process and conversion efficiencies		N/A
Further assumptions for scenario development		N/A

5. LCA: Results

Results of the Life Cycle Assessment are presented below, beginning in Table 22. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. All values in the tables below are rounded to three significant digits. The following impact indicators, specified by the PCR, are reported below:

Table 20. Life Cycle Impact Assessment indicators and characterization methods used.

Abbreviation	Impact Category	Unit	Characterization Method
GWP 100a	Global Warming Potential	kg CO_2 eq	IPCC 2013
ODP	Ozone Depletion Potential	kg CFC11 eq	TRACI 2.1
AP	Acidification Potential	kg SO_2 eq	TRACI 2.1
EP	Eutrophication Potential	kg N eq	TRACI 2.1
SFP	Smog Formation Potential	kg O_3 eq	TRACI 2.1
ADP_{fossil}	Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources (ADP_{fossil})	MJ, LHV	CML-baseline v4.7

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development, however the EPD users shall not use additional measures for comparative purposes.

Table 21. Additional transparency indicators used.

Resources	Unit	Waste and Outflows	Unit
RPR_E: Renewable primary energy used as energy carrier (fuel)	[MJ, LHV]	**HWD**: Hazardous waste disposed	[kg]
RPR_M: Renewable primary resources with energy content used as material	[MJ, LHV]	**NHWD**: Non-hazardous waste disposed	[kg]
$NRPR_E$: Non-renewable primary resources used as an energy carrier (fuel)	[MJ, LHV]	**HLRW**: High-level radioactive waste, conditioned, to final repository	[kg] or [m^3]
$NRPR_M$: Non-renewable primary resources with energy content used as material	[MJ, LHV]	**ILLRW**: Intermediate- and low-level radioactive waste, conditioned, to final repository	[kg] or [m^3]
SM: Secondary materials	[kg]	**CRU**: Components for re-use	[kg]
RSF: Renewable secondary fuels	[MJ, LHV]	**MR**: Materials for recycling	[kg]
NRSF: Non-renewable secondary fuels	[MJ, LHV]	**MER**: Materials for energy recovery	[kg]
RE: Recovered energy	[MJ, LHV]	**EE**: Recovered energy exported from the product system	MJ, heating value ([Hi] lower heating value) per energy carrier
FW: Use of net fresh water resources	[m^3]		

Table 22. Carbon emissions and removals.

Parameter	Unit
BCRP: Biogenic Carbon Removal from Product	[kg CO2]
BCEP: Biogenic Carbon Emission from Product	[kg CO2]
BCRK: Biogenic Carbon Removal from Packaging	[kg CO2]
BCEK: Biogenic Carbon Emission from Packaging	[kg CO2]
BCEW: Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	[kg CO2]
CCE: Calcination Carbon Emissions	[kg CO2]
CCR: Carbonation Carbon Removals	[kg CO2]
CWNR: Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	[kg CO2]

The results are presented below for each manufacturing facility. The manufacturing process and final product properties are consistent between the two sites, which is why results for both sites are presented within this EPD. It is acknowledged that there is a greater than 10% difference in the results between the two manufacturing sites for some indicators. Rather than a network average, the results are intentionally reported separately in this EPD for each manufacturing site to provide transparency into location-specific differences.

Table 23. Life Cycle Impact Assessment (LCIA) results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Newark Plant.

Impact Category	Units	A1-A3	A4	A5	C2	C4
GWP 100a (2013)	kg CO_2 eq	2.67E+00	6.98E-02	3.76E-02	1.27E-02	2.68E-03
ODP	kg CFC 11 eq	5.22E-08	9.90E-10	4.22E-11	1.81E-10	4.26E-11
AP	kg SO_2 eq	9.66E-03	1.67E-04	1.38E-05	3.04E-05	2.28E-05
EP	kg N eq	1.78E-03	1.13E-05	1.08E-06	2.07E-06	1.44E-06
SFP	kg O_3 eq	1.39E-01	4.24E-03	2.40E-04	7.74E-04	7.14E-04
ADP_{fossil}	MJ, LHV	3.45E+01	9.28E-01	3.63E-02	1.69E-01	3.48E-02

Table 24. Life Cycle Impact Assessment (LCIA) results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Mexico City Plant.

Impact Category	Units	A1-A3	A4	A5	C2	C4
GWP 100a (2013)	kg CO_2 eq	1.90E+00	7.13E-02	2.71E-02	1.27E-02	2.68E-03
ODP	kg CFC 11 eq	4.66E-08	1.01E-09	2.83E-11	1.81E-10	4.26E-11
AP	kg SO_2 eq	6.73E-03	1.70E-04	9.15E-06	3.04E-05	2.28E-05
EP	kg N eq	1.00E-03	1.16E-05	8.50E-07	2.07E-06	1.44E-06
SFP	kg O_3 eq	1.29E-01	4.33E-03	1.73E-04	7.74E-04	7.14E-04
ADP_{fossil}	MJ, LHV	2.98E+01	9.47E-01	2.42E-02	1.69E-01	3.48E-02

Table 25. Life Cycle Impact Assessment (LCIA) results, per declared unit for SSL I® Closure.

Impact Category	Units	A1-A3	A4	A5	C2	C4
GWP 100a (2013)	kg CO_2 eq	1.77E-02	4.82E-04	0.00E+00	2.77E-04	3.02E-05
ODP	kg CFC 11 eq	3.43E-10	7.00E-12	0.00E+00	4.02E-12	4.81E-13
AP	kg SO_2 eq	8.16E-05	2.55E-06	0.00E+00	1.47E-06	2.57E-07
EP	kg N eq	2.45E-05	1.67E-07	0.00E+00	9.62E-08	1.62E-08
SFP	kg O_3 eq	1.35E-03	7.89E-05	0.00E+00	4.54E-05	8.06E-06
ADP_{fossil}	MJ, LHV	2.63E-01	6.56E-03	0.00E+00	3.77E-03	3.92E-04

Table 26. Life Cycle Impact Assessment (LCIA) results, per declared unit for SSL II® Closure.

Impact Category	Units	A1-A3	A4	A5	C2	C4
GWP 100a (2013)	kg CO_2 eq	1.60E-02	2.60E-04	0.00E+00	1.50E-04	1.63E-05
ODP	kg CFC 11 eq	3.98E-10	3.78E-12	0.00E+00	2.17E-12	2.60E-13
AP	kg SO_2 eq	6.41E-05	1.38E-06	0.00E+00	7.94E-07	1.39E-07
EP	kg N eq	1.93E-05	9.04E-08	0.00E+00	5.20E-08	8.78E-09
SFP	kg O_3 eq	1.03E-03	4.26E-05	0.00E+00	2.45E-05	4.35E-06
ADP_{fossil}	MJ, LHV	2.67E-01	3.55E-03	0.00E+00	2.04E-03	2.12E-04

Table 27. Life Cycle Impact Assessment (LCIA) results, per declared unit for ASJ Max Jacketing Addon.

Impact Category	Units	A1-A3	A4	A5	C2	C4
GWP 100a (2013)	kg CO_2 eq	7.68E-01	7.71E-03	0.00E+00	4.43E-03	4.84E-04
ODP	kg CFC 11 eq	1.11E-08	1.12E-10	0.00E+00	6.44E-11	7.70E-12
AP	kg SO_2 eq	3.95E-03	4.09E-05	0.00E+00	2.35E-05	4.11E-06
EP	kg N eq	3.85E-04	2.68E-06	0.00E+00	1.54E-06	2.60E-07
SFP	kg O_3 eq	5.08E-02	1.26E-03	0.00E+00	7.26E-04	1.29E-04
ADP_{fossil}	MJ, LHV	1.02E+01	1.05E-01	0.00E+00	6.04E-02	6.28E-03

Table 28. Life Cycle Impact Assessment (LCIA) results, per declared unit for FSK Jacketing Addon.

Impact Category	Units	A1-A3	A4	A5	C2	C4
GWP 100a (2013)	kg CO_2 eq	5.54E-01	9.34E-03	0.00E+00	1.31E-03	2.75E-04
ODP	kg CFC 11 eq	5.76E-09	1.32E-10	0.00E+00	1.85E-11	4.37E-12
AP	kg SO_2 eq	3.00E-03	2.23E-05	0.00E+00	3.12E-06	2.33E-06
EP	kg N eq	2.95E-04	1.52E-06	0.00E+00	2.12E-07	1.48E-07
SFP	kg O_3 eq	3.73E-02	5.67E-04	0.00E+00	7.93E-05	7.32E-05
ADP_{fossil}	MJ, LHV	6.23E+00	1.24E-01	0.00E+00	1.74E-02	3.56E-03

Table 29. Resource Use Indicator Results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Newark Plant.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	3.12E+00	1.49E-03	1.43E-04	2.72E-04	1.54E-04
RPR_M	[MJ, LHV]	1.24E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	4.26E+01	9.30E-01	3.64E-02	1.70E-01	3.49E-02
$NRPR_M$	[MJ, LHV]	1.47E+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]	1.40E-02	3.13E-05	1.79E-05	5.70E-06	1.21E-06

Table 30. Resource Use Indicator Results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Mexico City Plant.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	2.85E+00	1.52E-03	9.93E-05	2.72E-04	1.54E-04
RPR_M	[MJ, LHV]	1.95E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	3.10E+01	9.49E-01	2.43E-02	1.70E-01	3.49E-02
$NRPR_M$	[MJ, LHV]	2.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	[kg]	2.30E-02	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]	7.18E-03	3.19E-05	1.26E-05	5.70E-06	1.21E-06

Table 31. Resource Use Indicator Results, per declared unit for SSL I® Closure.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	3.17E-01	1.06E-05	0.00E+00	6.07E-06	1.73E-06
RPR_M	[MJ, LHV]	1.32E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	2.77E-01	6.58E-03	0.00E+00	3.78E-03	3.94E-04
$NRPR_M$	[MJ, LHV]	7.70E-02	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]	2.01E-04	2.21E-07	0.00E+00	1.27E-07	1.36E-08

Table 32. Resource Use Indicator Results for, per declared unit for SSL II® Closure.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	1.08E-01	5.71E-06	0.00E+00	3.28E-06	9.36E-07
RPR_M	[MJ, LHV]	3.93E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	2.79E-01	3.55E-03	0.00E+00	2.04E-03	2.13E-04
$NRPR_M$	[MJ, LHV]	9.26E-02	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]	1.59E-04	1.19E-07	0.00E+00	6.87E-08	7.36E-09

Table 33. Resource Use Indicator Results, per declared unit for ASJ Max Jacketing Addon.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	2.74E+00	1.69E-04	0.00E+00	9.72E-05	2.77E-05
RPR_M	[MJ, LHV]	9.95E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	1.05E+01	1.05E-01	0.00E+00	6.05E-02	6.30E-03
$NRPR_M$	[MJ, LHV]	2.37E+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]	4.91E-03	3.54E-06	0.00E+00	2.03E-06	2.18E-07

Table 34. Resource Use Indicator Results for, per declared unit for FSK Jacketing Addon.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	2.07E+00	2.00E-04	0.00E+00	2.79E-05	1.57E-05
RPR_M	[MJ, LHV]	7.81E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	6.43E+00	1.24E-01	0.00E+00	1.74E-02	3.58E-03
$NRPR_M$	[MJ, LHV]	4.29E-01	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]	2.36E-03	4.18E-06	0.00E+00	5.85E-07	1.24E-07

Table 35. Waste and Output Flow Indicator Results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Newark Plant.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
HWD	[kg]	1.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	[kg]	2.41E-01	0.00E+00	6.74E-02	0.00E+00	1.00E+00
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]	1.05E-02	0.00E+00	5.00E-02	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	3.48E-03	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 36. Waste and Output Flow Indicator Results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Mexico City Plant.

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
HWD	[kg]	6.69E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	[kg]	8.36E-04	0.00E+00	1.03E-01	0.00E+00	1.00E+00
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]	1.39E-04	0.00E+00	7.17E-02	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	6.26E-03	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 37. Waste and Output Flow Indicator Results, per declared unit for SSL I® Closure.

Resource Use	Unit	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	1.13E-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]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 38. Waste and Output Flow Indicator Results, per declared unit for SSL II® Closure.

Resource Use	Unit	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	6.10E-03
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]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 39. Waste and Output Flow Indicator Results, per declared unit for ASJ Max Jacketing Addon.

Resource Use	Unit	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	1.81E-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]	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]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 40. Waste and Output Flow Indicator Results, per declared unit for FSK Jacketing Addon.

Resource Use	Unit	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	1.03E-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]	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]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 41. Carbon Emissions and Removals Indicator Results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Newark Plant.

Resource Use	Unit	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]	1.85E-02	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]	1.10E-01	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

Table 42. Carbon Emissions and Removals Indicator Results, per declared unit for Fiberglas™ Pipe Insulation manufactured at the Mexico Plant.

Resource Use	Unit	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]	1.07E-02	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]	1.12E-04	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

Table 43. Carbon Emissions and Removals Indicator Results, per declared unit for SSL I® Closure.

Resource Use	Unit	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]	2.22E-04	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

Table 44. Carbon Emissions and Removals Indicator Results, per declared unit for SSL II® Closure.

Resource Use	Unit	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]	7.18E-05	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

Table 45. Carbon Emissions and Removals Indicator Results, per declared unit for ASJ Max Jacketing Addon.

Resource Use	Unit	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]	2.12E-03	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

Table 46. Carbon Emissions and Removals Indicator Results, per declared unit for FSK Jacketing Addon.

Resource Use	Unit	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]	1.81E-03	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

Calculating Environmental Impact Values for Products with Specific Properties

The following scaling factors have been provided to assist in understanding the impacts for the specific, individual products that are commercially available.

Declared Unit Scaling Factors for Fiberglas™ Pipe Insulation

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, FSK (Mexico City plant only), 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 the jacket material and a pre-applied adhesive closure. These results are for the declared unit amounts. To calculate impact values for market-available versions of FPI, the following equation can be used:

Impact = [FPI Impact[a]] X [FPI scaling factor[b]] + [Jacket Addon Impact[c]] X [Jacket Addon Scaling Factor[d]] + [Adhesive Addon Impact[e]] X [Adhesive Addon Scaling Factor[f]]

a) Impact values for FIBERGLAS™ Pipe Insulation can be found in Section 4.2
b) Scaling factors for FIBERGLAS™ Pipe Insulation can be found in Table 56
c) Jacket Addon impact values can be found in Section 4.2
d) Jacket Addon scaling factors can be found in Table 57
e) Adhesive Addon impact values can be found in Section 4.2
f) Adhesive Addon scaling factor of 0.3048 is used with either SSL II® or SSL I® Adhesive Addon

Table 47. Scaling factors to one lineal foot for the declared unit - Fiberglas™ Pipe Insulation (1 m, 1 kg).

Thickness →	½"	1"	1 ½"	2"	2 ½"	3"	3 ½"	4"	4 ½"	5"
Inside Diameter										
½"	0.027	0.059	0.104	0.173	0.260	0.364	0.485	0.623	0.779	0.952
⅝"	0.031	0.064	0.110	0.182	0.271	0.377	0.500	0.641	0.799	0.974
¾"	0.034	0.069	0.117	0.190	0.281	0.390	0.515	0.658	0.818	0.996
1"	0.041	0.079	0.130	0.208	0.303	0.416	0.546	0.693	0.857	1.039
1 ¼"	0.048	0.089	0.143	0.225	0.325	0.442	0.576	0.727	0.896	1.082
1 ½"	0.054	0.099	0.156	0.242	0.346	0.468	0.606	0.762	0.935	1.126
2"	0.068	0.119	0.182	0.277	0.390	0.520	0.667	0.831	1.013	1.212
2 ⅛"	0.071	0.124	0.188	0.286	0.400	0.533	0.682	0.849	1.033	1.234
2 ½"	0.082	0.139	0.208	0.312	0.433	0.571	0.727	0.901	1.091	1.299
2 ⅝"	0.085	0.143	0.214	0.320	0.444	0.584	0.742	0.918	1.111	1.320
3"	0.095	0.158	0.234	0.346	0.476	0.623	0.788	0.970	1.169	1.385
3 ⅛"	0.099	0.163	0.240	0.355	0.487	0.636	0.803	0.987	1.188	1.407
3 ½"	0.109	0.178	0.260	0.381	0.520	0.675	0.849	1.039	1.247	1.472
3 ⅝"	0.112	0.183	0.266	0.390	0.530	0.688	0.864	1.056	1.266	1.494
4"	0.122	0.198	0.286	0.416	0.563	0.727	0.909	1.108	1.325	1.559
4 ⅛"	0.126	0.203	0.292	0.424	0.574	0.740	0.924	1.126	1.344	1.580
4 ½"	0.136	0.218	0.312	0.450	0.606	0.779	0.970	1.178	1.403	1.645
5"	0.150	0.238	0.338	0.485	0.649	0.831	1.030	1.247	1.481	1.732
5 ⅛"	0.153	0.242	0.344	0.494	0.660	0.844	1.046	1.264	1.500	1.753
6"	0.177	0.277	0.390	0.554	0.736	0.935	1.152	1.385	1.637	1.905
6 ⅛"	0.180	0.282	0.396	0.563	0.747	0.948	1.167	1.403	1.656	1.927
7"	0.204	0.317	0.442	0.623	0.823	1.039	1.273	1.524	1.792	2.078
8"	0.231	0.356	0.494	0.693	0.909	1.143	1.394	1.663	1.948	2.251
9"	0.259	0.396	0.546	0.762	0.996	1.247	1.515	1.801	2.104	2.424
10"	0.286	0.435	0.597	0.831	1.082	1.351	1.637	1.940	2.260	2.598
11"	0.313	0.475	0.649	0.901	1.169	1.455	1.758	2.078	2.416	2.771
12"	0.340	0.515	0.701	0.970	1.256	1.559	1.879	2.217	2.572	2.944
14"	0.395	0.594	0.805	1.108	1.429	1.766	2.121	2.494	2.883	3.290
15"	0.422	0.633	0.857	1.178	1.515	1.870	2.243	2.632	3.039	3.464
16"	0.449	0.673	0.909	1.247	1.602	1.974	2.364	2.771	3.195	3.637
17"	0.476	0.713	0.961	1.316	1.688	2.078	2.485	2.909	3.351	3.810
18"	0.503	0.752	1.013	1.385	1.775	2.182	2.606	3.048	3.507	3.983
19"	0.531	0.792	1.065	1.455	1.862	2.286	2.728	3.186	3.663	4.156
20"	0.558	0.831	1.117	1.524	1.948	2.390	2.849	3.325	3.819	4.329
21"	0.585	0.871	1.169	1.593	2.035	2.494	2.970	3.464	3.974	4.503
22"	0.612	0.910	1.221	1.663	2.121	2.598	3.091	3.602	4.130	4.676
23"	0.640	0.950	1.273	1.732	2.208	2.702	3.212	3.741	4.286	4.849
24"	0.667	0.990	1.325	1.801	2.295	2.805	3.334	3.879	4.442	5.022
25"	0.694	1.029	1.377	1.870	2.381	2.909	3.455	4.018	4.598	5.195
26"	0.721	1.069	1.429	1.940	2.468	3.013	3.576	4.156	4.754	5.369
27"	0.748	1.108	1.481	2.009	2.554	3.117	3.697	4.295	4.910	5.542
28"	0.776	1.148	1.533	2.078	2.641	3.221	3.819	4.433	5.065	5.715
29"	0.803	1.188	1.585	2.147	2.728	3.325	3.940	4.572	5.221	5.888
30"	0.830	1.227	1.637	2.217	2.814	3.429	4.061	4.710	5.377	6.061
31"	0.857	1.267	1.688	2.286	2.901	3.533	4.182	4.849	5.533	6.234
32"	0.884	1.306	1.740	2.355	2.987	3.637	4.303	4.988	5.689	6.408
33"	0.912	1.346	1.792	2.424	3.074	3.741	4.425	5.126	5.845	6.581
34"	0.939	1.385	1.844	2.494	3.160	3.845	4.546	5.265	6.001	6.754
35"	0.966	1.425	1.896	2.563	3.247	3.948	4.667	5.403	6.156	6.927
36"	0.993	1.465	1.948	2.632	3.334	4.052	4.788	5.542	6.312	7.100

Table 48. Scaling factors to one lineal foot for the declared unit - ASJ Max Jacket Addon (1 m²).

Thickness →	½"	1"	1 ½"	2"	2 ½"	3"	3 ½"	4"	4 ½"	5"
Inside Diameter										
½"	0.036	0.061	0.085	0.109	0.134	0.158	0.182	0.207	0.231	0.255
⅝"	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 ⅛"	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 ⅝"	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 ⅛"	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 ⅝"	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 ⅛"	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 ⅛"	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 ⅛"	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	0.413
8"	0.219	0.243	0.268	0.292	0.316	0.341	0.365	0.389	0.413	0.438
9"	0.243	0.268	0.292	0.316	0.341	0.365	0.389	0.413	0.438	0.462
10"	0.268	0.292	0.316	0.341	0.365	0.389	0.413	0.438	0.462	0.486
11"	0.292	0.316	0.341	0.365	0.389	0.413	0.438	0.462	0.486	0.511
12"	0.316	0.341	0.365	0.389	0.413	0.438	0.462	0.486	0.511	0.535
14"	0.365	0.389	0.413	0.438	0.462	0.486	0.511	0.535	0.559	0.584
15"	0.389	0.413	0.438	0.462	0.486	0.511	0.535	0.559	0.584	0.608
16"	0.413	0.438	0.462	0.486	0.511	0.535	0.559	0.584	0.608	0.632
17"	0.438	0.462	0.486	0.511	0.535	0.559	0.584	0.608	0.632	0.657
18"	0.462	0.486	0.511	0.535	0.559	0.584	0.608	0.632	0.657	0.681
19"	0.486	0.511	0.535	0.559	0.584	0.608	0.632	0.657	0.681	0.705
20"	0.511	0.535	0.559	0.584	0.608	0.632	0.657	0.681	0.705	0.730
21"	0.535	0.559	0.584	0.608	0.632	0.657	0.681	0.705	0.730	0.754
22"	0.559	0.584	0.608	0.632	0.657	0.681	0.705	0.730	0.754	0.778
23"	0.584	0.608	0.632	0.657	0.681	0.705	0.730	0.754	0.778	0.803
24"	0.608	0.632	0.657	0.681	0.705	0.730	0.754	0.778	0.803	0.827
25"	0.632	0.657	0.681	0.705	0.730	0.754	0.778	0.803	0.827	0.851
26"	0.657	0.681	0.705	0.730	0.754	0.778	0.803	0.827	0.851	0.876
27"	0.681	0.705	0.730	0.754	0.778	0.803	0.827	0.851	0.876	0.900
28"	0.705	0.730	0.754	0.778	0.803	0.827	0.851	0.876	0.900	0.924
29"	0.730	0.754	0.778	0.803	0.827	0.851	0.876	0.900	0.924	0.949
30"	0.754	0.778	0.803	0.827	0.851	0.876	0.900	0.924	0.949	0.973
31"	0.778	0.803	0.827	0.851	0.876	0.900	0.924	0.949	0.973	0.997
32"	0.803	0.827	0.851	0.876	0.900	0.924	0.949	0.973	0.997	1.022
33"	0.827	0.851	0.876	0.900	0.924	0.949	0.973	0.997	1.022	1.046
34"	0.851	0.876	0.900	0.924	0.949	0.973	0.997	1.022	1.046	1.070
35"	0.876	0.900	0.924	0.949	0.973	0.997	1.022	1.046	1.070	1.094
36"	0.900	0.924	0.949	0.973	0.997	1.022	1.046	1.070	1.094	1.119

In Table 45:

- **Factors without underline indicate ASJ Max jacket for insulation size is pre-applied with SSL II.**
- **Factors with single-underline indicate ASJ Max jacket for insulation size is pre-applied with SSL I.**
- **For 1 lineal foot, a scaling factor of 0.3048 is used with impact results for the declared unit of either SSL II Adhesive Tape Addon (1 m) or SSL I Adhesive Tape Addon (1 m).**

6. LCA: Interpretation

6.1 Interpretation

The Product Stage (A1-A3) is clearly the primary contributor to all impact categories. Within A1-A3, A3 manufacturing, which includes electricity during production and air emissions from production activities, is the largest contributor.

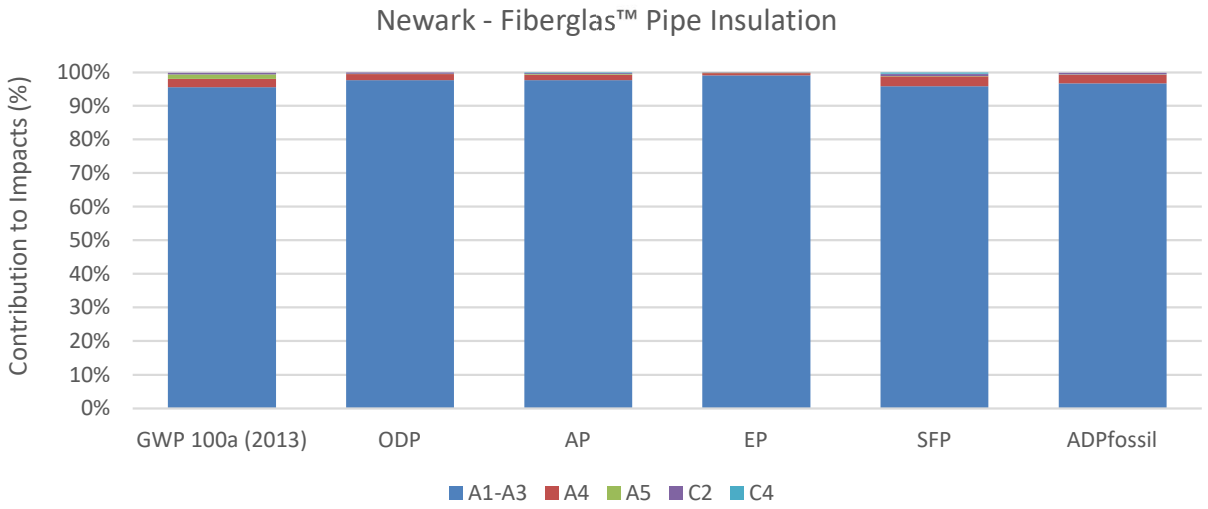

Figure 5. Contribution analysis for Fiberglas™ Pipe Insulation manufactured at the Newark Plant.

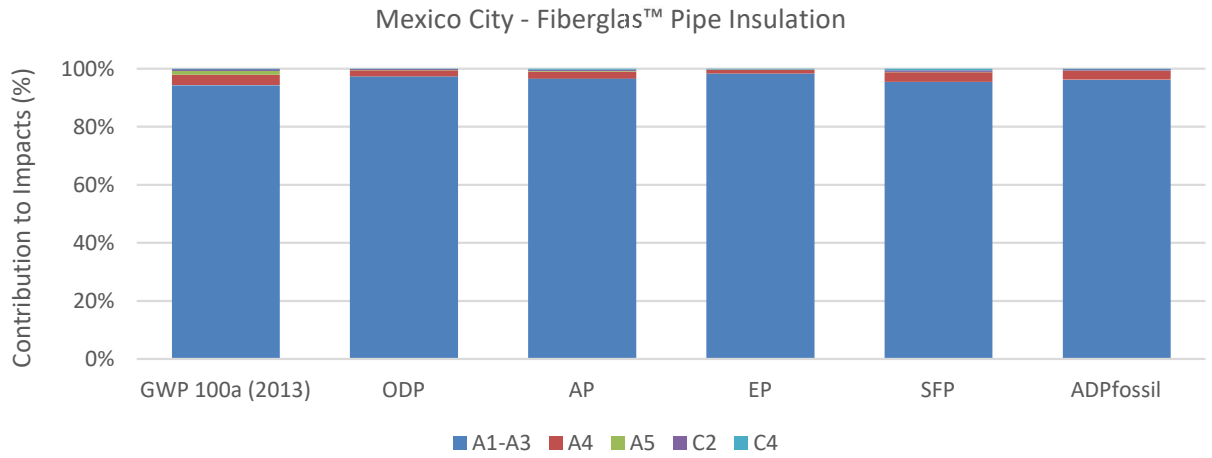

Figure 6. Contribution analysis for Fiberglas™ Pipe Insulation manufactured at the Mexico City Plant.

The primary data used for this study represent production of Fiberglas™ Pipe Insulation at manufacturing sites located in Mexico City, Mexico and Newark, OH, USA from January 2023 through December 2023 using consistent methods and materials.

6.2 Assumptions and Limitations

The ability of LCA to consider the entire life cycle of products makes it an attractive tool for the assessment of potential environmental impacts. Nevertheless, similar to other environmental management analysis tools, LCA has several limitations related to data quality and unavailability of potentially relevant data. It should be kept in mind that the impact assessment results are relative expressions and do not predict impacts on category endpoints, exceeding thresholds, or risks.

The study was conducted by including the relevant system boundaries and best available data for Fiberglas™ Pipe Insulation products, using a consistent data collection method and timeframe. In cases where data were reported for the entire facility rather than for the specific insulation materials product, mass allocation was used to allocate the facility-wide impacts to the specific product. This assumes that all products equally consume facility inputs and contribute to facility outputs.

7. Additional Environmental Information

7.1 Environment and Health during Manufacture

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

7.2 Energy Savings During Use

Insulation is a passive device that requires no extra utilities to operate over its useful life. Insulation of a building and its components may be responsible for reducing the energy burden associated with heating and cooling of the building.

7.3 Environment and Health during Installation

This product is considered an article. The 29 CFR 1910.1200(c) definition of an article is as follows: "Article" means a manufactured item other than a fluid or particle, (i) which is formed to a specific shape or design during manufacture, (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use, and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

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

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

- Eye/face protection – Wear safety glasses with side shields (or goggles)
- Skin and body protection – Wear protective gloves, long-sleeved shirt and long pants
- Respiratory protection – When facing airborne/dust concentration above the exposure limits, use an appropriate certified respirator. A properly fitted NIOSH approved disposable N95 type dust respirator or better is recommended.
- General hygiene instructions – Wash hands before breaks and immediately after handling products. Remove and wash contaminated clothing before re-use.

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

7.5 Delayed Emissions

No delayed emissions are expected from this product.

7.6 Environmental Activities and Certifications

Fiberglas™ Pipe Insulation products have the following certification and sustainable features:

- Certified by SCS Global Services to contain recycled content. Consult the SCS Global Services Green Products Guide for detailed recycled content information.
- GREENGUARD Gold: Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage (GREENGUARD Gold certification is for ASJ Max Fiberglas™ Pipe Insulation). Consult https://spot.ul.com/ for certification details.
- Health Product Declaration for U.S. ASJ Max and No-Wrap Fiberglas™ Pipe Insulation products. Consult the HPD Public Repository for details.

7.7 Further Information

Further information on the product can be found on the manufacturers' website at www.owenscorning.com.

8. References

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- ASTM C303, Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation
- ASTM C411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation
- ASTM C547, Standard Specification for Mineral Fiber Pipe Insulation
- ASTM C585, Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing
- ASTM C665, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- ASTM C795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
- ASTM C871, Standard Test Methods for Chemical Analysis of Thermal Insulation Materials for Leachable Chloride, Fluoride, Silicate, and Sodium Ions
- ASTM C1104, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation
- ASTM C1136, Flexible Low Permeance Vapor Retarders for Thermal Insulation: Types I, II, III, IV, X
- ASTM C1617, Standard Practice for Quantitative Accelerated Laboratory Evaluation of Extraction Solutions Containing Ions Leached from Thermal Insulation on Aqueous Corrosion of Metals
- ASTM D774/D774M, Standard Test Method for Bursting Strength of Paper
- ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM E96, Standard Test Methods for Water Vapor Sorption Transmission of Materials
- UL 723, Test for Surface Burning Characteristics of Building Materials
- ULC S102, Surface Burning Characteristics of Building Materials and Assemblies
- ULC S110, Standard Methods of Tests for Air Ducts

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