

**Declaration Owner**

Thermafiber, Inc.

One Owens Corning Parkway, Toledo, OH, USA

888-TFIBER [834-2371]

www.owenscorning.com/thermafiber

Products

Thermafiber® Mineral Wool Insulation

Functional Unit

1 m² of insulation with a thickness required for an average thermal resistance RSI = 1 m²K/W maintained for 75 years

EPD Number and Period of Validity

SCS-EPD-10747

EPD Valid September 22, 2026 through September 21, 2031

Version: October 1, 2026

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: Building Envelope Thermal Insulation Product EPD Requirements. Version 4.0. November 2025.

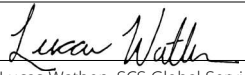
Program Operator

SCS Global Services

2261 Market Street #30372, San Francisco, CA 94114

+1.510.452.8000 | www.SCSglobalServices.com



Declaration Owner:	Thermafiber, Inc.
Address:	One Owens Corning Parkway, Toledo, OH 43659
Declaration Number:	SCS-EPD-10747
Declaration Validity Period:	September 22, 2026 through September 21, 2031
Version:	October 1, 2026
Product:	Thermafiber® Mineral Wool Insulation
Program Operator:	SCS Global Services
General Program Instructions & Version:	SCS Type III Environmental Declaration Program: Program Operator Manual. V12.0, December 2023
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
Functional Unit:	1 m ² of insulation material with a thickness that gives an average thermal resistance RSI = 1 m ² K/W
Intended Product Application & Use:	Building thermal insulation
RSL:	75 Years
Market of Applicability:	North America
EPD Type:	Manufacturer-specific, facility-specific
Range of Dataset Variability:	N/A
EPD Scope:	Cradle-to-Grave
Reference Year of Manufacturer Data:	2025
LCA Practitioner:	Aspire Sustainability
LCA Software:	SimaPro 10.3.0.4
LCI Database:	ecoinvent 3.11
LCIA Methodology:	TRACI 2.2 v1.00; IPCC 2013; CML baseline, v4.7
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	 Lucas Wathen, 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: Building Envelope Thermal Insulation Product EPD Requirements. Version 4.0. November 2025.
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:	 Lucas Wathen, SCS Global Services
Declaration Contents:	1. About Thermafiber, Inc. 2 2. Product 2 3. LCA: Calculation Rules 10 4. LCA: Scenarios and Additional Technical Information 15 5. LCA: Results 17 6. LCA: Interpretation 27 7. Additional Environmental Information 27 8. References 32
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 Thermafiber, Inc.

Thermafiber, Inc. is part of Owens Corning, which is a branded building products leader with three complementary market-leading businesses providing roofing, insulation, and doors primarily for residential markets in North America and Europe. The company operates with an integrated go-to-market strategy and a unique set of OC Advantages – including its iconic brand, unparalleled commercial strength, leading technology, and winning cost position – to help customers win and grow in the market. Owens Corning is committed to helping build better and achieve more through winning partnerships, leading performance, and engaging people. Founded in 1938 and headquartered in Toledo, Ohio, Owens Corning is listed on the New York Stock Exchange (NYSE: OC). For more information, visit www.owenscorning.com.

2. Product

2.1 Product Description

Thermafiber® Mineral Wool Insulation products are comprised of boards and batts. Mineral wool resists mold, fungi, and is vermin proof due to it being an inorganic material. The R-value of Thermafiber® Mineral Wool Insulation ranges from 3.7 – 4.3 per inch (25.4 mm) of thickness. It is available in multiple thicknesses and densities, with various facings by product type. Reflected by its R-value, mineral wool's insulating performance is achieved by its densely packed fibers. Its high resistance to heat flow translates into year-round comfort and energy savings.

The particular CSI codes applicable for the Thermafiber Mineral Wool Insulation product group are:

- 07 21 00 – Thermal Insulation
- 07 21 13 – Board Insulation
- 07 21 13.19 – Mineral Board Insulation

2.2 Product Identification

This Environmental Product Declaration reflects production of Thermafiber® Mineral Wool Insulation products manufactured in Joplin, Missouri, USA. The following product names reflect differences in final product dimensions, application, and R-value only. All Thermafiber® Mineral Wool Insulation products included in this study are made using consistent binder chemistry and manufacturing processes, making it appropriate to group them within a single EPD.

Thermafiber® Mineral Wool Insulation Products	EIFS Board
	Fire & Sound Guard® Plus
	FireSpan® 40, 90, & 120
	Peace & Quiet™
	SAFB™
	Safing
	RainBarrier®
	RainBarrier® ci High Compressive (80)
	RainBarrier® ci High Compressive Plus (110)
	RainBarrier® ci High Compressive Max (140)
	RainBarrier® Dark
	VersaBoard® 35, 40, 60, & 80

2.3 Product Specification and Technical Requirements

At a minimum, the insulation products covered by this EPD meet or exceed the information provided in the following tables. Additional documentation can be found at www.owenscorning.com/thermafiber.

Table 1. Technical specifications for Thermafiber® EIFS Board, Fire & Sound Guard Plus®, and FireSpan® Mineral Wool Insulation.

Property	Test Method	EIFS Board	Fire & Sound Guard® Plus	FireSpan®
Corrosion of Steel, Aluminum, and Copper	ASTM C665	Complies	Complies	Non-corrosive, Types I, III (Class A, Category 1)
Stress Corrosion – Austenitic Stainless Steel	ASTM C795	Complies	N/A	N/A
Non-Combustibility	ASTM E136	Non-combustible	Non-combustible	Non-combustible
Non-Combustibility	CAN/ULC S114	Non-combustible	Non-combustible	Non-combustible
Water Vapor Permeance	ASTM E96	> 50 perm	Unfaced, 50 perms as tested	Unfaced, Permable Foil-faced, Impermeable
Water Vapor Sorption	ASTM C1104	< 0.5%	Sorption less than 1% by volume	Sorption less than 1% by volume
Surface Burning Characteristics	ASTM E84	Flame Spread 0, Smoke Developed 0	Unfaced, Flame Spread 0, Smoke Developed 0	Unfaced, Flame Spread 0, Smoke Developed 0 Faced, Flame Spread 25, Smoke Developed 0
Surface Burning Characteristics	CAN/ULC S102	Flame Spread 0, Smoke Developed 0	Unfaced, Flame Spread 0, Smoke Developed 0	Unfaced, Flame Spread 0, Smoke Developed 0 Faced, Flame Spread 25, Smoke Developed 0
Fungi Resistance	ASTM C1338	Complies	Complies	Complies
Linear Shrinkage	ASTM C356	< 1% @ 1,200°F	N/A	< 2% @ 1,200°F (650°C)
Perimeter Fire Containment Systems	ASTM E2307	N/A	N/A	Thermafiber® Safing insulation used in conjunction with Thermafiber® FireSpan® insulations in the Perimeter Fire Containment System Complies
Fire Tests of Firestop Systems	CAN/ULC S115	N/A	N/A	Complies
Penetration Firestop Systems	ASTM E814 or UL 1479	N/A	N/A	N/A
Compressive Strength	ASTM C165	648 lbs/ft² @ 10% compression	N/A	N/A

Table 2. Technical specifications for Thermafiber® Peace & Quiet™, SAFB™, Safing, and VersaBoard® Mineral Wool Insulation.

Property	Test Method	Peace & Quiet™	SAFB™	Safing	VersaBoard®
Corrosion of Steel, Aluminum, and Copper	ASTM C665	Complies	Complies	Non-corrosive, Types I, II	Pass
Non-Combustibility	ASTM E136	Non-combustible	Non-combustible	Non-combustible	Non-combustible
Non-Combustibility	CAN/ULC S114	Complies	Complies	Complies	Complies
Water Vapor Permeance	ASTM E96	N/A	N/A	Unfaced, 50 perms as tested Foil-faced, 0.02 perms as tested	0.02 perms as tested for all facings available, excluding black mat
Water Vapor Sorption	ASTM C1104	Absorbs 0.3% by volume	Absorbs 0.3% by volume	Sorption less than 1% by volume	Absorption less than 1% by volume
Surface Burning Characteristics	ASTM E84	Flame Spread 0 Smoke Developed 0	Flame Spread 0 Smoke Developed 0	Unfaced, Flame Spread 0, Smoke Developed 0 Foil-Faced, Flame Spread 25, Smoke Developed 0	Flame Spread 0, Smoke Developed 0, unfaced Flame Spread 25, Smoke Developed, aluminum FSP
Surface Burning Characteristics	CAN/ULC S102	Flame Spread 0 Smoke Developed 0	Flame Spread 0 Smoke Developed 0	Unfaced, Flame Spread 0, Smoke Developed 0 Foil-Faced, Flame Spread 25, Smoke Developed 0	Flame Spread 0, Smoke Developed 0, unfaced Flame Spread 25, Smoke Developed, aluminum FSP
Fungi Resistance	ASTM C1338	N/A	N/A	N/A	N/A
Linear Shrinkage	ASTM C356	N/A	N/A	N/A	<2% @ 1,200°F (650°C)
Perimeter Fire Containment Systems	ASTM E2307	N/A	N/A	Thermafiber® Safing insulation used in conjunction with Thermafiber® FireSpan® insulations in the Perimeter Fire Containment System Complies	N/A
Fire Tests of Firestop Systems	CAN/ULC S115	N/A	N/A	Thermafiber® Safing insulation used in conjunction with an approved fill, void, or cavity material in construction joint systems Complies	N/A
Penetration Firestop Systems	ASTM E814 or UL 1479	N/A	N/A	Complies	N/A

Table 3. Technical specifications for Thermafiber® RainBarrier® Mineral Wool Insulation

Property	Test Method	Result				
		RainBarrier®	RainBarrier® Dark	RainBarrier® ci High Compressive (80)	RainBarrier® ci High Compressive Plus (110)	RainBarrier® ci High Compressive Max (140)
Corrosion of Steel, Aluminum, and Copper	ASTM C665	Pass				
Stress Corrosion – Austenitic Stainless Steel	ASTM C795	Pass				N/A
Non-Combustibility	ASTM E136	Non-combustible				
Non-Combustibility	CAN/ULC S114	Complies	N/A			
Water Vapor Permeance	ASTM E96	25-50 perm	25-50 perm	24 perm	46 perm	57 perm
Water Vapor Sorption	ASTM C1104	Absorbs 0.03% by volume	Absorbs 0.06% by volume	Sorption <0.1% by volume		
Linear Shrinkage	ASTM C356	<2% @ 1,200°F (650°C)	<2% @ 1,200°F (650°C)	<2% @ 1,200°F (650°C)		
Surface Burning Characteristics	ASTM E84	Flame Spread 0, Smoke Developed 0	Flame Spread 20 Smoke Developed 15	Flame Spread 0, Smoke Developed 0		
Surface Burning Characteristics	CAN/ULC S102	Flame Spread 0, Smoke Developed 0	Flame Spread 20 Smoke Developed 5	N/A		
Fungi Resistance	ASTM C1338	Complies				
UV Testing	ICC-ES AC38 Section 4.1.2 UV Exposure with ASTM D224 Color Evaluation	N/A	Complies; acceptable change in black color after UV exposure	N/A		
Compressive Strength	ASTM C165	N/A	N/A	475 lbs/ft² @ 10% deformation	720 lbs/ft² @ 10% deformation	1,296 lbs/ft² @ 10% deformation
Odor	ASTM C1304	N/A	N/A	Complies		
Chemical analysis for Cl, F, Na+, SiO4⁴	ASTM C871/ASTM C795	N/A				Results fall within acceptability limits of ASTM C795

2.4 Flow Diagram

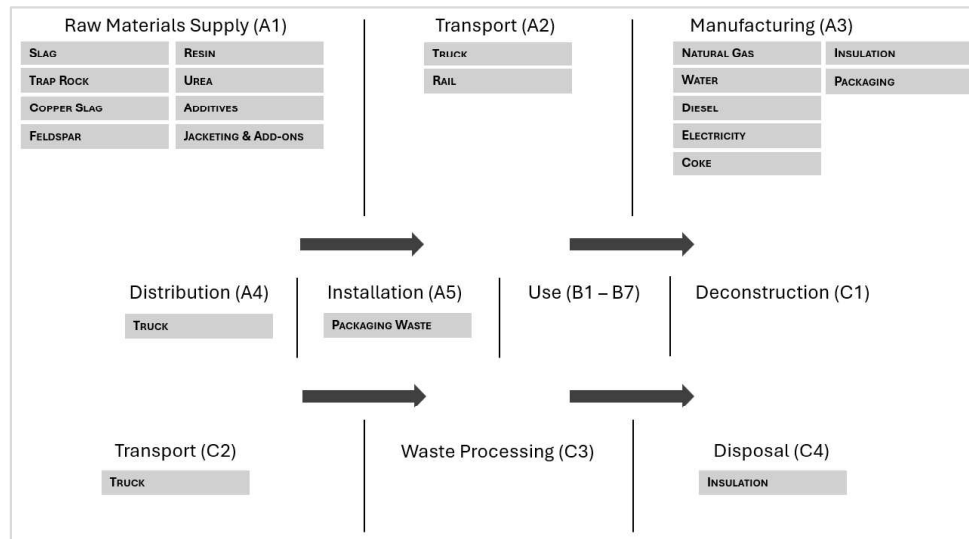


Figure 1. Flow Diagram.

2.5 Application

In residential and commercial construction, including multi-family construction, mineral wool insulation products are used as non-structural thermal-insulating materials in interior and exterior walls, floor-ceiling assemblies, attics, and crawl spaces.

In commercial construction, mineral wool insulation can be used as continuous insulation in the building envelope, exterior wall cavity insulation, acoustic insulation for partition interior walls, and a variety of other applications, including fire-rated partition walls and perimeter fire containment assemblies. Mineral wool is the only insulation approved for use in curtain wall perimeter fire containment applications because of its fire-resistant properties.

2.6 Properties of Declared Product as Delivered

When installed according to all applicable Thermafiber, Inc. specifications, recommendations, and guidelines, Thermafiber® Mineral Wool Insulation products deliver their advertised properties.

Table 4. Product properties.

Product	Available Density (nominal)	Available Thickness	Standard Dimensions
EIFS Board	7.0 pcf*	2", 3", 4", 5" 6"	24" x 48"
Fire & Sound Guard Plus®	--	2.5" – 7.125"	15" x 47", 23" x 47" 16" x 48", 24" x 48"
FireSpan®	40 (4.0 pcf)	2" – 7"	24" x 48", 24" x 60", 36" x 60"
	90 (8.0 pcf)	1" – 7"	24" x 48", 24" x 60", 36" x 60", 48" x 72"
	120 (12.0 pcf)	3"	24" x 60", 36" x 60", 48" x 72"
Peace & Quiet™	2.5 pcf	3", 6"	15" x 47", 23" x 47" 16" x 48", 24" x 48"
SAFB™	2.5 pcf	1.5" – 8" in ½" increments	15" x 47", 23" x 47" 16" x 48", 24" x 48"
	4.0 pcf	1"	15" x 47", 23" x 47" 16" x 48", 24" x 48"

Product	Available Density (nominal)	Available Thickness	Standard Dimensions
Safing	4.0 pcf*	1" – 7" in ½" increments	24" x 48"
	6.0 pcf*	2", 3", 4", 6"	24" x 48"
RainBarrier®	RainBarrier® (6.0 pcf)	1" – 8" in ½" increments	16" x 48", 24" x 48"
	RainBarrier® Dark (6.0 pcf)	2" – 8"	16" x 48", 24" x 48"
RainBarrier® ci High Compressive	80 (8.0 pcf)	1.5" – 6"	24" x 48", 48" x 72"
	110 (11.0 pcf)	1.25", 1.5" – 4"	24" x 48", 48" x 72"
	140 (14.0 pcf)	1" – 4"	24" x 48", 48" x 72"
VersaBoard®	35 (3.5 pcf*)	1.5" – 7"	16" x 48", 24" x 48"
	40 (4.0 pcf*)	1" – 8"	16" x 48", 24" x 48"
	60 (6.0 pcf*)	1" – 8"	16" x 48", 24" x 48"
	80 (8.0 pcf*)	1.5" – 5"	16" x 48", 24" x 48"

*Actual density

2.7 Manufacturer-Specific EPD

The LCIA results presented in this EPD represent SAFB™ (2.5 pcf), which is a reference product with a representative density, and was selected based on sales volume. The Joplin, MO, facility manufactures a wide range of products from the same manufacturing platform, which may have variations in density, k-value, and other features. Table 41 contains scaling factors to assist in understanding the impacts for the individual product lines being produced at the Joplin facility, at the functional unit of 1 m² of product at R_{SI} = 1.

2.8 Declaration of Methodological Framework

This product-specific EPD reflects cradle-to-grave with modules A1-A3, A4, A5, B1-B7, and C1-C4 included. The study follows ISO 14040, ISO 14044, ISO 14025, ISO 21930, UL Part A v4.0, and UL Part B: Building Envelope Thermal Insulation v3.0. The reference service life is 75 years, consistent with PCR requirements and assuming installation and use according to manufacturer recommendations. Facility-wide inputs and outputs were allocated to products on a mass basis where product-specific data were unavailable. Cut-off criteria were applied in accordance with UL Part A requirements. No known flows are deliberately excluded from this EPD.

2.9 Material Composition

Thermafiber Mineral Wool Insulation consists of two major components, charge and binder. The primary raw material used is blast furnace slag, a by-product of the steel industry. The reuse of slag into mineral wool prevents this material from being discarded into landfills and results in a recycled content in the final product. These materials are sourced locally and transported to the manufacturing facility. No substances required to be reported as hazardous are associated with the production of this product.

Table 5. Batch and binder composition.

Component	Composition % (by Mass)
Charge	
Slag	50 – 90%
Trap Rock	10 – 40%
Copper Slag	<10%
Feldspar	<10%
Binder	

Component	Composition % (by Mass)
Resin	<5%
Urea	<5%
Additives	<1%

2.10 Manufacturing

Thermafiber® Mineral Wool consists of two major components, charge and binder. The diagram below is representative of the processes used by the manufacturing facility to produce Thermafiber® Mineral Wool Insulation.

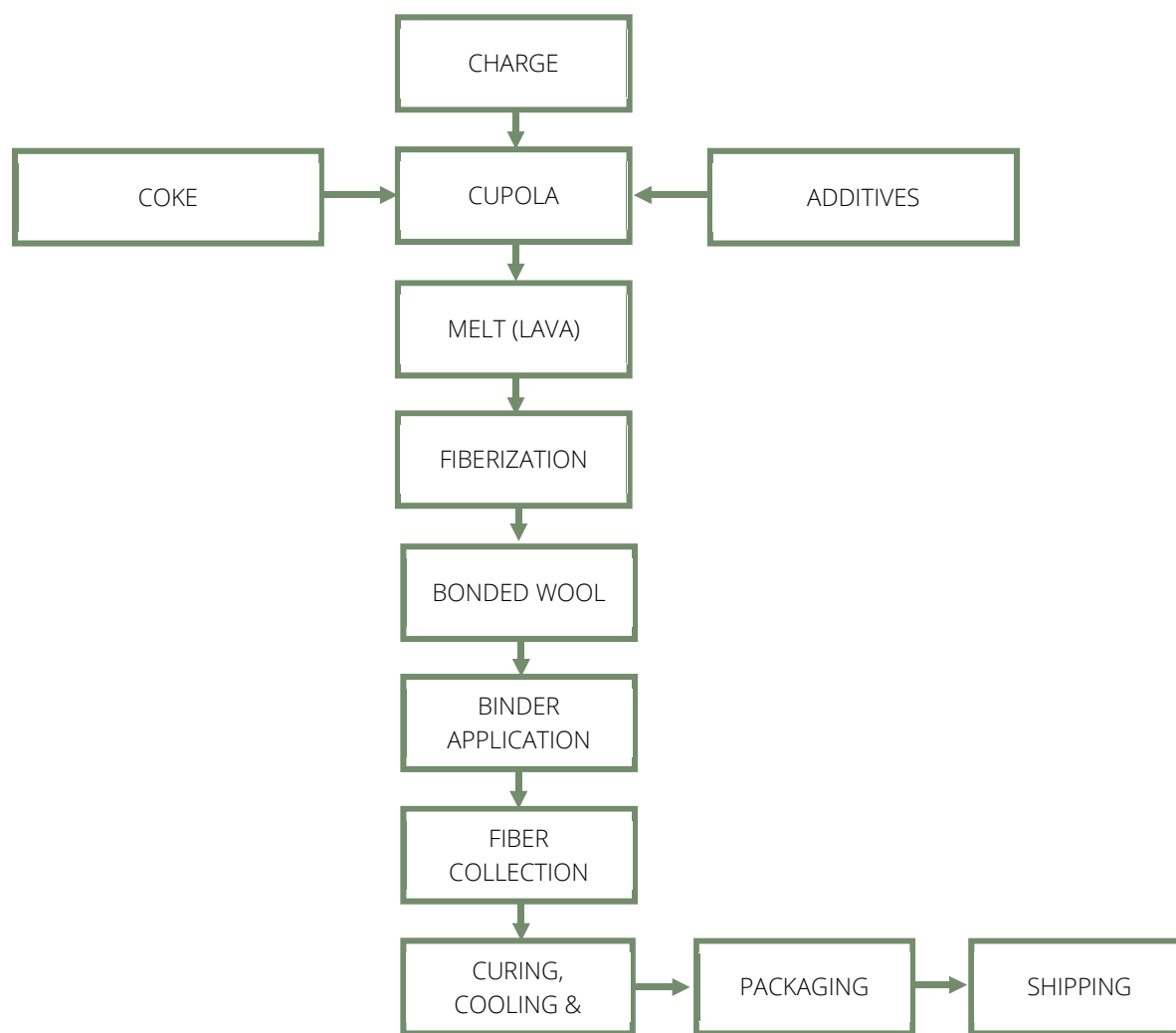


Figure 2. Process Flow Diagram for Manufacturing of Mineral Wool Insulation

2.11 Packaging

Thermafiber® Mineral Wool Insulation products are packaged using low-density polyethylene (LDPE) bags and may be wrapped using a polypropylene film.

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.

Table 6. *Packaging Material Disposal Scenarios (North America).*

North America (USA)	Material Type	Recycling Rate	Landfill Rate	Incineration Rate
Packaging Material Disposal Scenario	Plastics	15%	68%	17%
	Metals	57%	34%	9%
	Pulp (cardboard, paper)	75%	20%	5%

2.12 Transportation

Outbound transportation from the manufacturing facility is by diesel truck. The average distance from the Joplin manufacturing facility to the construction site for Thermafiber Mineral Wool Insulation is 764 miles (1,230 km).

2.13 Product Installation

Thermafiber® Mineral Wool Insulation products are made for easy handling, fabrication, and installation. Mineral wool insulation is easy to cut and install, and its flexibility allows it to conform to building shapes and construction irregularities. It comes in standard-sized sheets and is easily cut with a serrated knife. Custom sizes are available upon request.

Batts can be friction fitted in between studs with the ends of each piece butted closely together to fill all voids.

Rainscreen and cavity wall systems vary greatly from types of hangers and how they are installed. Generally, mineral wool insulation is installed with abutted joints and mechanically secured and attached to the building substrate.

Several mineral wool products are mechanically attached depending on the application. Please see product data sheets for installation guidance.

2.14 Use

Mineral wool is passive during its use after installation. During the use phase, mineral wool does not require energy or water to perform its function and requires no maintenance. Mineral wool insulation has no Use State impacts (B1) and does not require any Maintenance (B2), Repair (B3), Replacement (B4), or Refurbishment (B5) during the 75-year reference service life. As a result, these modules have no environmental impacts in this study and are therefore not presented in the results tables. Furthermore, the life cycle modules of Building Operational Energy Use During Product Use (B6) and Building Operational Water Use During Product Use (B7) have zero impacts. This is consistent with guidance provided in the PCR.

2.15 Reference Service Life (RSL) 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.

2.16 Disposal

The end-of-life stage modeled for Thermafiber Mineral Wool Insulation consisted of the transportation by truck for an assumed distance of 100 miles (161 km) to a landfill and the subsequent disposal of the used insulation.

3. LCA: Calculation Rules

3.1 Functional Unit

The functional unit is 1 m² of insulation material with a thickness that gives an average thermal resistance RSI = 1 m²K/W and with a building service life of 75 years. Faced Thermafiber Mineral Wool Insulation additionally has 1 m² of a facing material applied to the top surface of the insulation.

Table 7. Functional unit and reference flows.

Name	Unit	Value
Functional Unit	m ²	1
Mass	kg	1.25E+00
Density	kg/m ³	32.0
Thickness	cm	3.89

Table 8. Functional unit properties for facing addons.

Name	Unit	Value
5225 White Facing Addon		
Functional Unit	m ²	1
Mass	kg	6.05E-02
5225T Printed Facing Addon		
Functional Unit	m ²	1
Mass	kg	5.37E-02
5225 Printed Facing Addon		
Functional Unit	m ²	1
Mass	kg	5.61E-02
Black Veil Facing Addon		
Functional Unit	m ²	1
Mass	kg	6.15E-02

3.2 System Boundary

This declaration is a product-specific EPD and represents cradle-to-grave (A1-A5, B1-B7, C1-C4). As with most building envelope thermal insulation materials, mineral wool insulation is passive during its use after installation. During the use phase, mineral wool does not require energy or water to perform its function, and requires no maintenance. Mineral wool insulation has no Use Stage (B1) impacts and does not require any Maintenance (B2), Repair (B3), Replacement (B4), or Refurbishment (B5) during the 75-year reference service life. As a result, these modules have no environmental impacts in this study and are therefore not presented in the results tables. Furthermore, the life cycle modules of Building Operational Energy Use During Product Use (B6) and Building Operational Water Use During Product Use (B7) have zero impacts.

Table 9. *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	X	X	X	X	X	X	X	X	X	X	X	MND

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

3.3 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 similar 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.

This study was conducted by including the relevant system boundaries and best available data for Thermafiber® Mineral Wool 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 facility-wide impacts to the specific product. This assumes that all products equally consume facility inputs and contribute to facility outputs.

3.4 Units

The International System of Units (SI Units) was used to report LCA results. Where conversion to Imperial Units was necessary, conversion factors provided in UL PCR Part A, Table 11 were used.

3.5 Cut-off Rules

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, "The total of neglected input flows per module shall be a maximum of 5% of energy usage, mass, and environmental impacts." Flows excluded from 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. No known flows have been deliberately excluded.

3.6 Data Sources

Both primary and secondary data are used in the modeling of the life cycle of mineral wool insulation analyzed in this study. Primary manufacturing data, including raw materials consumption, inbound transportation (distance and mode), annual production figures, energy consumption, water consumption, emissions to air, waste generation, distribution of finished goods, and packaging usage, were collected from the Joplin, Missouri manufacturing site. Secondary data primarily reference the ecoinvent 3.11 database. Table 10 provides LCA modeling data sources. Secondary data from these were used to model production of input, raw materials, production and generation of energy, transportation modes throughout the life cycle, and waste treatment for packaging and product disposal scenarios. Minor components that have a negligible effect on impact category results are omitted from this table.

Table 10. *Data Sources.*

Modules	Flow / Modeled Unit Process	Ecoinvent 3.11 Process Dataset(s)	Reference Year
Product Materials			
	Binder Materials		
A1 - - - - -	Urea	Urea {RoW} urea production Cut-off, U	2020
A1 - - - - -	Resin	Formaldehyde {RoW} market for formaldehyde Cut-off, U Phenol {RoW} market for phenol Cut-off, U Methanol {RoW} market for methanol Cut-off, U	2024 2024 2018
	Charge Materials		
A1 - - - - -	Slag	Ground granulated blast furnace slag {US} production Cut-off, U	2023
A1 - - - - -	Trap Rock	Basalt {RoW} quarry operation Cut-off, U	2022
A1 - - - - -	Copper Slag	Ground granulated blast furnace slag {US} production Cut-off, U	2023
A1 - - - - -	Feldspar	Feldspar {RoW} production Cut-off, U	2024
	Facing Addon Materials		
A1 - - - - -	Fiberglass	Glass fibre {RoW} glass fibre production Cut-off, U	2024
A1 - - - - -	Polyethylene Film	Packaging film, low density polyethylene {RoW} production Cut-off, U	2024
	Packaging Materials		
-- A3 - - - -	Poly Bag	Polyethylene, low density, granulate {RoW} production Cut-off, U Extrusion, plastic film {FoW} extrusion, plastic film Cut-off, U	2019 2020
-- A3 - - - -	Polypropylene Film	Polypropylene, granulate {RoW} production Cut-off, U Extrusion, plastic film {RoW} extrusion, plastic film Cut-off, U	2019 2020
-- A3 - - - -	Pallet	EUR-flat pallet {RoW} production Cut-off, U	2021
Electricity/Heat/Resources for Manufacturing			
-- A3 - - - -	Electricity Joplin	Electricity, medium voltage {Joplin, MO} [eGRID SPNO 2024] Cut-off, U	2023
-- A3 - - - -	Coke	Coke {US} coke production Cut-off, U	2023
-- A3 - - - -	Water	Tap water {RoW} market Cut-off, U	2019
-- A3 - - - -	Natural Gas	Heat, district or industrial, natural gas {GLO} market group for Cut-off, U	2024
-- A3 - - - -	Diesel	Diesel, burned in building machine {GLO} diesel, burned in building machine Cut-off, U	2024
-- A3 - - - -	Propane	Propane, burned in building machine {GLO} market for propane Cut-off, U	2024
Transportation			
- A2 - - - - -	Rail	Transport, freight, train, fleet average {US} transport, freight, train, diesel Cut-off, U	2020
- A2 - A3 - A4 - A5 - C2	Truck	Transport, freight, lorry, >32 metric ton, diesel, EURO 5 {RoW} market Cut-off, U	2024

3.7 Electricity

Assumptions regarding the power mix were made in accordance with UL PCR Part A v4.0. The SPNO (Southwest Power Pool North) eGRID subregion was used for modeling purposes. This subregion covers the Joplin, Missouri manufacturing location.

3.8 Data Quality

Primary data were based on measured and calculated data from the Joplin, Missouri Thermafiber, Inc. plant and reflect calendar year 2025 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. The results of the data quality assessment are presented in the table below.

Table 11. *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	The material and resource inputs and emissions provided by Thermafiber, Inc. are directly from the manufacturer based on measured primary data in 2025 for the mineral wool insulation products. Secondary data for the Life Cycle Inventory (LCI) were obtained primarily from ecoinvent 3.11 datasets, the most up-to-date version available at the time of the study. The datasets have reference years between 2015 and 2024. 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 regional electricity grid selected for the production phase was specific to the Thermafiber® manufacturing facility in Joplin, MO, USA. The ecoinvent 3.11 database typically bases its research and measurement on specific producers, usually in Europe, and adjusts for global energy and transport considerations. Many of the common materials were modeled as global or “rest of world” datasets for consistency and in alignment with internal Owens Corning LCA conventions. Geographical coverage is considered very good quality.
Technology Coverage: Specific technology or technology mix	Thermafiber, Inc. provided the primary material and resource input and emission data based on their 2025 Thermafiber® production processes. Technology coverage is considered generally very good quality.
Precision: Measure of the variability of the data values for each data expressed	Thermafiber, Inc. provided the primary material and resource input and emission data based on their 2025 Thermafiber® production processes. Thus, precision is considered very good quality.
Completeness: Percentage of flow that is measured or estimated	Thermafiber, Inc. provided the primary material and resource input and emission data based on their 2025 Thermafiber® production processes. All materials reported in the data were included in the raw materials phase of the LCA. Energy data were provided by Thermafiber, Inc. for the manufacturing facility studied; 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	Thermafiber, Inc. provided the primary material and resource input and emission data based on their 2025 Thermafiber® production processes. Given Thermafiber Inc.'s expertise and in-depth knowledge of mineral wool insulation production, the representativeness of data 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 the stages of the study. Thus, consistency is considered high quality.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent	Provided the practitioner has access to the same data sources described in the report, the results would be reproducible. Therefore, reproducibility is considered high.

practitioner to reproduce the results reported in the study	
Sources of the Data: Description of all primary and secondary data sources	Thermafiber, Inc. provided the primary material and resource use input and emission data, material composition, supply chain transport, and measured energy consumption. Secondary data were obtained from the ecoinvent 3.11 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 the report.

3.9 Period under review

The period of review is calendar year 2025.

3.10 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 product volume (by mass). The types of product activities for the products manufactured at the given facility are similar, so mass allocation is considered an acceptable allocation strategy.

3.11 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 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 construction works energy use phase as instructed under this PCR. Full conformance with the PCR for 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.

4. LCA: Scenarios and Additional Technical Information

4.1 Transport to the Building Site (A4)

Thermafiber® Mineral Wool Insulation products are transported away from the manufacturing site by truck. The details for insulation and facing materials are provided separately in the tables below.

Table 12. *Thermafiber® Mineral Wool Insulation Product Transportation to Installation Site (A4).*

Name	Unit	Value
Vehicle type	-	45% Transport, freight lorry, >32 metric ton, diesel, EURO 5 {RoW} 55% Transport, freight, train, fleet average {US} , diesel
Fuel type	-	diesel, low-sulfur
Transport distance	km	1.23E+03
Capacity utilization	%	65%
Gross density of products transported	kg/m ³	2.57E-02
Capacity utilization volume factor	-	1

Table 13. *Facing Addon Product Transportation to Installation Site (A4).*

Name	Unit	5225-White	5225T-Printed	5225-Printed	Black Veil
Vehicle type	-	45% Transport, freight lorry, >32 metric ton, diesel, EURO 5 {RoW} 55% Transport, freight, train, fleet average {US} , diesel			
Fuel type	-	diesel, low-sulfur			
Transport distance	km	1.23E+03			
Capacity utilization	%	65%			
Gross density of products transported	kg/m ³	3.97E+02	3.58E+02	3.74E+02	9.88E+01
Capacity utilization volume factor	-	1			

4.2 Installation into the Building (A5)

Table 14. *Installation Summary.*

Name	Unit	Value
Ancillary materials (per m ²)	kg	1.20E-03
Electricity consumption	kwh	1.20E-02
Diesel fuel for onboard generators	MJ	3.70E-01
Product loss per functional unit	%	2.00E+00
Mass of packaging waste specified by type	kg	
Recycle	kg	1.95E-02
Landfill	kg	5.68E-03
Incineration	kg	2.27E-02
Biogenic carbon contained in packaging	kg CO ₂	0.00E+00
Direct emissions to ambient air, soil, and water	kg	0.00E+00
VOC content	µg/m ³	N/A (not tested)

4.3 End-of-Life (C1-C4)

Table 15. *End of Life Transport (C2) and Landfill Disposal (C4) of Thermafiber® Mineral Wool.*

End-of-life		Unit	Value
Assumptions for scenario development			
Collection process	Collected separately	kg	0.00E+00
	Collected with mixed construction waste	kg	1.25E+00
Transport	Diesel Powered Truck	km	1.61E+02
Disposition	Reuse	kg	0.00E+00
	Recycling	kg	0.00E+00
	Energy recovery	kg	0.00E+00
	Landfill	kg	1.25E+00
Removals of biogenic carbon (excluding packaging)		kg CO ₂	0.00E+00

Table 16. *End of Life Transport (C2) and Landfill Disposal (C4) of Facing Addons.*

Disposal Transport (C2) & Landfill (C4) – Facing Addons	Distance (km)	Weight (kg)	Landfill
5225-White	1.61E+02	6.05E-02	100%
5225T Printed	1.61E+02	5.37E-02	100%
5225 Printed	1.61E+02	5.61E-02	100%
Black Veil	1.61E+02	6.15E-02	100%

4.4 Re-use Phase

Although reuse and recycling of mineral wool 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.

5. LCA: Results

5.1 LCIA and LCI Results

The following impact indicators, specified by the PCR, are reported below for the declared system boundary modules.

Table 17. Description of the system boundary modules.

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	x	x	x	x	x	x	x	x	x	x	x	MND	

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

Table 18. Life Cycle Impact Assessment Indicators and characterization methods used.

Abbreviation	Impact Category	Unit	Characterization Method
GWP total	Global warming potential – total	kg CO ₂ eq	TRACI 2.2
GWP fossil	Global warming potential – fossil	kg CO ₂ eq	TRACI 2.2
GWP biogenic	Global warming potential – biogenic	kg CO ₂ eq	TRACI 2.2
GWP luluc	Global warming potential – land use, land use change	kg CO ₂ eq	TRACI 2.2
ODP	Depletion of stratospheric ozone layer	kg CFC-11 eq	TRACI 2.2
AP	Acidification potential of soil and water	kg SO ₂ eq	TRACI 2.2
EP marine	Eutrophication potential – marine	kg N eq	TRACI 2.2
EP freshwater	Eutrophication potential – freshwater	kg P eq	TRACI 2.2
SFP	Smog formation potential	kg O ₃ eq	TRACI 2.2
ADP-fossil	Depletion of non-renewable fossil fuels	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 19. *Additional transparency indicators used.*

Resources	Unit	Waste and Outflows	Unit
RPRE: Renewable primary energy used as energy carrier (fuel)	[MJ, LHV]	HWD: Hazardous waste disposed	[kg]
RPRM: Renewable primary resources with energy content used as material	[MJ, LHV]	NHWD: Non-hazardous waste disposed	[kg]
NRPRE: 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]
NRPRM: 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 20. *Carbon emissions and removals.*

Parameter	Unit
BCRP: Biogenic Carbon Removal from Product	[kg CO ₂]
BCEP: Biogenic Carbon Emission from Product	[kg CO ₂]
BCRK: Biogenic Carbon Removal from Packaging	[kg CO ₂]
BCEK: Biogenic Carbon Emission from Packaging	[kg CO ₂]
BCEW: Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	[kg CO ₂]
CCE: Calcination Carbon Emissions	[kg CO ₂]
CCR: Carbonation Carbon Removals	[kg CO ₂]
CWNR: Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	[kg CO ₂]

5.2 Product-Specific Results per Functional Unit

Results of the Life Cycle Assessment are presented below. 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.

Table 21. Life Cycle Impact Assessment (LCIA) results per functional unit for Thermafiber® Mineral Wool Insulation.

Impact Category	Units	A1	A2	A3	A4	A5	C2	C4
GWP total	kg CO ₂ eq	2.09E-01	7.90E-02	6.65E-01	1.06E-01	5.91E-02	1.68E-02	3.41E-03
GWP fossil	kg CO ₂ eq	2.08E-01	7.90E-02	6.99E-01	1.06E-01	5.78E-02	1.68E-02	3.41E-03
GWP biogenic	kg CO ₂ eq	7.75E-04	1.09E-05	-3.40E-02	1.80E-05	1.27E-03	3.02E-06	1.24E-06
GWP luluc	kg CO ₂ eq	7.00E-05	2.76E-06	1.41E-04	4.95E-06	1.26E-05	8.43E-07	1.72E-07
ODP	kg CFC-11 eq	4.42E-09	1.03E-09	4.41E-08	1.31E-09	1.67E-09	2.06E-10	5.15E-11
AP	kg SO ₂ eq	1.55E-03	7.95E-04	8.84E-03	4.42E-04	2.90E-04	4.20E-05	2.83E-05
EP marine	kg N eq	8.11E-05	2.21E-04	1.99E-03	1.07E-04	5.32E-05	8.43E-06	7.45E-06
EP freshwater	kg P eq	3.43E-06	4.35E-08	2.81E-05	2.78E-07	1.01E-06	5.42E-08	5.23E-09
SFP	kg O ₃ eq	7.97E-03	2.64E-02	5.10E-02	1.28E-02	2.57E-03	1.00E-03	8.90E-04
ADP fossil	MJ, LHV	4.18E+00	1.02E+00	1.65E+01	1.36E+00	1.10E+00	2.16E-01	4.34E-02

Table 22. Life Cycle Impact Assessment (LCIA) results per m² of 5225-White Facing Addon.

Impact Category	Units	A1	A2	A3	A4	A5	C2	C4
GWP total	kg CO ₂ eq	4.59E-02	9.87E-03	0.00E+00	4.92E-03	0.00E+00	7.86E-04	1.59E-04
GWP fossil	kg CO ₂ eq	4.58E-02	9.87E-03	0.00E+00	4.91E-03	0.00E+00	7.86E-04	1.59E-04
GWP biogenic	kg CO ₂ eq	-1.58E-04	1.78E-06	0.00E+00	8.39E-07	0.00E+00	1.41E-07	5.77E-08
GWP luluc	kg CO ₂ eq	2.58E-04	4.96E-07	0.00E+00	2.30E-07	0.00E+00	3.95E-08	8.00E-09
ODP	kg CFC-11 eq	6.57E-10	1.21E-10	0.00E+00	6.12E-11	0.00E+00	9.66E-12	2.40E-12
AP	kg SO ₂ eq	2.57E-04	2.47E-05	0.00E+00	2.06E-05	0.00E+00	1.97E-06	1.32E-06
EP marine	kg N eq	2.69E-05	4.96E-06	0.00E+00	4.98E-06	0.00E+00	3.95E-07	3.47E-07
EP freshwater	kg P eq	7.49E-07	3.19E-08	0.00E+00	1.30E-08	0.00E+00	2.54E-09	2.43E-10
SFP	kg O ₃ eq	3.21E-03	5.89E-04	0.00E+00	5.94E-04	0.00E+00	4.69E-05	4.14E-05
ADP fossil	MJ, LHV	5.03E-01	1.27E-01	0.00E+00	6.33E-02	0.00E+00	1.01E-02	2.02E-03

Table 23. Life Cycle Impact Assessment (LCIA) results per m² of 5225T Printed Facing Addon.

Impact Category	Units	A1	A2	A3	A4	A5	C2	C4
GWP total	kg CO ₂ eq	4.66E-01	8.75E-03	0.00E+00	1.14E-02	0.00E+00	7.27E-04	1.47E-04
GWP fossil	kg CO ₂ eq	4.65E-01	8.75E-03	0.00E+00	1.14E-02	0.00E+00	7.26E-04	1.47E-04
GWP biogenic	kg CO ₂ eq	-9.91E-04	1.57E-06	0.00E+00	2.01E-06	0.00E+00	1.31E-07	5.33E-08
GWP luluc	kg CO ₂ eq	2.05E-03	4.40E-07	0.00E+00	5.58E-07	0.00E+00	3.65E-08	7.40E-09
ODP	kg CFC-11 eq	6.45E-09	1.07E-10	0.00E+00	1.41E-10	0.00E+00	8.92E-12	2.22E-12
AP	kg SO ₂ eq	2.66E-03	2.19E-05	0.00E+00	3.62E-05	0.00E+00	1.82E-06	1.22E-06
EP marine	kg N eq	2.79E-04	4.40E-06	0.00E+00	8.05E-06	0.00E+00	3.65E-07	3.21E-07
EP freshwater	kg P eq	7.28E-06	2.83E-08	0.00E+00	3.41E-08	0.00E+00	2.35E-09	2.25E-10
SFP	kg O ₃ eq	3.30E-02	5.22E-04	0.00E+00	9.59E-04	0.00E+00	4.34E-05	3.83E-05
ADP fossil	MJ, LHV	4.94E+00	1.12E-01	0.00E+00	1.47E-01	0.00E+00	9.34E-03	1.87E-03

Table 24. Life Cycle Impact Assessment (LCIA) results per m² of 5225 Printed Facing Addon.

Impact Category	Units	A1	A2	A3	A4	A5	C2	C4
GWP total	kg CO ₂ eq	4.43E-02	9.16E-03	0.00E+00	1.14E-02	0.00E+00	7.27E-04	1.47E-04
GWP fossil	kg CO ₂ eq	4.43E-02	9.16E-03	0.00E+00	1.14E-02	0.00E+00	7.26E-04	1.47E-04
GWP biogenic	kg CO ₂ eq	-1.67E-04	1.65E-06	0.00E+00	2.01E-06	0.00E+00	1.31E-07	5.33E-08
GWP luluc	kg CO ₂ eq	2.57E-04	4.60E-07	0.00E+00	5.58E-07	0.00E+00	3.65E-08	7.40E-09
ODP	kg CFC-11 eq	6.30E-10	1.12E-10	0.00E+00	1.41E-10	0.00E+00	8.92E-12	2.22E-12
AP	kg SO ₂ eq	2.50E-04	2.29E-05	0.00E+00	3.62E-05	0.00E+00	1.82E-06	1.22E-06
EP marine	kg N eq	2.64E-05	4.60E-06	0.00E+00	8.05E-06	0.00E+00	3.65E-07	3.21E-07
EP freshwater	kg P eq	7.18E-07	2.96E-08	0.00E+00	3.41E-08	0.00E+00	2.35E-09	2.25E-10
SFP	kg O ₃ eq	3.13E-03	5.47E-04	0.00E+00	9.59E-04	0.00E+00	4.34E-05	3.83E-05
ADP fossil	MJ, LHV	4.77E-01	1.18E-01	0.00E+00	1.47E-01	0.00E+00	9.34E-03	1.87E-03

Table 25. Life Cycle Impact Assessment (LCIA) results per m² of Black Veil Facing Addon.

Impact Category	Units	A1	A2	A3	A4	A5	C2	C4
GWP total	kg CO ₂ eq	2.83E-01	7.50E-03	0.00E+00	5.20E-03	0.00E+00	8.32E-04	1.68E-04
GWP fossil	kg CO ₂ eq	2.84E-01	7.50E-03	0.00E+00	5.20E-03	0.00E+00	8.32E-04	1.68E-04
GWP biogenic	kg CO ₂ eq	-1.36E-03	1.35E-06	0.00E+00	8.88E-07	0.00E+00	1.50E-07	6.11E-08
GWP luluc	kg CO ₂ eq	2.56E-04	3.77E-07	0.00E+00	2.44E-07	0.00E+00	4.18E-08	8.47E-09
ODP	kg CFC-11 eq	2.00E-07	9.21E-11	0.00E+00	6.47E-11	0.00E+00	1.02E-11	2.54E-12
AP	kg SO ₂ eq	5.63E-04	1.88E-05	0.00E+00	2.18E-05	0.00E+00	2.08E-06	1.39E-06
EP marine	kg N eq	7.95E-05	3.77E-06	0.00E+00	5.27E-06	0.00E+00	4.18E-07	3.67E-07
EP freshwater	kg P eq	6.59E-06	2.42E-08	0.00E+00	1.37E-08	0.00E+00	2.69E-09	2.58E-10
SFP	kg O ₃ eq	9.94E-03	4.47E-04	0.00E+00	6.29E-04	0.00E+00	4.97E-05	4.39E-05
ADP fossil	MJ, LHV	4.32E+00	9.64E-02	0.00E+00	6.70E-02	0.00E+00	1.07E-02	2.14E-03

Table 26. Resource Use per Functional Unit for Thermafiber® Mineral Wool Insulation.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
RPR _E	MJ, LHV	1.45E-01	1.83E-03	1.46E+00	2.65E-03	5.01E-02	4.30E-04	1.90E-04
RPR _M	MJ, LHV	0.00E+00	0.00E+00	3.17E-01	0.00E+00	6.34E-03	0.00E+00	0.00E+00
NRPR _E	MJ, LHV	4.52E+00	1.03E+00	1.77E+01	1.36E+00	1.17E+00	2.16E-01	4.35E-02
NRPR _M	MJ, LHV	1.23E+00	0.00E+00	1.22E+00	0.00E+00	4.89E-02	0.00E+00	0.00E+00
SM	kg	1.35E+00	0.00E+00	0.00E+00	0.00E+00	2.71E-02	0.00E+00	0.00E+00
RSF	MJ, LHV	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	M ³	3.22E-03	1.50E-05	4.29E-03	5.14E-05	2.40E-04	9.60E-06	1.47E-06

Table 27. Resource Use per m² for 5225-White Facing Addon.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
RPR _E	MJ, LHV	3.08E-02	2.53E-04	0.00E+00	1.23E-04	0.00E+00	2.02E-05	8.87E-06
RPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E	MJ, LHV	5.18E-01	1.27E-01	0.00E+00	6.35E-02	0.00E+00	1.01E-02	2.03E-03
NRPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+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	0.00E+00	0.00E+00
RSF	MJ, LHV	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	M ³	1.97E-04	5.65E-06	0.00E+00	2.39E-06	0.00E+00	4.50E-07	6.86E-08

Table 28. Resource Use per m² for 5225T Printed Facing Addon.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
RPR _E	MJ, LHV	3.04E-01	2.24E-04	0.00E+00	2.90E-04	0.00E+00	1.86E-05	8.20E-06
RPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E	MJ, LHV	5.08E+00	1.13E-01	0.00E+00	1.47E-01	0.00E+00	9.36E-03	1.87E-03
NRPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+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	0.00E+00	0.00E+00
RSF	MJ, LHV	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	M ³	1.91E-03	5.01E-06	0.00E+00	6.14E-06	0.00E+00	4.16E-07	6.34E-08

Table 29. Resource Use per m² for 5225 Printed Facing Addon.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
RPR _E	MJ, LHV	3.01E-02	2.35E-04	0.00E+00	2.90E-04	0.00E+00	1.86E-05	8.20E-06
RPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E	MJ, LHV	4.91E-01	1.18E-01	0.00E+00	1.47E-01	0.00E+00	9.36E-03	1.87E-03
NRPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+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	0.00E+00	0.00E+00
RSF	MJ, LHV	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	M ³	1.86E-04	5.24E-06	0.00E+00	6.14E-06	0.00E+00	4.16E-07	6.34E-08

Table 30. Resource Use per m² for Black Veil Facing Addon.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
RPR _E	MJ, LHV	1.10E-01	1.92E-04	0.00E+00	1.31E-04	0.00E+00	2.13E-05	9.39E-06
RPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E	MJ, LHV	6.32E+00	9.66E-02	0.00E+00	6.72E-02	0.00E+00	1.07E-02	2.15E-03
NRPR _M	MJ, LHV	0.00E+00	0.00E+00	0.00E+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	0.00E+00	0.00E+00
RSF	MJ, LHV	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	M ³	1.43E-03	4.29E-06	0.00E+00	2.53E-06	0.00E+00	4.76E-07	7.26E-08

Table 31. Output Flows and Waste per Functional Unit for Thermafiber® Mineral Wool Insulation.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	0.00E+00	0.00E+00	1.19E-01	0.00E+00	5.06E-02	0.00E+00	1.25E+00
HLRW	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	7.04E-01	0.00E+00	3.41E-02	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.83E-03	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 32. Output Flows and Waste per m² for 5225-White Facing Addon.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
HWD	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	5.81E-02
HLRW	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 33. Output Flows and Waste per m² for 5225T Printed Facing Addon.

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
HWD	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	5.37E-02
HLRW	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 34. *Output Flows and Waste per m² for 5225 Printed Facing Addon.*

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
HWD	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	5.37E-02
HLRW	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 35. *Output Flows and Waste per m² for Black Veil Facing Addon.*

Resource Use	Units	A1	A2	A3	A4	A5	C2	C4
HWD	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	6.15E-02
HLRW	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 36. *Carbon Emissions and Removals Indicators per Functional Unit for Thermafiber® Mineral Wool Insulation.*

Carbon Indicators	Units	A1	A2	A3	A4	A5	C2	C4
BCRP	kg CO ₂	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
BCRK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	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	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	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	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	0.00E+00	0.00E+00

Table 37. *Carbon Emissions and Removals Indicators per m² for 5225-White Facing Addon.*

Carbon Indicators	Units	A1	A2	A3	A4	A5	C2	C4
BCRP	kg CO ₂	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
BCRK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	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	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	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	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	0.00E+00	0.00E+00

Table 38. Carbon Emissions and Removals Indicators per m² for 5225T Printed Facing Addon.

Carbon Indicators	Units	A1	A2	A3	A4	A5	C2	C4
BCRP	kg CO ₂	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
BCRK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	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	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	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	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	0.00E+00	0.00E+00

Table 39. Carbon Emissions and Removals Indicators per m² for 5225 Printed Facing Addon.

Carbon Indicators	Units	A1	A2	A3	A4	A5	C2	C4
BCRP	kg CO ₂	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00
BCRK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	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	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	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	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	0.00E+00	0.00E+00

Table 40. Carbon Emissions and Removals Indicators per m² for Black Veil Facing Addon.

Carbon Indicators	Units	A1	A2	A3	A4	A5	C2	C4
BCRP	kg CO ₂	-5.04E-05	0.00E+00	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	5.04E-05	0.00E+00	0.00E+00
BCRK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	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	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	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	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	0.00E+00	0.00E+00

5.3 Products with Different Mass per Functional Unit and Different Facer Options.

A formula is provided below for calculating the impact category results for products that have different masses per functional unit and different facer options. This calculation method can be used to derive a result for any or all declared indicators and for any reported life module(s). When using this equation, the EPD user defines which indicator and life cycle stage(s) they are using to calculate a product-specific result. The Result_PS, Result_Ref, and Result_Facer values must all align with the same indicator and life cycle stage(s) included.

$$\text{Result_PS} = (\text{Result_Ref} \times \text{Multiplier_PS}) + (\text{Result_Facer} \times \text{Number-of-Facers})$$

Where:

Result_PS = product-specific result per functional unit

Result_Ref = result for the (unfaced) reference product [from Table 21]

Multiplier_PS = product-specific functional unit multiplier [from Table 41]

Result_Facer = result for 1 m2 of facer material [from Table 22, Table 23, Table 24, or Table 25]

Number-of-Facers = number of facers on the product (1)

Table 41. Product-specific functional unit multipliers.

Product	Product-specific functional unit multiplier (multiplier_PS)	Product	Product-specific functional unit multiplier (multiplier_PS)
Fire & Sound Guard® Plus R-10	1.30	SAFB™ (2.5 pcf)	1.00
Fire & Sound Guard® Plus R-11	1.12	SAFB™ (4 pcf)	1.70
Fire & Sound Guard® Plus R-12	1.08	Peace & Quiet™ (2.5 pcf)	1.00
Fire & Sound Guard® Plus R-13	1.00	Peace & Quiet™ (4 pcf)	1.70
Fire & Sound Guard® Plus R-14	1.30	RainBarrier®	1.92
Fire & Sound Guard® Plus R-15	1.19	RainBarrier® Dark 2"	2.56
Fire & Sound Guard® Plus R-20	1.02	RainBarrier® ci High Compressive (80)	3.11
Fire & Sound Guard® Plus R-21	0.97	RainBarrier® ci High Compressive Plus (110)	3.56
Fire & Sound Guard® Plus R-22	1.20	RainBarrier® ci High Compressive Max	4.89
Fire & Sound Guard® Plus R-22.5	0.99	VersaBoard® 35	1.49
Fire & Sound Guard® Plus R-23	1.15	VersaBoard® 40	1.78
Fire & Sound Guard® Plus R-24	1.30	VersaBoard® 60	2.67
Fire & Sound Guard® Plus R-28	1.25	VersaBoard® 80	3.56
Fire & Sound Guard® Plus R-30	1.19	EIFS	3.24
Fire & Sound Guard® Plus R-32	1.20	Industrial Board 40	1.76
FireSpan® 40	1.70	Industrial Board 60	1.97
FireSpan® 90	2.77	Industrial Board 80	2.44
FireSpan® 120	4.00	Industrial Fabrication Board	2.89
Safing (4 pcf)	1.78		
Safing (6 pcf)	2.67		

5.3.1 Example Calculation (Product with Different Mass per Functional Unit and with Facer):

Desired result: cradle-to-grave (A1-C4) GWP_{total} for 1 functional unit of Thermafiber® FireSpan® 40 Mineral Wool insulation with 5225-Printed facer on one side. Data inputs:

Result_Ref = 1.14E+00 kg CO₂eq [from Table 21]

Multiplier_PS = 1.70 [from Table 41]

Result_Facer = 6.58E-02 kg CO₂eq [from Table 24]

Number-of-Facers = 1

The product-specific result can be calculated as:

Result_PS = (Result_Ref x Multiplier_PS) + (Result_Facer x Number-of-Facers)

Result_PS = (1.14E+00 kg CO₂eq x 1.70) + (6.58E-02 kg CO₂eq x 1)

Result_PS = 1.75E+00 kg CO₂eq + 6.58E-02 kg CO₂eq

Result_PS = 2.00 kg CO₂eq

5.3.2 Example Calculation (Product with Different Mass per Functional Unit and without Facers):

Desired result: cradle-to-grave (A1-C4) GWP_{total} for 1 functional unit of Thermafiber® FireSpan® 40 Mineral Wool insulation without facers. Data inputs:

Result_Ref = 1.14E+00 kg CO₂eq [from Table 21]

Multiplier_PS = 1.70 [from Table 41]

The product-specific result can be calculated as:

Result_PS = Result_Ref x Multiplier_PS

Result_PS = 1.14E+00 kg CO₂eq x 1.70

Result_PS = 1.93E+00 kg CO₂eq

6. LCA: Interpretation

Figure 3 illustrates the contribution of the modules to the TRACI 2.2 results for Global Warming Potential (GWP), Ozone Depletion (ODP), Acidification Potential (AP), Eutrophication Potential (EP), Smog Formation Potential (SFP), and Depletion of Non-renewable Fossil Fuels (ADP-fossil). GWP biogenic was omitted from the plot due to its irrelevance to the Thermafiber product, which contains minimal amounts of biogenic carbon. A3 manufacturing, which includes electricity during production and air emissions from production activities, is the largest contributor.

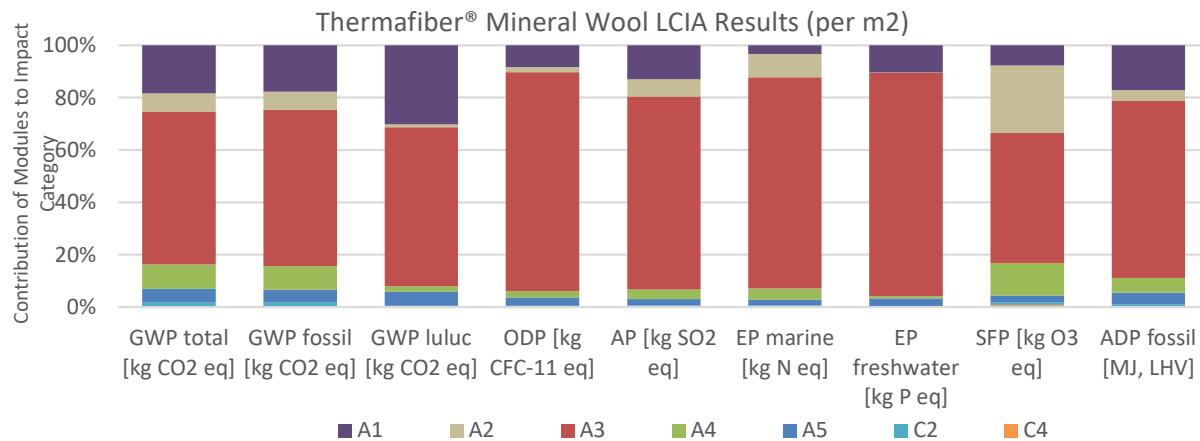


Figure 3. Contribution of Life Cycle Modules to Impacts for Thermafiber® Mineral Wool Insulation.

GWP-LULUC accounts for greenhouse gas emissions and removals associated with carbon stock changes from land use and land use change. For this product, GWP-LULUC represents 0.02% of GWP-total and is driven entirely by background (secondary) datasets in the upstream supply chain; no land transformation occurs at the manufacturing facility.

7. Additional Environmental Information

7.1 Environment and Health during Manufacture

The following environmental equipment may be used to control emissions: electrostatic precipitator, scrubber, and/or fabric filter (baghouse).

7.2 Energy Savings During Use

During its service life, insulation significantly reduces the energy use in a building, thereby reducing the impact on the environment. Use-stage environmental benefits of insulation during building operations can be significant as low thermal conductivity attributes of insulation limit utility consumption and associated environmental impacts. The exclusion of the building heating and cooling during the insulation material's use phase severely underestimates the benefits that insulation has on the environment (UL PCR Part B, 2025).

Per the UL PCR Part B, the tables below are the result of a robust Energy Plus-based calculation and provide average expected emissions reductions over the useful life of the installed building thermal envelope insulation. More detail on the methodology used is available in the 3rd party report: Impact of Building Envelope Thermal Insulation on Use-Phase Emissions, ICF, 2024.

Table 42. Average Operational Avoided Emissions for Residential Applications.

ASHRAE 169-202 Climate Zone																	Unit
1A	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8	All	
82	123	179	211	193	177	273	241	246	343	313	269	430	391	480	574	283	Kg CO ₂ e per FU

Table 43. Average Operational Avoided Emissions for Commercial Applications.

ASHRAE 169-202 Climate Zone																	Unit
1A	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8	All	
325	353	456	578	523	311	696	614	555	818	786	589	1002	929	1015	1218	673	Kg CO ₂ e per FU

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.

7.4 Market Scaling Factors and Estimating Impacts of Products at Different R-value than the Functional Unit

The environmental impact results in this EPD have been calculated for the functional unit of insulation, which has a surface area of 1 m² and a thermal resistance of RSI = 1 m²K/W. In Imperial units, this thermal resistance, or R-value, is equivalent to 5.678 hr·ft²·°F/BTU. To calculate total impact values for insulation at a specified project-determined thickness and R-value, with or without a specific facing material, the following equation may be used:

Product-specific result per 1 m² at the thickness and R-value specified

$$= \text{Result_PS} = (\text{Result_Ref} \times \text{MarketScalingFactor}) + (\text{Result_facer} \times \text{number-of-facers})$$

For product families with no facers, the EPD may use the simplified equation: Product-specific result per 1 m² at the thickness and R-value specified

$$= \text{Result_PS} = \text{Result_Ref} \times \text{MarketScalingFactor}$$

Table 44. Market scaling factors for product-as-marketed results.

Product	Market Scaling Factors for Product-as-Marketed Results																	
	1.0"	1.25"	1.5"	2"	2.5"	3"	3.5"	4"	4.5"	5"	5.5"	6"	6.5"	7.0"	7.125"	7.25"	7.5"	8.0"
EIFS Board				4.57		6.85		9.13		11.4		13.7						
Fire & Sound Guard® Plus R-10					2.28													
Fire & Sound Guard® Plus R-11						1.96												
Fire & Sound Guard® Plus R-13							2.28											
Fire & Sound Guard® Plus R-14							3.20											
Fire & Sound Guard® Plus R-15							3.20											
Fire & Sound Guard® Plus R-21											3.59							
Fire & Sound Guard® Plus R-22											4.66							
Fire & Sound Guard® Plus R-22.5												3.91						
Fire & Sound Guard® Plus R-23											4.66							
Fire & Sound Guard® Plus R-24												5.48						
Fire & Sound Guard® Plus R-28																6.15		
Fire & Sound Guard® Plus R-30															6.27			

Fire & Sound Guard® Plus R-32																		6.78
FireSpan® 120						8.81												
FireSpan® 40				2.61	3.26	3.91	4.57	5.22	5.87	6.52	7.17	7.83	8.48	9.13				
FireSpan® 90	2.12		3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.6	11.7	12.7	13.8	14.8				
RainBarrier®	1.47		2.20	2.94	3.67	4.40	5.14	5.87	6.60	7.34	8.07	8.81	9.54	10.3			11.0	11.7
RainBarrier® ci High Compressive (80)			3.42	4.57	5.71	6.85	7.99	9.13	10.3	11.4	12.6	13.7						
RainBarrier® ci High Compressive Max	3.59		5.38	7.17	8.97	10.8	12.6	14.4										
RainBarrier® ci High Compressive Plus (110)		3.26	3.91	5.22	6.52	7.83	9.13	10.4										
RainBarrier® Dark				3.91	4.89	5.87	6.85	7.83	8.81	9.78	10.8	11.7	12.7	13.7			14.7	15.7
SAFB™ (2.5 pcf)			0.98	1.30	1.63	1.96	2.28	2.61	2.94	3.26	3.59	3.91	4.24	4.57	4.89	5.22		
SAFB™ (4 pcf)	1.30																	
Safing (4 pcf)	1.30		1.96	2.61	3.26	3.91	4.57	5.22	5.87	6.52	7.17	7.83	8.48	9.13				
Safing (6 pcf)				3.91		5.87		7.83				11.7						
VersaBoard® 35			1.71	2.28	2.85	3.42	4.00	4.57	5.14	5.71	6.28	6.85	7.42	7.99				
VersaBoard® 40	1.30		1.96	2.61	3.26	3.91	4.57	5.22	5.87	6.52	7.17	7.83	8.48	9.13			9.78	10.4
VersaBoard® 60	1.96		2.94	3.91	4.89	5.87	6.85	7.83	8.81	9.78	10.8	11.7	12.7	13.7			14.7	15.7
VersaBoard® 80			3.91	5.22	6.52	7.83	9.13	10.4	11.7	13.1								

7.4.1 Example Calculation (Product with Different Mass per Functional Unit and with Facer):

Desired result: cradle-to-grave (A1-C4) GWP_{total} for 1 m² of 2" thick Thermafiber® FireSpan® 40 FF Mineral Wool insulation with 5225-Printed facer on one side.

Data inputs:

- Result_Ref = 1.14E+00 kg CO₂eq [from Table 21]
- MarketScalingFactor = 2.61 [from Table 44]
- Result_Facer = 6.58E-02 kg CO₂eq [from Table 24]
- Number-of-Facers = 1

The product-specific result can be calculated as:

Result_PS = (Result_Ref x Multiplier_PS) + (Result_Facer x Number-of-Facers)

Result_PS = (1.14E+00 kg CO₂eq x 2.61) + (6.58E-02 kg CO₂eq x 1)

Result_PS = 2.97E+00 kg CO₂eq + 6.58E-02 kg CO₂eq

Result_PS = 3.04 kg CO₂eq

7.5 Extraordinary Effects

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

7.6 Delayed Emissions

No delayed emissions are expected from this product.

7.7 Environmental Activities and Certifications

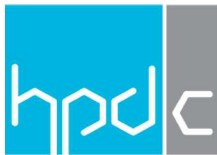
Recycled Content

Thermafiber® FF Mineral Wool Insulation products are manufactured using recycled content. Details can be found in the detailed report (VAR-1025), which can be accessed through the ICC Evaluation Service Reports Directory, at <https://icc-es.org/reports-directory/>.



Health Product Declaration (HPD)

The Health Product Declaration® (HPD) is a document for reporting the material contents of products and the potential hazard(s) associated with these materials. Thermafiber, Inc. maintains HPDs for several Thermafiber Mineral Wool Insulation products, which can be found in the HPD Public Repository, at <https://www.hpd-collaborative.org/hpd-public-repository-3/>.



Safety Act Designation

Several of the Thermafiber® Mineral Wool Insulation products and their supporting design and installation services have earned SAFETY Act Designation, retroactive to January 1, 2006, from the U.S. Department of Homeland Security. Use of these products and services will provide building owners and professionals with liability protection in the unfortunate event of an act of terrorism on their structure. Thermafiber, Inc. is the first insulation manufacturer to be listed publicly with the Department of Homeland Security as having qualified technology carrying the SAFETY Act Designation. Further information can be found at <https://www.safetyact.gov/>.



7.7 Further Information

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

8. References

- LCA Report – Life Cycle Assessment of Joplin, MO Thermafiber® Mineral Wool Insulation
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
- ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and Framework
- ISO 14044: 2006/AMD 1:2017/ AMD 2:2020 Environmental Management – Life cycle assessment – Requirements and Guidelines.
- 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 Guidance for Building-Related Products and Services Part B: Building Envelope Thermal Insulation EPD Requirements. Version 4.0. Sept. 2025.
- ISO 21930: 2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.
- SCS Type III Environmental Declaration Program: Program Operator Manual. V12.0 December 2023. SCS Global Services.
- ASTM C665, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- ASTM C1104/C1104M-13a, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation
- ASTM C1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM C1304, Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials
- ASTM E96, Standard Test Method for Water Vapor Transmission of Materials
- Impact of Building Envelope Thermal Insulation on Use-Phase Emissions, ICF, 2024.

For more information, contact:



Declaration Owner

Thermafiber, Inc.

One Owens Corning Parkway, Toledo, OH, USA

888-TFIBER [834-2371]

www.owenscorning.com/thermafiber



SCS Global Services

2261 Market Street #30372, San Francisco, CA 94114

Main +1.510.452.8000 | fax +1.510.452.8001

THERMAFIBER, INC.

ONE OWENS CORNING PARKWAY

TOLEDO, OHIO, 43659 USA

888-TFIBER [834-2371]

www.owenscorning.com/thermafiber

Pub. No. 10019415-F. © 2026 Owens Corning. All Rights Reserved.