Thermo-Lag Series
Thermo-Lag E100, E100 S, 3000-P & 3000-SP

Intended for exterior/interior use, Carboline's Thermo-Lag product line, consisting of epoxy based intumescents, were designed for high durability, fast application and permanent exposure to exterior environments and where the highest level of physical performance is required. Materials can be applied both onsite & offsite for improved project scheduling. These products have been subjected to a myriad of destructive exposures to simulate real-world performance in commercial/residential & industrial/petrochemical environments.

Performance dashboard

Features & functionality

Unmatched flexibility, resistance to handling damage and cold weather cracking

Ideal for off-site application, fast cure, high build

Easy 1:1 mixing ratio

Visit Carboline for more product information

Thermo-Lag E100
Thermo-Lag E100 S
Thermo-Lag 3000-P
Thermo-Lag 3000-SP

Environment & materials

Improved by:

Certified to UL 263 / ASTM E119 / NFPA 251 for commercial and light industrial fire protection in exterior environments (Thermo-Lag E100 Series)

Certified to UL 1709, UL 2431, NORSOK M-501, and more for hydrocarbon fires in refineries, power plants, LNG facilities, etc. (Thermo-Lag 3000 Series)

Certifications & rating systems:

Environmental Product Declaration (EPD)

ASTM E84 - UL 723 - Class A

SCAQMD Rule 1113 Compliant

Tested to meet (CDPH) Standard Method v1.2

MasterFormat® 07 81 23

Thermo-Lag Series Guide Specs
For spec help, contact us or call 281.414.9710

See LCA, interpretation & rating systems

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✓
Transparency Report (EPD)	
3rd-party verified	✓

Validity: 20230213 – 20280212

Decl #: CAR-20230213-003

This environmental product declaration (EPD) was externally verified, according to NSF PCR for Architectural Coatings, and ISO 14025:2006, by Jack Geibig, President, Ecoform.

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SUMMARY

Reference PCR

NSF PCR for Architectural Coatings: NAICS 325510, 2022

Regions; system boundaries
North America; Cradle to grave

Functional unit / reference service life:
1 m^2 of covered and protected substrate; 60 years

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Developer 9.4
EcoInvent 3.8, US-EI 2.2, and ELCD databases.

LCA conducted by: Sustainable Minds

Public LCA:
Life Cycle Assessment of Carboline Intumescent Fire-Resistive Materials

Carboline Global Inc.
2150 Schuetz Rd.
St. Louis, MO 63146
https://www.carboline.com/
314-644-1000

Contact us

LCA results & interpretation

Thermo-Lag Series

Life cycle assessment

Scope and summary

○ Cradle to gate ○ Cradle to gate with options ✔ **Cradle to grave**

Product description
Carboline's Thermo-Lag series includes four products: Thermo-Lag E100, Thermo-Lag E100-S, Thermo-Lag 3000, and Thermo-Lag 3000-SP. Thermo-Lag products are two-component epoxy-based thin-film, intumescent coating products for structural steel. They allow the designer to express the structure as an artform in buildings where fire resistance ratings are required. In a fire, they soften and expand to form thick meringue-like layers, which insulate the structure and protect the steel from fire.

Functional unit
The functional unit is **one square meter** of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building).

Application and maintenance: Since Thermo-Lag products fall under the primer designation and are applied to interior architecture, a 5-year market-based lifetime was adopted in the LCA models. One initial coating application and 11 recoats are required because the average life span of a building is assumed to be 60 years. The preferred waste management option for leftover paint is 100% incinerated.

Colorant: Colorants are not added to the fireproofing coatings themselves, neither at the point of sale nor at the point of application as defined in the application manuals and are therefore not included in the scope of this study.

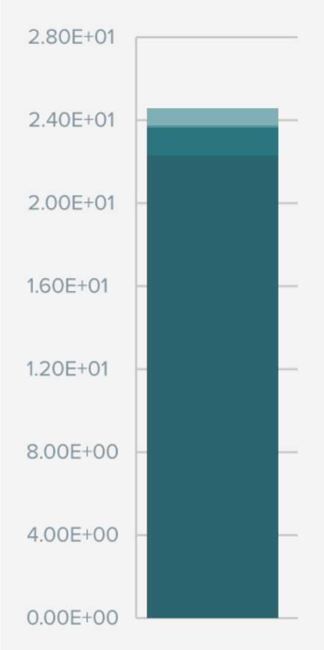
Manufacturing data
Time coverage: The data covers annual manufacturing data for the 2021 calendar year from Carboline's manufacturing plant in Dayton, Nevada. This period of time was chosen in order to capture a representative picture of businesses activities at Carboline.

Geographical coverage: The geographical coverage for this study is based on United States system boundaries for all processes and products.

Material composition greater than 1% by weight

MATERIAL	AVG % WT.
Acid catalyst	20-30%
Curing agent	20-30%
Resin	10-20%
Spumific	10-20%
Resin	10-20%
Carbon donor	5-10%
Additives	10-20%

Total impacts by life cycle stages [mPts/per func unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Product stage	2.24E+01
Design and construction	1.25E+00
Use and maintenance	9.91E-02
End of life	8.60E-01

A variation of 10 to 20% | A variation greater than 20%

What's causing the greatest impacts

All life cycle stages
The product stage (Stage 1) accounts for the highest contribution to impacts, primarily because of the impacts associated with raw material manufacturing. The design and construction stage (Stage 2) is the next highest contributor for all impact categories except for global warming, smog, eutrophication, and carcinogenics. The use and maintenance stage (Stage 3) accounts for a minimum contribution to almost all impact categories due to the low energy required for spray application.

Product stage
The raw material manufacturing phase (1-1) is the largest contributor to all impact categories. This holds true for the LCA results of each of Carboline's Thermo-Lag products. Raw material manufacturing accounts for over 50% of the impact in each category for most of the products. Thermo-Lag 3000-SP is the only exception; however, raw material manufacturing still contributes ~45% to smog and ~48% to ecotoxicity impact categories.

Design and construction
The design and construction stage (Stage 2) is the next highest contributor to most of the impact categories, including ozone depletion, acidification, non carcinogenics, respiratory effects, ecotoxicity, and fossil fuel depletion. For the Thermo-Lag series, stage 2 contributes over 20% to total ozone depletion. The contributions to transportation are caused by the use of truck and trailer transportation.

Use and maintenance
It's worth noting that the VOC emissions released in the drying phase (phase 3-2) affect the variability in potential smog formation impacts. According to the product data sheets, Thermo-Lag E 100-S and Thermo-Lag 3000-SP release more VOCs during the drying process than the other two products. This results in phase 3-2 having a greater contribution to smog formation (over 30%) for Thermo-Lag E 100-S and Thermo-Lag 3000-SP.

End of life
For the Thermo-Lag series, the second highest impact to the global warming, eutrophication, and carcinogenics categories comes from the end-of-life stage (Stage 4).

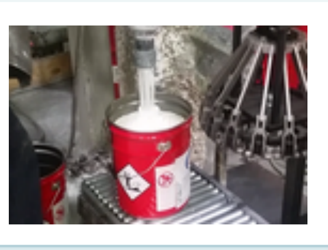
Sensitivity analysis
A sensitivity analysis was performed to check the robustness of the results when the mass of specified raw materials was changed by +/-20%. These raw materials were chosen based on a combination of relatively higher contribution to the results.

Global warming potential was evaluated for sensitivity since Carboline is interested in the potential CO2-equivalent emissions of its products. The resulting variation in the total life cycle impacts is less than 10%, implying that the system is not sensitive to this assumed value.

Carboline is committed to finding new and efficient alternatives in manufacturing, raw material sourcing, and logistics to improve sustainability efforts. One of Carboline's most impactful contributions is the creation of the SLOB Program (slow moving and obsolete inventory). To reduce hazardous waste generation, the SLOB Program was designed to provide optics to Carboline's Inventory Analytics Team to review inventory close to expiration. Preventative measures are taken to rework inventory or sell this material at a discounted rate, with the ultimate goal of preventing little to zero waste of unused material. As an RPM company, Carboline is dedicated to working towards reaching the goals that have been set through RPM's Building a Better World Program. These goals include reducing energy consumption, landfill contributions, and water reuse/conservation opportunities.

See how we make it greener

LCA results

LIFE CYCLE STAGE	STAGE 1 PRODUCT STAGE	STAGE 2 DESIGN AND CONSTRUCTION	STAGE 3 USE AND MAINTENANCE	STAGE 4 END OF LIFE
Information modules: Included (X) | Excluded* (MND) No stages are excluded	**1-1 Raw material manufacturing**	**2-1 Transportation to distribution center**	**3-1 Coating application**	**4-1 Transportation to disposal site**
	1-2 Transportation of raw materials to plants	**2-2 Transportation to point of sale**	**3-2 Emissions from drying**	**4-2 End-of-life management**
	1-3 Coating manufacturing	**2-3 Transportation to application site**	**3-3 Necessary maintenance and repaints**	
				

SM Single Score

Learn about SM Single Score results

Impacts of the coating used for covering 1 square meter of substrate	2.24E+01 mPts	1.25E+00 mPts	9.91E-02 mPts	8.60E-01 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Energy used for raw material extraction (electricity and fuels).	Trucks and trailer transportation (fuel consumption).	Energy and electricity consumed for coating application and recoats.	Incineration of the waste coating.

Thermo-Lag E100: TRACI v2.1 results per functional unit

LIFE CYCLE STAGE		STAGE 1 PRODUCT STAGE	STAGE 2 DESIGN AND CONSTRUCTION	STAGE 3 USE AND MAINTENANCE	STAGE 4 END OF LIFE
Ecological damage					
Impact category	Unit				
Acidification	kg SO_2 eq	8.16E-01	3.70E-02	3.66E-04	3.82E-03
Eutrophication	kg N eq	2.12E-01	7.71E-03	3.06E-05	2.74E-02
Global warming (embodied carbon)	kg CO_2 eq	1.70E+02	2.13E+01	9.39E-02	3.62E+01
Ozone depletion	kg CFC-11 eq	1.94E-05	5.07E-06	3.84E-09	5.42E-08
Human health damage					
Impact category	Unit				
Carcinogenics	CTU_h	8.12E-06	1.95E-08	1.79E-10	1.42E-07
Non-carcinogenics	CTU_h	1.76E-05	2.99E-06	3.02E-09	2.52E-07
Respiratory effects	kg $PM_{2.5}$ eq	1.16E-01	7.46E-03	2.15E-05	3.04E-04
Smog	kg O_3 eq	8.90E+00	4.75E-01	1.16E+00	5.28E-02
Additional environmental information					
Impact category	Unit				
Fossil fuel depletion	MJ, LHV	3.04E+02	4.51E+01	1.24E-01	4.84E-01
Ecotoxicity	CTU_e	2.30E+02	6.04E+01	7.08E-03	8.49E+00

See the additional content required by the NSF PCR for architectural coatings on page 4 of the **Transparency Report PDF**.

Thermo-Lag E100-S: TRACI v2.1 results per functional unit

LIFE CYCLE STAGE		STAGE 1 PRODUCT STAGE	STAGE 2 DESIGN AND CONSTRUCTION	STAGE 3 USE AND MAINTENANCE	STAGE 4 END OF LIFE
Ecological damage					
Impact category	Unit				
Acidification	kg SO_2 eq	6.37E-01	2.82E-02	2.91E-04	2.95E-03
Eutrophication	kg N eq	1.29E-01	5.87E-03	2.43E-05	2.11E-02
Global warming (embodied carbon)	kg CO_2 eq	1.36E+02	1.62E+01	7.46E-02	2.78E+01
Ozone depletion	kg CFC-11 eq	1.48E-05	3.86E-06	3.05E-09	4.26E-08
Human health damage					
Impact category	Unit				
Carcinogenics	CTU_h	6.52E-06	1.49E-08	1.42E-10	1.09E-07
Non-carcinogenics	CTU_h	1.35E-05	2.28E-06	2.40E-09	1.94E-07
Respiratory effects	kg $PM_{2.5}$ eq	9.43E-02	5.68E-03	1.70E-05	2.35E-04
Smog	kg O_3 eq	7.08E+00	3.62E-01	4.42E+00	4.07E-02
Additional environmental information					
Impact category	Unit				
Fossil fuel depletion	MJ, LHV	2.52E+02	3.44E+01	9.84E-02	3.80E-01
Ecotoxicity	CTU_e	1.86E+02	4.60E+01	5.62E-03	6.54E+00

See the additional content required by the NSF PCR for architectural coatings on page 4 of the **Transparency Report PDF**.

Thermo-Lag 3000: TRACI v2.1 results per functional unit

LIFE CYCLE STAGE		STAGE 1 PRODUCT STAGE	STAGE 2 DESIGN AND CONSTRUCTION	STAGE 3 USE AND MAINTENANCE	STAGE 4 END OF LIFE
Ecological damage					
Impact category	Unit				
Acidification	kg SO_2 eq	7.89E-01	3.75E-02	3.65E-04	3.81E-03
Eutrophication	kg N eq	1.89E-01	7.80E-03	3.05E-05	2.73E-02
Global warming (embodied carbon)	kg CO_2 eq	1.73E+02	2.15E+01	9.36E-02	3.60E+01
Ozone depletion	kg CFC-11 eq	2.00E-05	5.13E-06	3.83E-09	5.41E-08
Human health damage					
Impact category	Unit				
Carcinogenics	CTU_h	8.16E-06	1.98E-08	1.79E-10	1.41E-07
Non-carcinogenics	CTU_h	1.79E-05	3.03E-06	3.01E-09	2.51E-07
Respiratory effects	kg $PM_{2.5}$ eq	1.15E-01	7.55E-03	2.14E-05	3.03E-04
Smog	kg O_3 eq	8.15E+00	4.81E-01	1.16E+00	5.27E-02
Additional environmental information					
Impact category	Unit				
Fossil fuel depletion	MJ, LHV	3.15E+02	4.57E+01	1.23E-01	4.82E-01
Ecotoxicity	CTU_e	2.44E+02	6.12E+01	7.06E-03	8.47E+00

See the additional content required by the NSF PCR for architectural coatings on page 4 of the **Transparency Report PDF**.

Thermo-Lag 3000-SP: TRACI v2.1 results per functional unit

LIFE CYCLE STAGE		STAGE 1 PRODUCT STAGE	STAGE 2 DESIGN AND CONSTRUCTION	STAGE 3 USE AND MAINTENANCE	STAGE 4 END OF LIFE
Ecological damage					
Impact category	Unit				
Acidification	kg SO_2 eq	6.17E-01	3.11E-02	2.91E-04	3.00E-03
Eutrophication	kg N eq	1.32E-01	6.49E-03	2.43E-05	2.14E-02
Global warming (embodied carbon)	kg CO_2 eq	1.38E+02	1.79E+01	7.47E-02	2.83E+01
Ozone depletion	kg CFC-11 eq	1.57E-05	4.27E-06	3.06E-09	4.33E-08
Human health damage					
Impact category	Unit				
Carcinogenics	CTU_h	6.77E-06	1.64E-08	1.43E-10	1.11E-07
Non-carcinogenics	CTU_h	1.50E-05	2.52E-06	2.40E-09	1.98E-07
Respiratory effects	kg $PM_{2.5}$ eq	9.57E-02	6.28E-03	1.71E-05	2.39E-04
Smog	kg O_3 eq	6.60E+00	4.00E-01	4.42E+00	4.14E-02
Additional environmental information					
Impact category	Unit				
Fossil fuel depletion	MJ, LHV	2.57E+02	3.80E+01	9.86E-02	3.87E-01
Ecotoxicity	CTU_e	2.20E+02	5.09E+01	5.63E-03	6.66E+00

See the additional content required by the NSF PCR for architectural coatings on page 4 of the **Transparency Report PDF**.

References

LCA Background Report
Carboline Intumescent fireproofing coating LCA Background Report (public version), Carboline 2022; SimaPro Analyst 9.4; Ecoinvent 3.4 and US ecoinvent (US -EI 2.2) database; TRACI 2.1

PCRs

PCR for Architectural Coatings: NAICS 325510
Valid through Feb. 29, 2023. PCR review conducted by Thomas P. Gloria (Industrial Ecology Consultants), Ph. D; Mr. Bill Stough (Sustainable Research Group); Dr. Michael Overcash (Environmental Clarity).

NSF Program Operator Instructions

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

Download PDF SM Transparency Report, which includes the additional EPD content required by the NSF PCR.

SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable purchasers and users to compare the potential environmental performance of products on a life cycle basis. Environmental declarations from different programs (ISO 14025) may not be comparable. In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the building level per ISO 21930 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization
Environmental product declarations

○ Industry-wide (generic) EPD	½product
✔ Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization
Environmental product declarations

○ Industry-wide (generic) EPD	1 product
✔ Product-specific Type III EPD	1.5 product

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products
Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 points
○ Multi-product specific EPD	.75 points
✔ Product-specific EPD	1 point

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✔
	Transparency Report (EPD)
3rd-party verified	✔

Validity: 20230213 – 20280212
Decl #: CAR-20230213-003

This environmental product declaration (EPD) was externally verified, according to NSF PCR for Architectural Coatings, and ISO 14025:2006, by Jack Geibig, President, Ecoform.

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SUMMARY
Reference PCR
NSF PCR for Architectural Coatings: NAICS 325510, 2022
Regions; system boundaries
North America; Cradle to grave
Functional unit / reference service life:
1 m^2 of covered and protected substrate; 60 years
LCIA methodology: TRACI 2.1
LCA software; LCI database
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LCA conducted by: Sustainable Minds
Public LCA:
Life Cycle Assessment of Carboline Intumescent Fire-Resistive Materials

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314-644-1000

Contact us

How we make it greener

Thermo-Lag Series

Collapse all

See LCA results by life cycle stage

RAW MATERIAL ACQUISITION

Carboline is dedicated to improving raw material sustainability efforts. These initiatives include researching alternative methods to acquire raw materials, while being conscience of their environmental impact and opting for suppliers who place emphasis on sustainable manufacturing techniques/renewable energy processes.

TRANSPORTATION

In an effort to reduce multiple long distance LTL shipments, Carboline has initiated pooling orders from local warehousing sites vs. shipping individual orders from multiple manufacturing and warehousing locations throughout the country.

MANUFACTURING

Carboline is always exploring solutions to reduce energy usage throughout the production process. Some of these initiatives include –

- Installing VFD drives to reduce electrical usage for mixing units
- Upgrading air driers with the intent of generating better air, which could result in using less air in the production process
- Researching solar installation at Carboline's Dayton, Nevada manufacturing site

END OF LIFE

Carboline fireproofing products provide long-term protection to the structures to which they are applied and were designed to outlive the expected lifespan of a building. Essentially, the only waste generated is at the time of demolition or if any repairs need to be made to the building.

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✓
	Transparency Report (EPD)
3rd-party verified	✓

Validity: 20230213 – 20280212

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314-644-1000

Contact us

Additional EPD content required by: NSF PCR: Architectural Coatings

Thermo-Lag Series

Data

Background This product-specific declaration was created by collecting life cycle data for the Thermo-Lag Series covering 1 m² of substrate for a period of 60 years (the assumed average lifetime of a building). Databases adopted in the model include ecoinvent v3, US-EI 2.2, and ELCD databases.

Allocation The allocation methods used were examined according to the allocation rules in the NSF PCR for Architectural Coatings. The only manufacturing input that needed allocation was electricity since there is only one single meter that includes the production of multiple Carboline IFRM products. The allocation of electricity was based on the percentage of production for individual products divided by total site production output. In addition, there is no co-product produced in the manufacturing process.

Cut-off criteria A minimum of 95% of the total mass, energy, and environmental relevance for the system were captured. The total of neglected input flows per module does not exceed 5% of energy usage, mass, and environmental impacts. The cut-off rules do not apply to hazardous and toxic properties, which must be listed even when the given process unit is under the cut-off criterion. No known flows are deliberately excluded from this declaration; therefore, these criteria have been met. No biogenic carbon enters the product system.

Quality All primary data were collected for one year to ensure representativeness of annual business activities and post-consumer contents. Except for overseas transportation, secondary datasets for the US were used since Carboline products are expected to be applied in the US. The overall quality of the data used in this study is considered to be good and representative of the described systems.

Major system boundary exclusions:

- Capital goods & infrastructure; maintenance and operation of support equipment;
- Manufacture & transport of packaging materials not associated with final product;
- Human labor and employee transport;
- Building operational energy and water use not associated with final product.

Major assumptions and limitations:

- Material input and transportation distances are averages and do not reflect changes in material efficiency and supplier locations.
- Proxy materials were used when matching secondary data sets were not identified.
- Generic data sets used for material inputs, transport, and waste processing are considered good quality, but actual impacts from material suppliers, transport carriers, and local waste processing may vary.
- LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Relevant technical properties

PRODUCT	E 100	E 100-S	3000	3000-SP	Unit
Density	1.32	1.32	1.32	1.32	kg/L
Dry Film Thickness (DFT) / coat	80	60	80	60	mils
Reference flow per functional unit	17.7	13.6	17.6	13.9	kg
Packaging for finished products	Steel pail	Steel pail	Steel pail	Steel pail	--
Packaging volume	17	17	17	17	L

Scenarios and additional technical information

PARAMETER (for 1 kg finished product)	VALUE	UNIT
Design and construction [Stage 2]		
Vehicle type	Lorry, 16-32 ton	
Average packaging weight for 1 kg coating		
Thermo-Lag E100	0.075	kg
Thermo-Lag E100-S	0.153	kg
Thermo-Lag 3000	0.076	kg
Thermo-Lag 3000-SP	0.153	kg
Distance from manufacturer to distribution center		
Thermo-Lag E100	2864*	km
Thermo-Lag E100-S	2584.1*	km
Thermo-Lag 3000	2917.1*	km
Thermo-Lag 3000-SP	2878.1*	km
Distance from distribution center to point of sale	804.5	km
Distance from point of sale to application site	0	km
Use and maintenance [Stage 3]		
Application scrap assumed	10	%
Spray equipment assumed	Graco Mark V Airless	
Electricity consumption	2.09	kWh
Sprayer flow rate	1.35	gpm
Waste materials at the application site before waste processing (product scrap and packaging waste)		
Product scrap	0.1	kg
Packaging waste recycling - Thermo-Lag E100	0.075	kg
Packaging waste recycling - Thermo-Lag E100-S	0.153	kg
Packaging waste recycling - Thermo-Lag 3000	0.076	kg
Packaging waste recycling - Thermo-Lag 3000-SP	0.153	kg
Output materials from on-site waste processing	0	kg
Biogenic carbon contained in packaging	0	kg CO_2
VOC emissions from drying (EPA Method 24)		
Thermo-Lag E100	13	g/L
Thermo-Lag E100-S	64	g/L
Thermo-Lag 3000	13	g/L
Thermo-Lag 3000-SP	64	g/L
Necessary maintenance and repaints		
Product life for functional unit	60	years
Coating type/environment	Indoor	
Market-based lifetime	5	years
Initial coating application	1	time
Maintenance recoat	11	times
No colorants are added	–	–

*Average transportation distances between the manufacturing plant and the distribution centers were provided by Carboline based on sales data.

End of life [Stage 4]

Assumptions for scenario development	Manual deconstruction, sent for incineration by truck		
End-of-life products (incineration)	Collected with mixed construction waste	1	kg
Recovery	Reuse	0	kg
	Recycling	0	kg
	Landfill	0	kg
Waste transport (incineration)		11.27	km
Removals of biogenic carbon (excluding packaging)		0	kg CO_2

Thermo-Lag E 100: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	Unit	Stage 1 - Product stage			Stage 2 - Design and construction			Stage 3 - Use and maintenance			Stage 4 - End of life		Total
		1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	
LCIA results (per m² covered and protected substrate for a period of 60 years)													
Ozone depletion	kg CFC-11 eq	1.48E-05	4.03E-06	5.43E-07	3.96E-06	1.11E-06	0	3.20E-10	0	3.52E-09	1.56E-08	3.87E-08	**2.45E-05**
Global warming	kg CO_2 eq	1.37E+02	1.70E+01	1.63E+01	1.66E+01	4.67E+00	0	7.82E-03	0	8.61E-02	6.53E-02	3.61E+01	**2.28E+02**
Smog	kg O_3 eq	6.70E+00	1.70E+00	5.09E-01	3.71E-01	1.04E-01	0	2.62E-04	1.16E+00	2.89E-03	1.46E-03	5.14E-02	**1.06E+01**
Acidification	kg SO_2 eq	6.84E-01	8.77E-02	4.48E-02	2.89E-02	8.11E-03	0	3.05E-05	0	3.35E-04	1.14E-04	3.71E-03	**8.58E-01**
Eutrophication	kg N eq	1.98E-01	8.44E-03	5.31E-03	6.02E-03	1.69E-03	0	2.55E-06	0	2.80E-05	2.37E-05	2.74E-02	**2.47E-01**
Carcinogenics	CTUh	7.19E-06	1.43E-08	9.15E-07	1.53E-08	4.28E-09	0	1.49E-11	0	1.64E-10	6.00E-11	1.42E-07	**8.28E-06**
Non-carcinogenics	CTUh	1.51E-05	2.04E-06	4.81E-07	2.33E-06	6.56E-07	0	2.52E-10	0	2.77E-09	9.18E-09	2.43E-07	**2.08E-05**
Respiratory effects	kg $PM_{2.5}$ eq	9.61E-02	1.05E-02	9.80E-03	5.82E-03	1.64E-03	0	1.79E-06	0	1.97E-05	2.29E-05	2.81E-04	**1.24E-01**
Ecotoxicity	CTUe	1.72E+02	4.05E+01	1.75E+01	4.72E+01	1.33E+01	0	5.90E-04	0	6.49E-03	1.86E-01	8.31E+00	**2.99E+02**
Fossil fuel depletion	MJ surplus	2.48E+02	3.57E+01	2.00E+01	3.52E+01	9.90E+00	0	1.03E-02	0	1.14E-01	1.39E-01	3.45E-01	**3.50E+02**
Resource use indicators													
Renewable primary energy used as energy carrier (fuel)	MJ, LHV	7.24E+01	2.28E-01	1.82E+01	2.24E-01	6.30E-02	0	8.35E-03	0	9.18E-02	8.82E-04	2.74E-03	**9.11E+01**
Renewable primary resources with energy content used as material	MJ, LHV	5.55E+01	8.26E-02	3.01E+00	8.18E-02	2.30E-02	0	2.57E-03	0	2.83E-02	3.22E-04	9.32E-04	**5.88E+01**
Total use of renewable primary resources with energy content	MJ, LHV	1.28E+02	3.11E-01	2.12E+01	3.06E-01	8.60E-02	0	1.09E-02	0	1.20E-01	1.20E-03	3.67E-03	**1.50E+02**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	2.35E+03	2.38E+02	2.03E+02	2.35E+02	6.60E+01	0	1.41E-01	0	1.55E+00	9.25E-01	2.27E+00	**3.10E+03**
Non-renewable primary resources with energy content used as material	MJ, LHV	1.17E+00	7.65E-04	1.11E-02	7.03E-04	1.97E-04	0	1.20E-09	0	1.32E-08	2.76E-06	1.29E-05	**1.19E+00**
Total use of non-renewable primary resources with energy content	MJ, LHV	2.36E+03	2.38E+02	2.03E+02	2.35E+02	6.60E+01	0	1.41E-01	0	1.55E+00	9.25E-01	2.27E+00	**3.10E+03**
Hazardous waste disposed	kg	0	0	3.02E+00	0	0	0	0	0	0	0	0	**3.02E+00**
Non-hazardous waste disposed	kg	0	0	2.90E-01	0	0	0	0	0	0	0	0	**2.90E-01**
Hydro/wind power	MJ, LHV	0	0	1.41E+00	0	0	0	0	0	0	0	0	**1.41E+00**
Fossil energy	MJ, LHV	0	0	2.77E+01	0	0	0	0	0	0	0	0	**2.77E+01**
Bio-energy	MJ, LHV	0	0	8.83E-01	0	0	0	0	0	0	0	0	**8.83E-01**
Nuclear- energy	MJ, LHV	0	0	9.64E+00	0	0	0	0	0	0	0	0	**9.64E+00**
Other-energy	MJ, LHV	0	0	4.82E-01	0	0	0	0	0	0	0	0	**4.82E-01**
Renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Non-renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Recycled materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Recovered energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Use of net fresh water resources	m³	1.92E+02	2.25E+00	4.99E+00	2.19E+00	6.16E-01	0	2.53E-04	0	2.78E-03	8.62E-03	2.81E-02	**2.02E+02**
Output flows and waste category indicators													
High-level radioactive waste, conditioned, to final repository	kg	2.65E-02	8.34E-05	7.01E-04	8.09E-05	2.27E-05	0	5.45E-07	0	6.00E-06	3.18E-07	1.17E-06	**2.74E-02**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	6.41E-05	3.53E-05	3.55E-06	3.48E-05	9.78E-06	0	6.01E-09	0	6.61E-08	1.37E-07	3.41E-07	**1.48E-04**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Exported energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions and removals													
Biogenic carbon removal from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**

Thermo-Lag E 100-S: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	Unit	Stage 1 - Product stage			Stage 2 - Design and construction			Stage 3 - Use and maintenance			Stage 4 - End of life		Total
		1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	
LCIA results (per m² covered and protected substrate for a period of 60 years)													
Ozone depletion	kg CFC-11 eq	1.10E-05	3.13E-06	6.30E-07	2.95E-06	9.17E-07	0	2.54E-10	0	2.80E-09	1.28E-08	2.97E-08	**1.87E-05**
Global warming	kg CO_2 eq	1.06E+02	1.32E+01	1.67E+01	1.24E+01	3.85E+00	0	6.22E-03	0	6.84E-02	5.39E-02	2.78E+01	**1.80E+02**
Smog	kg O_3 eq	5.20E+00	1.28E+00	5.95E-01	2.76E-01	8.59E-02	0	2.08E-04	4.42E+00	2.29E-03	1.20E-03	3.95E-02	**1.19E+01**
Acidification	kg SO_2 eq	5.23E-01	6.67E-02	4.77E-02	2.15E-02	6.69E-03	0	2.42E-05	0	2.67E-04	9.36E-05	2.85E-03	**6.69E-01**
Eutrophication	kg N eq	1.17E-01	6.50E-03	5.99E-03	4.48E-03	1.39E-03	0	2.02E-06	0	2.23E-05	1.95E-05	2.10E-02	**1.56E-01**
Carcinogenics	CTUh	5.13E-06	1.11E-08	1.38E-06	1.13E-08	3.53E-09	0	1.19E-11	0	1.31E-10	4.94E-11	1.09E-07	**6.65E-06**
Non-carcinogenics	CTUh	1.13E-05	1.59E-06	5.74E-07	1.74E-06	5.40E-07	0	2.00E-10	0	2.20E-09	7.57E-09	1.87E-07	**1.60E-05**
Respiratory effects	kg $PM_{2.5}$ eq	7.25E-02	8.01E-03	1.38E-02	4.33E-03	1.35E-03	0	1.42E-06	0	1.56E-05	1.89E-05	2.16E-04	**1.00E-01**
Ecotoxicity	CTUe	1.28E+02	3.16E+01	2.62E+01	3.51E+01	1.09E+01	0	4.69E-04	0	5.15E-03	1.53E-01	6.39E+00	**2.39E+02**
Fossil fuel depletion	MJ surplus	2.07E+02	2.77E+01	1.73E+01	2.62E+01	8.16E+00	0	8.20E-03	0	9.02E-02	1.14E-01	2.65E-01	**2.87E+02**
Resource use indicators													
Renewable primary energy used as energy carrier (fuel)	MJ, LHV	5.51E+01	1.77E-01	1.52E+01	1.67E-01	5.19E-02	0	6.63E-03	0	7.30E-02	7.27E-04	2.10E-03	**7.07E+01**
Renewable primary resources with energy content used as material	MJ, LHV	2.89E+01	6.41E-02	2.50E+00	6.09E-02	1.89E-02	0	2.05E-03	0	2.25E-02	2.65E-04	7.17E-04	**3.16E+01**
Total use of renewable primary resources with energy content	MJ, LHV	8.40E+01	2.41E-01	1.77E+01	2.28E-01	7.09E-02	0	8.68E-03	0	9.55E-02	9.92E-04	2.82E-03	**1.02E+02**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	1.91E+03	1.85E+02	1.98E+02	1.75E+02	5.44E+01	0	1.12E-01	0	1.23E+00	7.62E-01	1.74E+00	**2.52E+03**
Non-renewable primary resources with energy content used as material	MJ, LHV	4.48E-01	5.93E-04	1.46E-02	5.23E-04	1.63E-04	0	9.53E-10	0	1.05E-08	2.28E-06	9.93E-06	**4.63E-01**
Total use of non-renewable primary resources with energy content	MJ, LHV	1.91E+03	1.85E+02	1.98E+02	1.75E+02	5.44E+01	0	1.12E-01	0	1.23E+00	7.62E-01	1.74E+00	**2.52E+03**
Hazardous waste disposed	kg	0	0	2.39E+00	0	0	0	0	0	0	0	0	**2.39E+00**
Non-hazardous waste disposed	kg	0	0	2.30E-01	0	0	0	0	0	0	0	0	**2.30E-01**
Hydro/wind power	MJ, LHV	0	0	1.12E+00	0	0	0	0	0	0	0	0	**1.12E+00**
Fossil energy	MJ, LHV	0	0	2.21E+01	0	0	0	0	0	0	0	0	**2.21E+01**
Bio-energy	MJ, LHV	0	0	7.03E-01	0	0	0	0	0	0	0	0	**7.03E-01**
Nuclear- energy	MJ, LHV	0	0	7.67E+00	0	0	0	0	0	0	0	0	**7.67E+00**
Other-energy	MJ, LHV	0	0	3.84E-01	0	0	0	0	0	0	0	0	**3.84E-01**
Renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Non-renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Recycled materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Recovered energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Use of net fresh water resources	m³	1.70E+02	2.31E+00	8.34E+00	2.17E+00	6.75E-01	0	2.01E-04	0	2.21E-03	9.44E-03	2.72E-02	**1.83E+02**
Output flows and waste category indicators													
High-level radioactive waste, conditioned, to final repository	kg	2.11E-02	6.48E-05	9.17E-04	6.02E-05	1.87E-05	0	4.33E-07	0	4.76E-06	2.62E-07	9.00E-07	**2.22E-02**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	4.78E-05	2.74E-05	3.77E-06	2.59E-05	8.06E-06	0	4.78E-09	0	5.25E-08	1.13E-07	2.62E-07	**1.13E-04**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Exported energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions and removals													
Biogenic carbon removal from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**

Thermo-Lag 3000: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	Unit	Stage 1 - Product stage			Stage 2 - Design and construction			Stage 3 - Use and maintenance			Stage 4 - End of life		Total
		1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	
LCIA results (per m² covered and protected substrate for a period of 60 years)													
Ozone depletion	kg CFC-11 eq	1.54E-05	4.00E-06	5.46E-07	4.02E-06	1.11E-06	0	3.19E-10	0	3.51E-09	1.55E-08	3.85E-08	**2.52E-05**
Global warming	kg CO_2 eq	1.40E+02	1.69E+01	1.62E+01	1.69E+01	4.66E+00	0	7.80E-03	0	8.58E-02	6.52E-02	3.60E+01	**2.31E+02**
Smog	kg O_3 eq	6.85E+00	7.89E-01	5.11E-01	3.77E-01	1.04E-01	0	2.62E-04	1.16E+00	2.88E-03	1.46E-03	5.12E-02	**9.84E+00**
Acidification	kg SO_2 eq	6.91E-01	5.31E-02	4.49E-02	2.94E-02	8.10E-03	0	3.04E-05	0	3.34E-04	1.13E-04	3.70E-03	**8.31E-01**
Eutrophication	kg N eq	1.77E-01	6.82E-03	5.17E-03	6.12E-03	1.69E-03	0	2.54E-06	0	2.79E-05	2.36E-05	2.73E-02	**2.24E-01**
Carcinogenics	CTUh	7.22E-06	1.52E-08	9.22E-07	1.55E-08	4.27E-09	0	1.49E-11	0	1.64E-10	5.98E-11	1.41E-07	**8.32E-06**
Non-carcinogenics	CTUh	1.52E-05	2.25E-06	4.82E-07	2.37E-06	6.54E-07	0	2.51E-10	0	2.76E-09	9.16E-09	2.42E-07	**2.12E-05**
Respiratory effects	kg $PM_{2.5}$ eq	9.78E-02	7.10E-03	9.88E-03	5.92E-03	1.63E-03	0	1.78E-06	0	1.96E-05	2.28E-05	2.80E-04	**1.23E-01**
Ecotoxicity	CTUe	1.81E+02	4.53E+01	1.76E+01	4.80E+01	1.32E+01	0	5.88E-04	0	6.47E-03	1.85E-01	8.28E+00	**3.14E+02**
Fossil fuel depletion	MJ surplus	2.60E+02	3.56E+01	2.01E+01	3.58E+01	9.87E+00	0	1.03E-02	0	1.13E-01	1.38E-01	3.44E-01	**3.62E+02**
Resource use indicators													
Renewable primary energy used as energy carrier (fuel)	MJ, LHV	7.52E+01	2.27E-01	1.82E+01	2.28E-01	6.29E-02	0	8.32E-03	0	9.16E-02	8.80E-04	2.73E-03	**9.41E+01**
Renewable primary resources with energy content used as material	MJ, LHV	4.57E+01	8.25E-02	3.02E+00	8.32E-02	2.29E-02	0	2.57E-03	0	2.82E-02	3.21E-04	9.29E-04	**4.90E+01**
Total use of renewable primary resources with energy content	MJ, LHV	1.21E+02	3.10E-01	2.12E+01	3.11E-01	8.58E-02	0	1.09E-02	0	1.20E-01	1.20E-03	3.66E-03	**1.43E+02**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	2.44E+03	2.38E+02	2.04E+02	2.39E+02	6.59E+01	0	1.40E-01	0	1.54E+00	9.23E-01	2.26E+00	**3.19E+03**
Non-renewable primary resources with energy content used as material	MJ, LHV	8.31E-01	7.19E-04	1.12E-02	7.14E-04	1.97E-04	0	1.20E-09	0	1.32E-08	2.76E-06	1.29E-05	**8.43E-01**
Total use of non-renewable primary resources with energy content	MJ, LHV	2.44E+03	2.38E+02	2.04E+02	2.39E+02	6.59E+01	0	1.40E-01	0	1.54E+00	9.23E-01	2.26E+00	**3.19E+03**
Hazardous waste disposed	kg	0	0	3.01E+00	0	0	0	0	0	0	0	0	**3.01E+00**
Non-hazardous waste disposed	kg	0	0	2.91E-01	0	0	0	0	0	0	0	0	**2.91E-01**
Hydro/wind power	MJ, LHV	0	0	1.41E+00	0	0	0	0	0	0	0	0	**1.41E+00**
Fossil energy	MJ, LHV	0	0	2.79E+01	0	0	0	0	0	0	0	0	**2.79E+01**
Bio-energy	MJ, LHV	0	0	8.87E-01	0	0	0	0	0	0	0	0	**8.87E-01**
Nuclear- energy	MJ, LHV	0	0	9.67E+00	0	0	0	0	0	0	0	0	**9.67E+00**
Other-energy	MJ, LHV	0	0	4.84E-01	0	0	0	0	0	0	0	0	**4.84E-01**
Renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Non-renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Recycled materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Recovered energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Use of net fresh water resources	m³	1.87E+02	2.17E+00	4.58E+00	2.19E+00	6.03E-01	0	2.52E-04	0	2.77E-03	8.44E-03	2.74E-02	**1.97E+02**
Output flows and waste category indicators													
High-level radioactive waste, conditioned, to final repository	kg	2.86E-02	8.23E-05	7.06E-04	8.22E-05	2.27E-05	0	5.43E-07	0	5.98E-06	3.18E-07	1.17E-06	**2.95E-02**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	6.54E-05	3.52E-05	3.56E-06	3.54E-05	9.76E-06	0	5.99E-09	0	6.59E-08	1.37E-07	3.40E-07	**1.50E-04**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Exported energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions and removals													
Biogenic carbon removal from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**

Thermo-Lag 3000-SP: LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	Unit	Stage 1 - Product stage			Stage 2 - Design and construction			Stage 3 - Use and maintenance			Stage 4 - End of life		Total
		1-1	1-2	1-3	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	
LCIA results (per m² covered and protected substrate for a period of 60 years)													
Ozone depletion	kg CFC-11 eq	1.15E-05	3.58E-06	6.40E-07	3.34E-06	9.34E-07	0	2.55E-10	0	2.80E-09	1.31E-08	3.03E-08	**2.00E-05**
Global warming	kg CO_2 eq	1.07E+02	1.45E+01	1.68E+01	1.40E+01	3.92E+00	0	6.23E-03	0	6.85E-02	5.49E-02	2.83E+01	**1.84E+02**
Smog	kg O_3 eq	5.24E+00	7.47E-01	6.04E-01	3.12E-01	8.75E-02	0	2.09E-04	4.41E+00	2.30E-03	1.22E-03	4.02E-02	**1.15E+01**
Acidification	kg SO_2 eq	5.24E-01	4.44E-02	4.83E-02	2.43E-02	6.81E-03	0	2.43E-05	0	2.67E-04	9.54E-05	2.91E-03	**6.51E-01**
Eutrophication	kg N eq	1.20E-01	6.16E-03	6.09E-03	5.07E-03	1.42E-03	0	2.03E-06	0	2.23E-05	1.99E-05	2.14E-02	**1.60E-01**
Carcinogenics	CTUh	5.34E-06	1.55E-08	1.42E-06	1.28E-08	3.60E-09	0	1.19E-11	0	1.31E-10	5.04E-11	1.11E-07	**6.90E-06**
Non-carcinogenics	CTUh	1.17E-05	2.78E-06	5.84E-07	1.97E-06	5.51E-07	0	2.00E-10	0	2.20E-09	7.71E-09	1.90E-07	**1.78E-05**
Respiratory effects	kg $PM_{2.5}$ eq	7.35E-02	8.19E-03	1.41E-02	4.90E-03	1.37E-03	0	1.42E-06	0	1.56E-05	1.92E-05	2.20E-04	**1.02E-01**
Ecotoxicity	CTUe	1.36E+02	5.75E+01	2.69E+01	3.97E+01	1.11E+01	0	4.69E-04	0	5.16E-03	1.56E-01	6.50E+00	**2.78E+02**
Fossil fuel depletion	MJ surplus	2.07E+02	3.18E+01	1.74E+01	2.97E+01	8.31E+00	0	8.22E-03	0	9.04E-02	1.16E-01	2.70E-01	**2.95E+02**
Resource use indicators													
Renewable primary energy used as energy carrier (fuel)	MJ, LHV	5.74E+01	2.03E-01	1.52E+01	1.89E-01	5.29E-02	0	6.65E-03	0	7.31E-02	7.41E-04	2.14E-03	**7.32E+01**
Renewable primary resources with energy content used as material	MJ, LHV	2.92E+01	7.37E-02	2.51E+00	6.89E-02	1.93E-02	0	2.05E-03	0	2.25E-02	2.70E-04	7.30E-04	**3.19E+01**
Total use of renewable primary resources with energy content	MJ, LHV	8.67E+01	2.76E-01	1.77E+01	2.58E-01	7.22E-02	0	8.69E-03	0	9.56E-02	1.01E-03	2.87E-03	**1.05E+02**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	1.91E+03	2.12E+02	2.00E+02	1.98E+02	5.55E+01	0	1.12E-01	0	1.23E+00	7.77E-01	1.78E+00	**2.58E+03**
Non-renewable primary resources with energy content used as material	MJ, LHV	4.46E-01	6.50E-04	1.49E-02	5.92E-04	1.66E-04	0	9.55E-10	0	1.05E-08	2.32E-06	1.01E-05	**4.62E-01**
Total use of non-renewable primary resources with energy content	MJ, LHV	1.91E+03	2.12E+02	2.00E+02	1.98E+02	5.55E+01	0	1.12E-01	0	1.23E+00	7.77E-01	1.78E+00	**2.58E+03**
Hazardous waste disposed	kg	0	0	2.39E+00	0	0	0	0	0	0	0	0	**2.39E+00**
Non-hazardous waste disposed	kg	0	0	2.31E-01	0	0	0	0	0	0	0	0	**2.31E-01**
Hydro/wind power	MJ, LHV	0	0	1.12E+00	0	0	0	0	0	0	0	0	**1.12E+00**
Fossil energy	MJ, LHV	0	0	2.20E+01	0	0	0	0	0	0	0	0	**2.20E+01**
Bio-energy	MJ, LHV	0	0	7.01E-01	0	0	0	0	0	0	0	0	**7.01E-01**
Nuclear- energy	MJ, LHV	0	0	7.65E+00	0	0	0	0	0	0	0	0	**7.65E+00**
Other-energy	MJ, LHV	0	0	3.83E-01	0	0	0	0	0	0	0	0	**3.83E-01**
Renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Non-renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Recycled materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Recovered energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Use of net fresh water resources	m³	1.75E+02	2.16E+00	8.37E+00	2.01E+00	5.63E-01	0	2.01E-04	0	2.21E-03	7.89E-03	2.36E-02	**1.88E+02**
Output flows and waste category indicators													
High-level radioactive waste, conditioned, to final repository	kg	2.17E-02	7.34E-05	9.35E-04	6.81E-05	1.91E-05	0	4.34E-07	0	4.77E-06	2.67E-07	9.16E-07	**2.28E-02**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	4.93E-05	3.14E-05	3.82E-06	2.93E-05	8.21E-06	0	4.78E-09	0	5.26E-08	1.15E-07	2.67E-07	**1.22E-04**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	0	**0**
Exported energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions and removals													
Biogenic carbon removal from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from product	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon removal from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	0	**0**