

**Optimization Owner**

Owens Corning

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FOAMULAR® NGX® XPS Insulation

Functional Unit

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

Optimization Number

SCS-OPT-09753

Period of Validity

February 13, 2024 through February 12, 2028


Version Date: February 17, 2024

Program Operator

SCS Global Services

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Optimization Report Owner:		Owens Corning
Address:		One Owens Corning Parkway, Toledo, OH, USA
Optimization Number:		SCS-OPT-09753
Validity Period:		February 13, 2024 through February 12, 2028
Version Date:		February 17, 2024
Product Type:		Insulation
Product Name:		FOAMULAR® NGX® XPS Insulation
Optimized EPD Information	Document Link:	https://www.scsglobalservices.com/certified-green-products-guide?pd_pid=54583
	Validation Period:	January 10, 2024 through January 9, 2029
	Program Operator:	SCS Global Services
	LCA Software:	SimaPro 9.5.0.0
	LCA Practitioner:	Rémi Bagard (Owens Corning)
Baseline EPD Information	Document Link:	https://transparencycatalog.com/assets/uploads/pdf/Owens-Corning_EP_D_FOAMULAR-XPS-Insulation-2020.pdf FOAMULAR® XPS Insulation UL Declaration Number 4788721182.101.1
	Validation Period:	January 1, 2019 – January 1, 2024
	Program Operator:	UL
	LCA Software:	SimaPro 8.5.2.0
	LCA Practitioner:	John Augustine & Cheryl Smith (Owens Corning)
Functional/Declared Unit:		1 m² of insulation with a thickness required for an average thermal resistance RSI = 1 m²K/W maintained for 75 years
Reference PCR:		PCR Guidance for Building-Related Products and Services Part B: Building Envelope Thermal Insulation EPD Requirements. Version 3.0. April 2023
Independent critical review of the Optimization Report:		<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Verifier of Optimization Report:		 Beth Cassese, SCS Global Services
Optimization Report Contents:		<ol style="list-style-type: none"> 1. Introduction 2. Summary of Results 3. Impact Reduction Narrative 4. References

Disclaimers: This Optimization Report conforms to the LEED v4.1 Guidance for MR Credit: Environmental Product Declarations, Option 2.

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, the EPDs this report is based on provide estimations of potential impacts that are inherently limited in terms of accuracy.

Comparability: The PCR the referenced EPDs were 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. Introduction

The LEED v4.1 Standard includes a credit for EPDs of permanently installed products in a LEED project, allowing for up to two points.

- One point for a project which includes 20 products from 5 different manufacturers providing qualified disclosure documentation such as life cycle assessments (LCAs) and/or environmental product declarations (EPDs).
- A second point is available for a project which includes 5 products from 3 different manufacturers with compliant embodied carbon optimization report or action plan separate from the LCA EPD.

The LEED v4.1 credit for Environmental Product Declarations, Option 2: Embodied Carbon/LCA Optimization, recognizes products which have achieved “optimization”. To qualify for optimization, a manufacturer specific EPD must show reductions in environmental impact potentials. The amount of credits achieved depends on the amount of reductions in impact.

Table 1. LEED v4.1 credit for Environmental Product Declarations, Option 2 Optimization Credit Requirements.

Reduction Type	Reference Document(s) for the Optimization Report	Report Verification	Valuation
Embodied Carbon/LCA Action Plan	Product-specific LCA or product-specific Type III EPD	Prepared by the manufacturer and signed by company executive	½ product
Reductions in Embodied Carbon: < 10% reduction in GWP relative to baseline	Baseline: Product-specific LCA, product-specific Type III EPD, or Industry-wide Type III EPD Optimized: Product-specific LCA or product-specific Type III EPD	Comparative analysis verified by an independent party	1 product
Reductions in Embodied Carbon: > 10% reduction in GWP relative to baseline	Baseline: Product-specific LCA, product-specific Type III EPD, or Industry-wide Type III EPD Optimized: Product-specific LCA or product-specific Type III EPD	Comparative analysis verified by an independent party	1.5 product
Reductions in Embodied Carbon: > 20% reduction in GWP and > 5% reduction in two additional impact categories, relative to baseline	Baseline: Product-specific LCA or product-specific Type III EPD Optimized: Product-specific LCA or product-specific Type III EPD	Comparative analysis verified by an independent party	2 products

Note: Reference documents for the optimization reports must be compliant with EPD Credit Option 1.

LCA/EPD based comparisons require the greatest degree of care in ensuring that the systems under comparison are treated equally and without bias. For example, parameters in LCA which need to be held constant for comparability to be achieved included:

- Equivalent functional unit
- Same background database
- Same LCA software
- Same Life Cycle Impact Assessment (LCIA) methods
- Parity of assumptions
- Same version of the Product Category Rule (PCR)
- Equivalent data quality requirements

The results from the baseline document were recalculated to use the same background database, ecoinvent 3.9.1; same LCA software, SimaPro 9.5.0.0; same LCIA methods, TRACI 2.1 v1.08, IPCC (2013); and the same version of the PCR. The functional units, assumptions and data quality requirements were equivalent in the baseline and optimized EPDs.

2. Summary of Results

As the LEED v4.1 EPD Optimization credit only applies to embodied carbon, the results presented in this section are for the A1-C4 Modules (from raw material extraction and processing to end of life), as the change of blowing agent affects A1-A3, B1 and C4.

2.1 LCIA Impact Categories

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. The following environmental impact category indicators and characterization methods are used for optimization:

Table 2. *Environmental Impact Assessment Categories.*

Abbreviation	Impact Category	Unit	Characterization Method
GWP 100a	Global Warming Potential	kg CO ₂ eq	IPCC 2013 (AR5)
ODP	Ozone Depletion Potential	kg CFC-11 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 (Tropospheric Ozone) 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

**see LEED v4.1 Guidance for specified categories and units*

2.2 Baseline EPD Results

Table 3. *Baseline (recalculated) EPD Results. 1 m² FOAMULAR® at R_{SI} = 1*

Impact Category	Unit	A1 – A3	A4	A5	B1	C2	C4
GWP 100a	kg CO ₂ eq	2.10E+01	1.78E-01	2.19E-03	2.69E+01	2.40E-02	6.76E+00
ODP	kg CFC-11 eq	3.34E-05	2.94E-09	1.22E-11	0.00E+00	3.96E-10	1.47E-10
AP	kg SO ₂ eq	1.41E-02	9.55E-04	3.78E-06	0.00E+00	1.29E-04	3.19E-05
EP	kg N eq	8.09E-04	8.04E-05	3.89E-07	0.00E+00	1.08E-05	2.73E-06
SFP	kg O ₃ eq	2.09E-01	2.67E-02	1.06E-04	3.39E-04	3.60E-03	8.52E-04
ADP _{fossil}	MJ, LHV	6.85E+01	2.49E+00	9.62E-03	0.00E+00	3.34E-01	1.16E-01

2.3 Optimized EPD Results

Table 4. *Optimized EPD Results.* 1 m² FOAMULAR® NGX® at R_{SI} = 1

Impact Category	Unit	A1 – A3	A4	A5	B1	C2	C4
GWP 100a	kg CO ₂ eq	6.58E+00	7.47E-02	1.82E-02	2.78E+00	1.30E-02	3.85E-01
ODP	kg CFC-11 eq	2.00E-05	1.39E-09	1.53E-10	0.00E+00	2.41E-10	1.50E-10
AP	kg SO ₂ eq	1.38E-02	1.76E-04	2.57E-05	0.00E+00	3.06E-05	3.25E-05
EP	kg N eq	8.28E-04	1.98E-05	7.48E-06	0.00E+00	3.44E-06	2.78E-06
SFP	kg O ₃ eq	1.61E-01	3.16E-03	5.63E-04	3.52E-04	5.49E-04	9.06E-04
ADP _{fossil}	MJ, LHV	6.52E+01	1.11E+00	1.21E-01	0.00E+00	1.93E-01	1.19E-01

2.4 Optimization Results

Table 5. *Optimization Results.*

Impact Category	Unit	Baseline (recalculated) EPD A1-C4	Optimized EPD A1-C4	% Change A1-C4
GWP 100a	kg CO ₂ eq	5.49E+01	9.85E+00	-82%
ODP	kg CFC-11 eq	3.34E-05	2.00E-05	-40%
AP	kg SO ₂ eq	1.41E-02	1.40E-02	-1%
EP	kg N eq	8.09E-04	8.61E-04	+6%
SFP	kg O ₃ eq	2.09E-01	1.66E-01	-21%
ADP _{fossil}	MJ, LHV	6.85E+01	6.67E+01	-3%

2.5 LEED v4.1 Credit

Based on the LEED v4.1 credit language in Table 1 and the Optimization Results presented in Table 5, this optimization qualifies for 2 product(s) in the LEED v4.1 credit calculation.

3. Impact Reduction Narrative

For GWP, ODP, and SFP the environmental impacts for FOAMULAR® NGX® are reduced by more than 20% compared to FOAMULAR®. The reduction in GWP is due to the change in the blowing agent used to manufacture the insulation product. The blowing agent blend used in FOAMULAR® NGX® has a significantly lower GWP than the blowing agent blend used in standard FOAMULAR® XPS insulation. Even though FOAMULAR® and FOAMULAR® NGX® XPS insulation use blowing agents with zero ozone depletion potential, the upstream life cycle of HFC 134a includes ODP emissions. The reduction in ODP can be attributed to the elimination of HFC 134a in the blowing agent used in FOAMULAR® NGX®. The reduction in SFP can be attributed to improvements in the transportation stages.

4. References

- LEED v4.1 Building Design and Construction, Getting started guide for beta participants. United States Green Building Council (USGBC). July 2023.
- 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 3.0. April 2023.
- Life Cycle Assessment of Owens Corning FOAMULAR® and FOAMULAR® NGX® extruded polystyrene insulation, October 2023
- Owens Corning's FOAMULAR® NGX® XPS insulation EPD, registered SCS-EPD-09753, January 10, 2024 – January 9, 2029
- Owens Corning's FOAMULAR® XPS Insulation EPD, registered UL 4788721182.101.1, January 1, 2019 – January 1, 2024

For more information contact:



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