

**LIFE CYCLE ASSESSMENT (LCA)
OF ISOLATEK INTERNATIONAL PASSIVE FIRE PROTECTION
PRODUCTS**

Status Public

Client



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EXECUTIVE SUMMARY

Isolatek International is committed to responsible environmental practice and operating in a sustainable manner. Isolatek is committed to reducing its environmental impact while continually improving its environmental performance as an integral part of their business and operations. They encourage customers, suppliers, and other stakeholders to join them with this continuing and evolving environmental and business responsibility. As Isolatek aims to reduce any impacts from their operations on the environment and local communities in which they operate, the company commissioned this study to evaluate the potential environmental impacts of its CAFCO® 300, CAFCO® 400, FENDOLITE®, and BLAZE-SHIELD® series products and using a cradle-to-installation approach.

The declared unit of spray-applied fire-resistive materials (SFRMs) was determined to be one metric ton (1,000 kg) of product. Life cycle assessment (LCA) was conducted conforming to applicable ISO 14040/44 standards and ISO 21930:2017 using a cradle-to-installation approach. The cradle-to-installation scope includes life cycle stages from raw extraction and upstream manufacturing (A1); transportation from supplier facilities to the manufacturing facilities (A2); manufacturing processes within the manufacturing facilities (A3); distribution to the building site (A4), and product installation (A5).

A high-level summary of the findings from this study is presented in the table below, which shows impacts per declared unit. The table includes potential CO₂-equivalent emissions based on IPCC, AR6 for each product type across the various life cycle modules. For other impact categories and a breakdown by each life cycle stage, refer to the tables in the full report.

Overall, the study found that environmental performance is primarily driven by the raw material supply (A1) phase for the CAFCO® 300, CAFCO® 400, and FENDOLITE® product series. In contrast, the manufacturing phase (A3) is the major contributor to environmental impacts for the BLAZE-SHIELD® series, accounting for ~80% of the potential CO₂-equivalent emissions from cradle to installation.

Product	Plant	Global warming potential	A1 Raw material supply	A2 Transport to facility	A3 Manufacturing	A1-A3 Total	A4 Transport to site	A5 Installation	Total
CAFCO® 300	San Bernardino, CA	IPCC _{Total}	2.19E+02	1.07E+02	3.20E+01	3.57E+02	4.16E+01	2.68E+01	4.26E+02
		%	51.34%	25.08%	7.52%	83.94%	9.77%	6.29%	100.00%
	Stanhope, NJ	IPCC _{Total}	3.45E+02	2.97E+01	4.79E+01	4.23E+02	4.16E+01	2.78E+01	4.92E+02
		%	70.12%	6.04%	9.74%	85.89%	8.46%	5.65%	100.00%
	Houston, TX	IPCC _{Total}	2.32E+02	6.08E+01	4.41E+01	3.37E+02	4.16E+01	2.51E+01	4.03E+02
		%	57.48%	15.06%	10.93%	83.47%	10.31%	6.22%	100.00%
CAFCO® 300 AC	San Bernardino, CA	IPCC _{Total}	2.23E+02	1.08E+02	3.26E+01	3.64E+02	4.16E+01	2.73E+01	4.33E+02
		%	51.52%	25.02%	7.54%	84.08%	9.61%	6.31%	100.00%
	Stanhope, NJ	IPCC _{Total}	3.24E+02	2.86E+01	4.77E+01	4.00E+02	4.16E+01	2.63E+01	4.68E+02
		%	69.22%	6.10%	10.18%	85.51%	8.88%	5.61%	100.00%
	Houston, TX	IPCC _{Total}	2.33E+02	6.06E+01	3.51E+01	3.29E+02	4.16E+01	2.52E+01	3.96E+02
		%	58.96%	15.30%	8.88%	83.14%	10.50%	6.36%	100.00%
CAFCO® 300 HS	San Bernardino, CA	IPCC _{Total}	2.23E+02	1.08E+02	3.26E+01	3.64E+02	4.16E+01	2.73E+01	4.33E+02
		%	51.52%	25.02%	7.54%	84.08%	9.61%	6.31%	100.00%
	Stanhope, NJ	IPCC _{Total}	3.25E+02	3.68E+01	6.27E+01	4.24E+02	4.16E+01	3.90E+01	5.05E+02
		%	64.33%	7.30%	12.41%	84.04%	8.23%	7.73%	100.00%
	Houston, TX	IPCC _{Total}	2.52E+02	5.87E+01	3.49E+01	3.46E+02	4.16E+01	2.56E+01	4.13E+02
		%	61.05%	14.22%	8.46%	83.72%	10.07%	6.21%	100.00%
CAFCO® 3000	San Bernardino, CA	IPCC _{Total}	2.23E+02	1.08E+02	2.37E+01	3.55E+02	4.16E+01	2.73E+01	4.24E+02
		%	52.61%	25.55%	5.59%	83.74%	9.81%	6.44%	100.00%
	Stanhope, NJ	IPCC _{Total}	3.29E+02	2.88E+01	2.06E+01	3.78E+02	4.16E+01	2.67E+01	4.47E+02
		%	73.66%	6.45%	4.62%	84.73%	9.31%	5.97%	100.00%
	Houston, TX	IPCC _{Total}	2.52E+02	5.87E+01	4.38E+01	3.55E+02	4.16E+01	2.56E+01	4.22E+02
		%	59.76%	13.92%	10.39%	84.06%	9.86%	6.07%	100.00%
CAFCO® 400 AC	San Bernardino, CA	IPCC _{Total}	3.11E+02	1.08E+02	3.34E+01	4.52E+02	4.16E+01	2.70E+01	5.21E+02
		%	59.65%	20.77%	6.41%	86.83%	7.98%	5.19%	100.00%
	Stanhope, NJ	IPCC _{Total}	2.41E+02	2.88E+01	4.68E+01	3.17E+02	4.16E+01	2.78E+01	3.86E+02
		%	62.44%	7.46%	12.13%	82.03%	10.77%	7.20%	100.00%
	Houston, TX	IPCC _{Total}	2.53E+02	5.84E+01	4.40E+01	3.55E+02	4.16E+01	2.59E+01	4.23E+02
		%	59.82%	13.82%	10.40%	84.04%	9.83%	6.13%	100.00%
CAFCO® 400	San Bernardino, CA	IPCC _{Total}	5.52E+02	1.08E+02	3.21E+01	6.92E+02	5.69E+01	2.70E+01	7.76E+02
		%	71.15%	13.90%	4.14%	89.19%	7.33%	3.48%	100.00%
	Stanhope, NJ	IPCC _{Total}	6.57E+02	2.49E+01	4.75E+01	7.30E+02	5.69E+01	2.71E+01	8.14E+02
		%	80.77%	3.06%	5.84%	89.67%	7.00%	3.33%	100.00%
	Houston, TX	IPCC _{Total}	5.70E+02	6.72E+01	4.43E+01	6.82E+02	5.69E+01	2.75E+01	7.66E+02
		%	74.44%	8.77%	5.78%	88.98%	7.43%	3.59%	100.00%
FENDOLITE® M-II	San Bernardino, CA	IPCC _{Total}	6.69E+02	1.32E+02	3.16E+01	8.33E+02	4.16E+01	2.76E+01	9.02E+02
		%	74.16%	14.67%	3.51%	92.34%	4.61%	3.06%	100.00%
	Stanhope, NJ	IPCC _{Total}	6.53E+02	3.33E+01	3.74E+01	7.24E+02	4.16E+01	2.65E+01	7.92E+02
		%	82.49%	4.20%	4.72%	91.41%	5.25%	3.34%	100.00%
	Houston, TX	IPCC _{Total}	6.85E+02	6.53E+01	4.50E+01	7.95E+02	4.16E+01	2.97E+01	8.66E+02
		%	79.05%	7.54%	5.19%	91.78%	4.80%	3.42%	100.00%
FENDOLITE® M-II/P	Stanhope, NJ	IPCC _{Total}	6.53E+02	3.33E+01	3.74E+01	7.24E+02	4.16E+01	2.64E+01	7.92E+02
		%	82.49%	4.20%	4.72%	91.42%	5.25%	3.34%	100.00%
	Houston, TX	IPCC _{Total}	6.85E+02	6.53E+01	4.50E+01	7.95E+02	4.16E+01	2.97E+01	8.66E+02
		%	79.05%	7.54%	5.19%	91.78%	4.80%	3.42%	100.00%
BLAZE-SHIELD® II	Huntington, IN	IPCC _{Total}	1.98E+02	1.65E+01	9.42E+02	1.16E+03	4.16E+01	5.55E+00	1.20E+03
		%	16.48%	1.37%	78.24%	96.09%	3.45%	0.46%	100.00%
BLAZE-SHIELD® II HS	Huntington, IN	IPCC _{Total}	1.98E+02	1.65E+01	9.42E+02	1.16E+03	4.16E+01	5.55E+00	1.20E+03
		%	16.48%	1.37%	78.24%	96.09%	3.45%	0.46%	100.00%
BLAZE-SHIELD® HP	Huntington, IN	IPCC _{Total}	1.98E+02	1.65E+01	9.42E+02	1.16E+03	4.16E+01	6.04E+00	1.20E+03
		%	16.47%	1.37%	78.20%	96.05%	3.45%	0.50%	100.00%

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1. BACKGROUND

1.1. Opportunity

Isolatek International is the world's leading single source manufacturer of passive fireproofing materials for the construction industry. Isolatek has been working towards low energy and sustainably built products and solutions that will be important for the construction sector of the marketplace. In fulfilling their commitment to sustainability, it is important for Isolatek to conduct Life Cycle Assessments (LCAs). These LCAs will evaluate the environmental impacts of products for the life cycle stages from raw materials to product installation or cradle to gate with installation. The goal of conducting the Life Cycle Assessment is to understand the scope of environmental impacts from the products and to recognize ways to improve the process and reduce overall impacts. Isolatek International intends to provide information that the market needs to be able to accurately assess the environmental impacts of their products and solutions.

Isolatek International has chosen the Cradle to gate (A1 - A3) with installation (A4, A5) approach for the Life Cycle Assessment of their products. By conducting a cradle-to-installation Life Cycle Assessment, Isolatek will be informed on how to reduce the environmental impacts for each of their products from raw material acquisition to manufacturing.

Isolatek is interested in having LCA data available for its passive fire protection products to be able to obtain Sustainable Minds Transparency Report [EPDs]TM (TRs), which is an ISO 14025 Type III [1] environmental declaration that can be used for communication with and amongst other companies, architects, and consumers, and that can also be utilized in whole building LCA tools in conjunction with the LCA background report and life cycle inventory (LCI). This study aims to conform to the requirements of ISO 14040/14044 [2], ISO 21930:2017 [3], and the Smart EPD PCR Part A [4] and Part B for Spray-Applied Fire-Resistive Materials (SFRM) [5].

1.2. Life cycle assessment (LCA)

LCA is performed to comprehensively explore, quantify, and interpret the potential environmental impacts associated with a product or service throughout its entire life cycle. A product's life cycle consists of various stages, starting from raw material acquisition and manufacturing to product use and maintenance, plus final product disposal. Depending on the inclusion and exclusion of life cycle stages, an LCA could be cradle to gate (from raw material acquisition to the manufactured product ready to be shipped), cradle to gate with options (which also optionally includes other modules such as shipment and installation), and cradle to grave (which includes all other stages including the use phase and disposal once the useful life is over).

Any LCA conducted with the intention of publishing EPDs needs to comply with the internationally accepted ISO 14040 and ISO 14044 standards. ISO 14040 provides principles and frameworks for conducting an LCA, while ISO 14044 specifies requirements and provides guidelines for an LCA. ISO 14040 sets out a four-phase methodology framework for completing a LCA, as depicted in **Figure 1**.

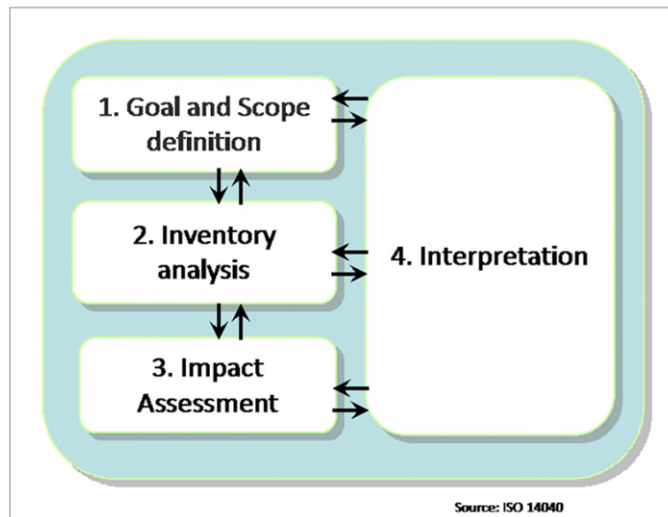


Figure 1. Phases of an LCA

- Goal and scope definition:** Goals refer to establishing the purpose of the LCA, and they define the environmental aspects to be studied and the intended audience. Scope outlines the system boundaries, the declared unit of analysis, and the life cycle stages to be included. System boundaries set up inclusions and exclusions in an LCA. PCRs usually specify whether the boundary must be cradle-to-gate, cradle-to-installation, or cradle-to-grave.
- Life cycle inventory analysis:** In this step, a detailed inventory of all the environmental inputs and outputs associated with each stage of the product's life cycle is compiled. Primary data about materials, energy, and emissions assessing the upstream supply chain, company's manufacturing operations, and downstream processes (after product leaves the factory gate) are collected via LCI data collection templates or tools. Annual data is suggested in most cases to be representative of the manufacturing operations. In the case of multi outputs, resources can be allocated to the product of interest via mass or volume, or as relevant. The inventory is then scaled to meet the declared unit of the LCA.
- Life cycle impact assessment:** The compiled LCI is then modeled using an LCA software like SimaPro, GaBi, openLCA, or others using suitable background data sets available on their databases. Each is assigned to categories according to different impact methodologies, and the software provides final impact values for those different environmental impact categories. Several LCIA methodologies exist in the market including ReCiPe, TRACI v2.2, IPCC AR6, CML, and ILCD, which differ in terms of their approaches, characterization factors, evaluated impact categories, and modeling assumptions. Practitioners can choose a combination of LCIA methodologies to provide a holistic view of the environmental performance of a product.
- Interpretation of results:** In this step, the LCIA results are analyzed and presented via an LCA report. This stage helps draw conclusions about the environmental performance of the product, identify any environmental hotspots, make recommendations, and assess the significance of the findings. Sensitivity analysis, scenario studies, and uncertainty assessment are often included as a part of the interpretation to ensure the reliability and robustness of the results. LCA, if well interpreted and evaluated, presents a number of

opportunities for the manufacturer in developing sustainability goals and initiatives.

This LCA study follows an attributional approach and uses a cradle-to-installation system boundary. This report incorporates LCA terminology. To assist the readers in understanding LCA, special attention has been given to list definitions of important terms used at the end of this report.

A critical review of the LCA and an independent verification of the TR are required for ISO 14025 Type III environmental declarations. Both are included in this project.

1.3. Team

This LCA report is the outcome of the efforts of the project team led by Dan Ehehalt on behalf of Isolatek, with support from Isolatek personnel during the data collection, reporting, and interpretation phases. Sustainable Minds led the development of the LCA results, LCA report, and TRs.

1.4. Status

All information in this report reflects the best possible data inventory by Isolatek at the time it was collected, and Sustainable Minds and Isolatek adhered to best practices in transforming the inventory into this report.

Primary data was provided for manufacturing activities from January 2024 to December 2024 for Isolatek's facilities. Where data was missing, assumptions were made for the facility based on expertise from Isolatek and its upstream suppliers. This study also includes background data to complete the inventory and fill gaps where necessary.

This is a supporting LCA report for Transparency Reports [EPDs][™] of Isolatek passive fire protection products and was evaluated for conformance to the PCRs according to the ISO 14025 and ISO 14040/14044 standards. The LCA review and verification of the Sustainable Minds Transparency Report [EPD][™] were carried out Jack Geibig, President, Ecoform to determine conformance to ISO 14040/14044 and ISO 21930:2017.

2. GOAL AND SCOPE

This chapter explains the goal and scope of the study. The aim of the goal and scope is to define the product under study and the depth and breadth of the analysis.

2.1. Intended application and audience

This report intends to define the specific application of the LCA methodology to the life cycle of the passive fire protection products manufactured by Isolatek. The report serves both internal and external purposes and is intended for a diverse audience. The intended audience includes the program operator (Sustainable Minds) and reviewers who will be assessing the LCA for conformance to the PCRs, as well as Isolatek's internal stakeholders involved in marketing and communications, operations, and design.

The results presented in this document are not meant to support comparative claims. The outcomes will be made available to the public in a Sustainable Minds Transparency Report [EPD][™] (Type III environmental declaration per ISO 14025), which is intended for communication between businesses and consumers (B2C).

2.2. Product description

Isolatek International is recognized as the world's leading single source manufacturer with a range of applied fireproofing materials for steel construction. For more than 60 years, Isolatek International has been known for the outstanding thermal performance, durability, and ease of application of its products. The products are supported by the industry's most knowledgeable team of Technical and Field professionals. As a manufacturer of applied fireproofing materials, Isolatek International is interested in demonstrating its sustainability leadership and leveraging business value associated with transparent reporting of its products' cradle-to-gate environmental impacts. For more information on Isolatek International products, go to <https://www.isolatek.com/>.

The declaration names with products represented, manufacturing locations, and type of declaration are listed in **Table 1**. Other product information for each product is listed in

Table 2. The product series studied in this report are listed and visually represented in **Figure 2** through **Figure 5**.



Figure 2. Visual representation of Isolatek CAFCO® 300 series



Figure 3. Visual representation of Isolatek CAFCO® 400 series



Figure 4. Visual representation of Isolatek FENDOLITE® series



Figure 5. Visual representation of Isolatek BLAZE-SHIELD® series

Table 1. Declared product information and type of declaration

CSI MasterFormat® classification: 07 81 00			
Transparency Report [EPD]™ name	Product name	Manufacturing location(s)	Type of declaration
CAFCO® 300 Series	CAFCO® 300 CAFCO® 300 AC CAFCO® 300 HS CAFCO® 3000	Stanhope, NJ Houston, TX San Bernardino, CA	Product-specific, facility-specific Environmental Product Declaration (EPD)
CAFCO® 400 Series	CAFCO® 400 CAFCO® 400 AC	Stanhope, NJ Houston, TX San Bernardino, CA	
FENDOLITE® Series	FENDOLITE® M-II	Stanhope, NJ Houston, TX San Bernardino, CA	
	FENDOLITE® M-II/P	Stanhope, NJ Houston, TX	
BLAZE-SHIELD® Series	BLAZE-SHIELD® II BLAZE-SHIELD® HP BLAZE-SHIELD® II HS	Huntington, IN	

For more information about the products, including details about the materials that conform to the relevant standards, visit <https://www.isolatek.com/construction/commercial-products/>.

Table 2. Other product information

Transparency Report name	CSI MasterFormat® classification	Application	Product specification
CAFCO® 300 Series Products	07 81 00	CAFCO 300 Series products are durable, gypsum based, wet mix, commercial density Spray-Applied Fire Resistive Materials (SFRMs) designed to provide fire protection to concealed floor and roof assemblies, steel beams, columns, and joists in building construction projects.	<ul style="list-style-type: none"> • MasterSpec®, Section 078100 - APPLIED FIREPROOFING (AIA) (C300, C300AC, C300HS, C3000) • MasterFormat® 2014, Section 07 81 00 Applied Fireproofing (CSC, CSI) (C300, C300AC, C300HS, C3000) • United Facilities Guide Specification, UFGS 07 81 00 Spray-Applied Fireproofing (USACE, NAVFAC, AFCEC, NASA) (C300, C300AC, C300HS, C3000) • Master Construction Specifications, 07 81 00 Applied Fireproofing (VA) (C300, C300AC, C300HS, C3000) • Code of Federal Regulations, Title 40: Protection of the Environment (EPA) (C300, C300AC, C300HS, C3000) • PBS-P100 Facilities Standards for the Public Buildings Services (GSA) • Factory Mutual Approved (C300, C300HS)
CAFCO® 400 Series Products	07 81 00	CAFCO 400 Series products are Portland cement based, wet mix, medium density Spray-Applied Fire Resistive Materials (SFRMs) designed to provide fire protection for structural steel in commercial and high-rise construction. The durable surface and Portland cement-based formulation make it well suited for applications in either unconditioned or conditioned areas	<ul style="list-style-type: none"> • MasterSpec®, Section 078100 APPLIED FIREPROOFING (AIA) (C400, C400AC) • MasterFormat® 2014, Section 07 81 00 Applied Fireproofing (CSC, CSI) (C400, C400AC) • Unified Facilities Guide Specification, UFGS 07 81 00 Spray-Applied Fireproofing (USACE, NAVFAC, AFCEC, NASA) (C400, C400AC) • Master Construction Specifications, 07 81 00 Applied Fireproofing (VA) (C400, C400AC) • Code of Federal Regulations, Title 40 Protection of the Environment (EPA) (C400, C400AC) • PBS-P100, Facilities Standards for the Public Buildings Services (GSA) (C400, C400AC) • Factory Mutual Approved(C400)
FENDOLITE® Series Products	07 81 00	FENDOLITE® Series products for commercial use are vermiculite and Portland cement based, wet mix, high density Spray-Applied Fire Resistive Materials (SFRMs) designed to provide fire protection to structural columns and beams in exterior environments and interior situations where the highest levels of abrasion resistance and hardness are necessary.	<ul style="list-style-type: none"> • MasterSpec®, Section 078100 - APPLIED FIREPROOFING (AIA) • MasterFormat® 2014, Section 07 81 00 Applied Fireproofing (CSC, CSI) • Unified Facilities Guide Specification, UFGS-07 81 00 Spray-Applied Fireproofing (USACE, NAVFAC, AFCEC, NASA) • Master Construction Specifications, Number 07 81 00 Applied Fireproofing (VA) • Code of Federal Regulations, Title 40: Protection of the Environment (EPA) • PBS-P100 Facilities Standards for the Public Buildings Services (GSA)
BLAZE-SHIELD® Series Products	07 81 00	BLAZE-SHIELD® Series products are Portland cement and mineral wool based applied fireproofing materials available in commercial and medium densities, as well as with high bonding capabilities to satisfy the International Building Code (IBC) bond strength requirement for buildings up to 420 ft in height.	<ul style="list-style-type: none"> • MasterSpec®, Section 078100 APPLIED FIREPROOFING (AIA) • MasterFormat® 2014, Section 07 81 00 Applied Fireproofing (CSC, CSI) • Unified Facilities Guide Specification, UFGS 07 81 00 Spray-Applied Fireproofing (USACE, NAVFAC, AFCEC, NASA) • Master Construction Specifications, 07 80 10 Applied Fireproofing (VA) • Code of Federal Regulations, Title 40 Protection of the Environment (EPA) • PBS-P100 Facilities Standards for the Public Buildings Services (GSA)

2.3. Declared unit

The LCA only covers the cradle-to-installation stage for Isolotek passive fire protection products. According to the Smart EPD PCR Part B, the declared unit in this study was determined to be one metric ton (1,000 kg) of product. The results in this report are expressed in terms of potential impacts per 1,000 kg of product from cradle to installation (A1 - A5).

2.4. System boundary

This section describes the system boundary for the analysis. The system boundary defines which life cycle stages are included and which are excluded.

This LCA's system boundary is from cradle to gate with installation. Therefore, the life cycle activities and related processes shall include all life cycle stage modules from A1-A3 (Production stage) and A4-A5 (Construction stage) as illustrated in

Figure 6.

Table 3. System boundary inclusions and exclusions lists specific inclusions and exclusions for the system boundary. This study follows the modularity principle, where all environmental impacts and potential impacts are declared in the life cycle stage where they can be attributed. It also applies the polluter pays principle, meaning that the environmental burdens associated with waste management processes (e.g., transportation, recycling, landfilling, incineration) are assigned to the product or process that generated the waste.

The environmental impact of capital goods is excluded due to its small contribution compared to the total impacts from raw materials, energy consumption, transportation, and product use or disposal. Also, a production facility may make multiple product lines, each with different volumes and lifespans. Since LCA studies primarily aim to evaluate and improve material selection, process efficiency, and energy use, the inclusion of capital goods can dilute meaningful insights by introducing marginal or irrelevant contributions.

Scope	PRODUCTION STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Extraction and upstream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/Demolition	Transport to waste processing or disposal	Waste processing	Disposal of waste	Reuse, Recovery, Recycling Potential
Cradle to installation	x	x	• x	• x	• x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
				Packaging materials associated (module)													

Figure 6. Applied system boundary

Table 3. System boundary inclusions and exclusions

2.4.1 Production stage (A1-A3)

The production stage starts when raw materials are extracted from nature and ends when the product is packaged and ready to be loaded onto a transport vehicle at the facilities.

The production stage includes three product life cycle modules:

I. Extraction and upstream preprocessing (A1)

- Extraction and processing of raw materials
- Transport of raw materials from extraction/production to manufacturer of components
- Energy consumption for raw material manufacturing

II. Transport to factory (A2)

Included	Excluded
<ul style="list-style-type: none"> ● Raw material extraction for components ● Transport of raw materials/ purchased components to the manufacturing facility ● Processing of raw materials into components (for externally purchased and in-house manufactured) ● Material, manufacture and transport of packaging materials associated with final product ● Packaging of raw materials and their disposal ● Energy production ● Manufacturing scrap and its disposal ● Packaging material and disposal of packaging materials associated with the final product (A5 module) 	<ul style="list-style-type: none"> ● Construction of major capital equipment ● Human labor and employee transport ● Disposal of packaging materials associated with final product ● Building operational energy and water use for office work

- The information module “transport to factory” covers the transport of raw materials and other inputs to the factory and internal transport.

III. Manufacturing (A3)

- Energy and water consumption for product manufacturing
- Product packaging inputs
- Releases to environmental media (air, soil, ground, & surface water)
- Manufacturing waste transportation from plant to disposal sites
- Manufacturing waste disposal/recycling/reuse/energy recovery
- Final product preparation for outbound shipment

2.4.2 Construction stage (A4-A5)

The construction stage includes the following:

I. Transport to the building site (A4)

- The module covers the transportation of the finished product and its packaging to the building site.

II. Product installation (A5)

- Energy and water consumption for product installation
- Total packaging waste materials resulting from on-site waste processing

3. LIFE CYCLE INVENTORY ANALYSIS

This chapter includes an overview of the obtained data and data quality that has been used in this study. A comprehensive life cycle inventory calculation workbook, which catalogs the flows crossing the system boundary and serves as the starting point for life cycle impact assessment, can be found in the appendix.

3.1. Data collection procedures

Primary data was provided by Isolatek representing the supply chain (A1-A2) and manufacturing processes (A3) for the products. Data was collected in a consistent manner and level of detail to ensure high-quality data. All submitted data were checked for quality multiple times on the plausibility of inputs and outputs using mass balance and benchmarking. All questions regarding data, including gaps, outliers, and any inconsistencies, were resolved with Isolatek and their suppliers. Twelve months of data (January 2024 to December 2024) was collected at the manufacturing facilities. The resulting inventory calculations were developed by an analyst at Sustainable Minds and subsequently checked internally.

As the actual distance to each construction site varies, specific primary data for A4 is not available. Therefore, the distribution of SFRMs from the manufacturing gate to construction sites is assumed as 500 km (311 miles) by a single unit truck with an empty backhaul per the Smart EPD PCR Part B section 7.1.7.3.1. The Isolatek SFRMs are wet mix products. The water and energy consumption scenarios for the installation of Isolatek SFRMs are based on the assumptions outlined in Table 4 of the Smart EPD PCR Part B.

Expert judgment was used in selecting appropriate data sets to model the associated activities in this study, including materials and energy, which have been noted in the following sections. Databases adopted in the model include ecoinvent v3.11 and US-EI 2.2 databases. Overall, the quality of the data used in this study is considered to be good and representative of the described systems. All appropriate means were employed to guarantee the data quality and representativeness as described below.

3.2. Primary data and PCR guidelines

Primary data were collected for the A1-A3 modules, and PCR guidelines were used for the A4-A5. Primary data were collected using either direct measurement or the manufacturing facility representative personnel's best engineering estimates based on actual production if measurements were not available or missing.

Production Stage: Data on processing materials and manufacturing the applied fireproofing products were collected in a consistent manner and level of detail to ensure high quality data. All submitted data were checked for quality multiple times on the plausibility of inputs and outputs. All questions regarding data were answered by Isolatek. All product types are manufactured by blending the specified bulking agent with a number of product-specific binders to achieve prescribed fire rating performance in the field. Finished goods are packaged in individual bags, stacked on pallets, and stretch wrapped before delivery to job sites.

For products manufactured at multiple facilities, primary data was collected separately from each location and used individually for product-specific and facility-

specific studies. **Table 4** shows the yearly declared unit production for each Isolotek SFRM product by facility.

- CAFCO® 300 Series, CAFCO® 400 Series, and Fendolite® M-II were produced at three facilities (Stanhope, NJ; Houston, TX; and San Bernardino, CA)
- Fendolite® M-II/P was produced at two facilities (Stanhope, NJ; and Houston, TX).
- CAFCO® BLAZE-SHIELD® series products were exclusively manufactured at the Huntington, IN facility.

Table 4. Annual declared units of SFRM produced per product per facility

Product	Facility location	Production quantity (Declared unit, 1,000 kg)
CAFCO® 300	San Bernardino, CA	█
	Stanhope, NJ	█
	Houston, TX	█
CAFCO® 300 AC	San Bernardino, CA	█
	Stanhope, NJ	█
	Houston, TX	█
CAFCO® 300 HS	San Bernardino, CA	█
	Stanhope, NJ	█
	Houston, TX	█
CAFCO® 3000	San Bernardino, CA	█
	Stanhope, NJ	█
	Houston, TX	█
CAFCO® 400 AC	San Bernardino, CA	█
	Stanhope, NJ	█
	Houston, TX	█
CAFCO® 400	San Bernardino, CA	█
	Stanhope, NJ	█
	Houston, TX	█
FENDOLITE® M-II	San Bernardino, CA	█
	Stanhope, NJ	█
	Houston, TX	█
FENDOLITE® M-II/P	Stanhope, NJ	█
	Houston, TX	█
BLAZE-SHIELD® II	Huntington, IN	█
BLAZE-SHIELD® II HS	Huntington, IN	█
BLAZE-SHIELD® HP	Huntington, IN	█

Installation Stage: Data on product transportation, as well as water and energy use during the installation of SFRMs, were developed in accordance with the guidance provided in the Smart EPD PCR Part B.

- Distribution of SFRMs from the manufacturing gate to the construction site is assumed to be 500 km (311 miles) by a single unit truck with an empty backhaul.
- Water and energy inputs for product installation were modeled based on the parameters outlined in Table 4 of the Smart EPD PCR Part B.

3.2.1. Raw materials acquisition and transportation (A1-A2)

The acquisition of raw materials marks the first stage in the life cycle of spray-applied fireproofing products. Materials such as Portland cement, calcium sulfate, Natural gypsum, vermiculite, calcium carbonate, mica, cellulose, and bentonite clay are produced at the suppliers' facilities and then transported to Isolatek's manufacturing locations in San Bernardino, CA; Stanhope, NJ; Houston, TX; and Huntington, IN. Primary transportation data were collected based on real-world distances from suppliers to facilities and modeled assuming empty backhaul trips.

Table 5 identifies the data sources for LCA inputs.

Table 5. Data sources for LCA inputs

LCA module	Data	Data sources
Extraction and upstream production (A1)	Raw material use	Indirect (calculation)
Transport (A2)	Transportation distances and vehicle types	Direct (facility records)
Manufacturing (A3)	Electricity, natural gas, coke	Indirect (calculation)
	Waste scenario	Direct (facility records)
	Transportation distances and vehicle types for waste treatment	Direct (facility records)
Transport to the building site (A4)	Transportation distances and vehicle	Estimated (PCR)
Installation(A5)	Electricity and water consumption for installation	Estimated (PCR)
	Transportation distances and vehicle types for packaging waste treatment	Estimated (PCR)

The raw material and packaging inputs for the products are detailed in **Tables 6 to 16**. Isolatek incorporates recycled cellulose in the manufacturing of the CAFCO® 300 Series and CAFCO® 400 Series and utilizes recycled Levy slag in the production of BLAZE-SHIELD® Series. The gypsum used as a raw material in SFRM production is manufactured using standard commercial methods, with no flue gas desulfurization (FGD) gypsum included. Isolatek's passive fire protection products do not contain hazardous substances according to the standards or regulations of the Resource Conservation and Recovery Act (RCRA), Subtitle C.

Table 6. CAFCO® 300 raw material inputs per declared unit for all manufacturing plants

Raw material	Means of transportation	San Bernardino, CA		Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance	Mass percentage	Distance
Natural gypsum	Bulk tanker	50-65%	134 km	50-65%	169 km	50-65%	185 km
Natural unexpanded vermiculite	Intermodal	20-30%	3,862 km	20-30%	589 km	20-30%	1,577 km
Calcium carbonate	Bulk tanker	5-8%	100 km	5-8%	245 km	5-8%	415 km
Recycled content (cellulose)	53' dry van	0-7%	2,390 km	0-7%	682 km	0-7%	2,414 km
Bentonite clay	48" rail container	4-7%	830 km	4-7%	290 km	4-7%	2,256 km

Table 7. CAFCO® 300 AC raw material mass per declared unit and associated transportation

Raw material	Means of transportation	San Bernardino, CA		Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance	Mass percentage	Distance
Natural gypsum	Bulk tanker	50-65%	134 km	50-65%	169	50-65%	185
Vermiculite	Intermodal	20-30%	3,862 km	20-30%	589	20-30%	1,577
Calcium carbonate	Bulk tanker	5-8%	100 km	5-8%	245	5-8%	415
Recycled content (cellulose)	53' dry van	0-7%	2,390 km	0-7%	682	0-7%	2,414
Bentonite clay	48" rail container	4-7%	830 km	4-7%	290	4-7%	2,256

Table 8. CAFCO® 300 HS raw material mass per declared unit and associated transportation

Raw material	Means of transportation	San Bernardino, CA		Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance	Mass percentage	Distance
Natural gypsum	Bulk tanker	35-65%	134 km	35-65%	169	35-65%	185
Vermiculite	Intermodal	20-45%	3,862 km	20-45%	589	20-45%	1,577
Calcium carbonate	Bulk tanker	5-12%	100 km	5-12%	245	5-12%	415
Recycled content (cellulose)	53' dry van	0-7%	2,390 km	0-7%	682	0-7%	2,414
Bentonite clay	48" rail container	4-9%	830 km	4-9%	290	4-9%	2,256

Table 9. CAFCO® 3000 raw material mass per declared unit and associated transportation

Raw material	Means of transportation	San Bernardino, CA		Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance	Mass percentage	Distance
Natural gypsum	Bulk tanker	50-65%	134 km	50-65%	169	50-65%	185
Vermiculite	Intermodal	20-30%	3,862 km	20-30%	589	20-30%	1,577
Calcium carbonate	Bulk tanker	5-8%	100 km	5-8%	245	5-8%	415
Recycled content (cellulose)	53' dry van	0-7%	2,390 km	0-7%	682	0-7%	2,414
Bentonite clay	48" rail container	4-6%	830 km	4-6%	290	4-6%	2,256

Table 10. CAFCO® 400 AC raw material mass per declared unit and associated transportation

Raw material	Means of transportation	San Bernardino, CA		Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance	Mass percentage	Distance
Natural gypsum	Bulk tanker	55-65%	134 km	55-65%	169	55-65%	185
Vermiculite	Intermodal	20-30%	3,862 km	20-30%	589	20-30%	1,577
Calcium carbonate	Bulk tanker	5-10%	100 km	5-10%	245	5-10%	415
Recycled content (cellulose)	53' dry van	0-7%	2,390 km	0-7%	682	0-7%	2,414
Bentonite clay	48" rail container	4-6%	830 km	4-6%	290	4-6%	2,256

Table 11. CAFCO® 400 raw material mass per declared unit and associated transportation

Raw material	Means of transportation	San Bernardino, CA		Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance	Mass percentage	Distance
Portland Cement Type 1L10	Bulk tanker	55-65%	195 km	55-65%	92 km	55-65%	301km
Vermiculite	Intermodal	20-30%	3,862 km	20-30%	589 km	20-30%	1,577 km
Calcium carbonate	Bulk tanker	5-10%	100 km	5-10%	245 km	5-10%	415 km
Recycled content (cellulose)	53' dry van	0-7%	2,390 km	0-7%	682 km	0-7%	2,414 km
Bentonite clay	48" rail container	4-6%	830 km	4-6%	290 km	4-6%	2,256 km

Table 12. FENDOLITE® M-II raw material mass per declared unit and associated transportation

Raw material	Means of transportation	San Bernardino, CA		Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance	Mass percentage	Distance
Portland Cement Type 1L10	Bulk tanker	55-65%	195 km	50-65%	92 km	50-65%	301 km
Vermiculite	Intermodal	20-30%	3,862 km	20-30%	589 km	20-30%	1,577 km
Calcium carbonate	Bulk tanker	5-10%	100 km	5-10%	245 km	5-10%	415 km
Mica	53' dry van	5-15%	3,732 km	5-15%	993 km	5-15%	2,179 km

Table 13. FENDOLITE® M-II/P raw material mass per declared unit and associated transportation

Raw material	Means of transportation	Stanhope, NJ		Houston, TX	
		Mass percentage	Distance	Mass percentage	Distance
Portland Cement Type 1L10	Bulk Tanker	55-65%	92 km	50-65%	301 km
Vermiculite	Intermodal	20-30%	589 km	20-30%	1,577 km
Calcium carbonate	Bulk Tanker	5-10%	245 km	5-10%	415 km
Mica	53" Dry Van	5-15%	993 km	5-15%	2,179 km

Table 14. BLAZE-SHIELD® II raw material mass per declared unit and associated transportation

Raw material	Means of transportation	Huntington, IN	
		Mass percentage	Distance
Feldspar	Bulk Tanker	60-70%	164 km
Recycled levy slag	Intermodal	10-20%	224 km
Portland Cement Type 1L10	Bulk Tanker	10-20%	177 km
Plaster of Paris	53" Dry Van	0-3%	225 km

Table 15. BLAZE-SHIELD® II HS raw material mass per declared unit and associated transportation

Raw material	Means of transportation	Huntington, IN	
		Mass percentage	Distance
Feldspar	Bulk Tanker	60-70%	164 km
Recycled levy slag	Intermodal	10-20%	224 km
Portland Cement Type 1L10	Bulk Tanker	10-20%	177 km
Plaster of Paris	53" Dry Van	0-3%	225 km

Table 16. BLAZE-SHIELD® HP raw material mass per declared unit and associated transportation

Raw material	Means of transportation	Huntington, IN	
		Mass percentage	Distance
Feldspar	Bulk Tanker	60-70%	164 km
Recycled levy slag	Intermodal	10-20%	224 km
Portland Cement Type 1L10	Bulk Tanker	10-20%	177 km
Plaster of Paris	53" Dry Van	0-3%	225 km

3.2.2. Manufacturing (A3)

All raw materials are transported to Isolatek facilities. The material input includes recycled content and is considered burden-free, with no additional recycling or energy recovery processes required. The recycling process is treated as closed-loop, as the recycled material retains its original properties without degradation. As a result, no allocation of environmental impacts is necessary. Products are manufactured in the facilities by blending the bulking agent with several product specific binders. The environmental impacts associated with manufacturing processes, including the electricity use for blending and natural gas consumption for heating, have been accounted for in the study. Isolatek facilities do not use any renewable energy contracts to purchase electricity.

Finished goods are then packaged, stacked, and stretch wrapped before being distributed to warehouses and delivered to job sites. No by-products are generated

during the manufacturing process. The output flows from the manufacturing phase are not usable, classified as waste, and 100% of them are sent to landfill. Annual manufacturing inputs and ancillary materials for the products are shown in **Table 17** to **Table 27**. Ancillary materials were provided by Isolatek and are included in the following tables. **Figure 7** illustrates an overview of the product flow.

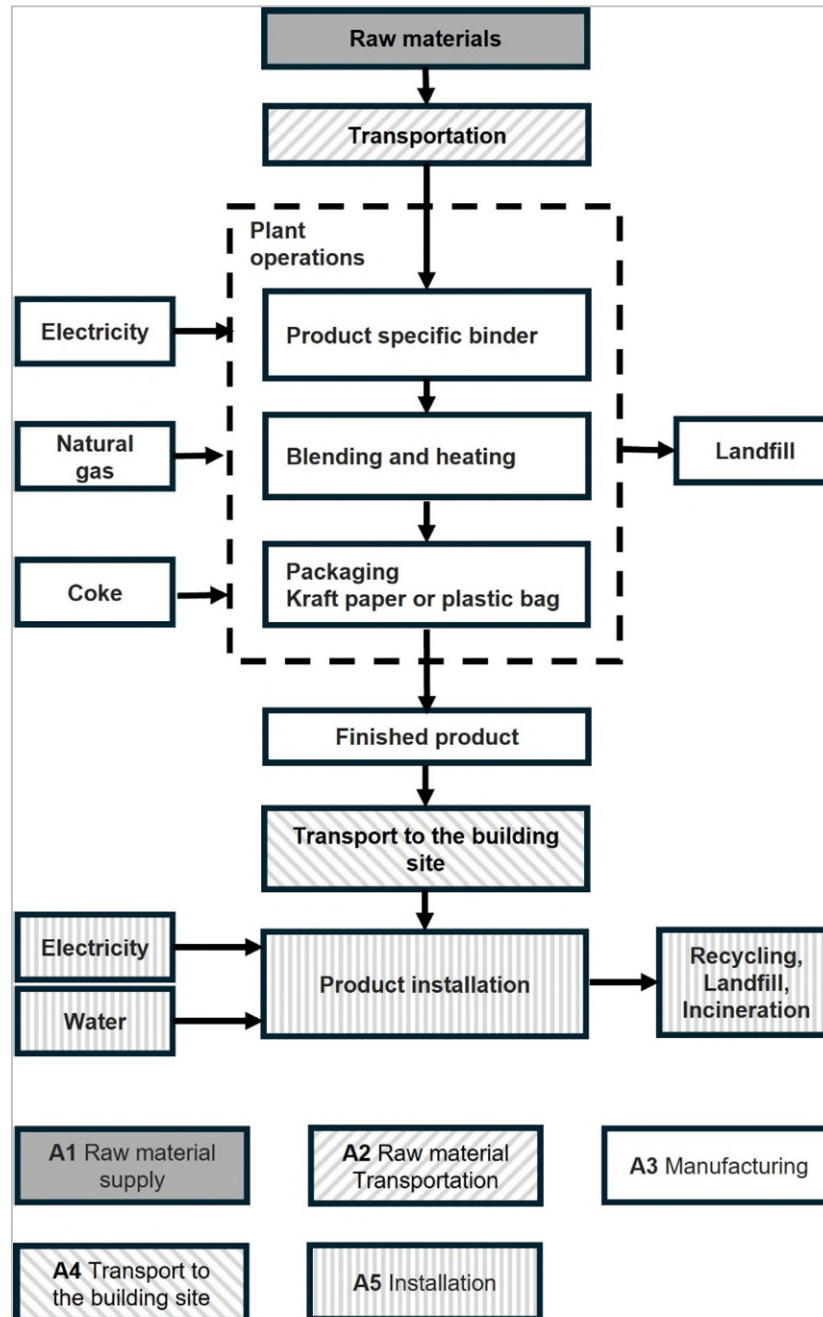


Figure 7. System boundary and product flow diagram of passive fire protection products

Table 17. Annual manufacturing inputs and outputs per declared unit for CAFCO® 300

Raw material	San Bernardino, CA	Stanhope, NJ	Houston, TX
Electricity (kwh)	█	█	█
Natural gas (mmBtu)	█	█	█
Kraft paper packaging (mass percentage)	█	█	█
Shipping distance for packaging material (km)	█	█	█
Vehicle for packaging transport	53' dry van trailers		
Wastes (kg)	█		
Waste disposal	100% landfill		
Waste management transport distance (km)	█	█	█
Vehicle for waste collection and transport	Garbage truck		

Table 18. Annual manufacturing inputs and outputs for CAFCO® 300 AC

Raw material	San Bernardino, CA	Stanhope, NJ	Houston, TX
Electricity (kwh)	█	█	█
Natural gas (mmBtu)	█	█	█
Kraft paper packaging (mass percentage)	█	█	█
Shipping distance for packaging material (km)	█	█	█
Vehicle for packaging transport	53' dry van trailers		
Wastes (kg)	█		
Waste disposal	100% landfill		
Waste management transport distance (km)	█	█	█
Vehicle for waste collection and transport	Garbage truck		

Table 19. Annual manufacturing inputs and outputs for CAFCO® 300 HS

Raw material	San Bernardino, CA	Stanhope, NJ	Houston, TX
Electricity (kwh)	█	█	█
Natural gas (mmBtu)	█	█	█
Kraft paper packaging (mass percentage)	█	█	█
Shipping distance for packaging material (km)	█	█	█
Vehicle for packaging transport	53' dry van trailers		
Wastes (kg)	█		
Waste disposal	100% landfill		
Waste management transport distance (km)	█	█	█
Vehicle for waste collection and transport	Garbage truck		

Table 20. Annual manufacturing inputs and outputs for CAFCO® 3000

Raw material	San Bernardino, CA	Stanhope, NJ	Houston, TX
Electricity (kwh)	█	█	█
Natural gas (mmBtu)	█	█	█
Kraft paper packaging (mass percentage)	█	█	█
Shipping distance for packaging material (km)	█	█	█
Vehicle for packaging transport	53' dry van trailers		
Wastes (kg)	█		
Waste disposal	100% landfill		
Waste management transport distance (km)	█	█	█
Vehicle for waste collection and transport	Garbage truck		

Table 21. Annual manufacturing inputs and outputs for CAFCO® 400 AC

Raw material	San Bernardino, CA	Stanhope, NJ	Houston, TX
Electricity (kwh)	████	████	████
Natural gas (mmBtu)	████	████	████
Kraft paper packaging (mass percentage)	████	████	████
Shipping distance for packaging material (km)	████	████	████
Vehicle for packaging transport	53' dry van trailers		
Wastes (kg)	████		
Waste disposal	100% landfill		
Waste management transport distance (km)	████	████	████
Vehicle for waste collection and transport	Garbage truck		

Table 22. Annual manufacturing inputs and outputs for CAFCO® 400

Raw material	San Bernardino, CA	Stanhope, NJ	Houston, TX
Electricity (kwh)	████	████	████
Natural gas (mmBtu)	████	████	████
Kraft paper packaging (mass percentage)	████	████	████
Shipping distance for packaging material (km)	████	████	████
Vehicle for packaging transport	53' dry van trailers		
Wastes (kg)	████		
Waste disposal	100% landfill		
Waste management transport distance (km)	████	████	████
Vehicle for waste collection and transport	Garbage truck		

Table 23. Annual manufacturing inputs and outputs for FENDOLITE® M-II

Raw material	San Bernardino, CA	Stanhope, NJ	Houston, TX
Electricity (kwh)	████	████	████
Natural gas (mmBtu)	████	████	████
Kraft paper packaging (mass percentage)	████	████	████
Shipping distance for packaging material (km)	████	████	████
Vehicle for packaging transport	53' dry van trailers		
Wastes (kg)	████		
Waste disposal	100% landfill		
Waste management transport distance (km)	████	████	████
Vehicle for waste collection and transport	Garbage truck		

Table 24. Annual manufacturing inputs and outputs for FENDOLITE® M-II/P

Raw material	Stanhope, NJ	Houston, TX
Electricity (kwh)	████	████
Natural gas (mmBtu)	████	████
Kraft paper packaging (mass percentage)	████	████
Shipping distance for packaging material (km)	████	████
Vehicle for packaging transport	53' dry van trailers	
Wastes (kg)	████	
Waste disposal	100% landfill	
Waste management transport distance (km)	████	████
Vehicle for waste collection and transport	Garbage truck	

Table 25. Annual manufacturing inputs and outputs for BLAZE-SHIELD® II

Raw material	Huntington, IN
Electricity (kwh)	████
Natural gas (mmBtu)	████
Coke (kg)	████
Plastic packaging (mass percentage)	████
Shipping distance for packaging material (km)	████
Vehicle for packaging transport	53' dry van trailers
Wastes (kg)	████
Waste disposal	100% landfill
Waste management transport distance (km)	████
Vehicle for waste collection and transport	Garbage truck

Table 26. Annual manufacturing inputs and outputs for BLAZE-SHIELD® II HS

Raw material	Huntington, IN
Electricity (kwh)	████
Natural gas (mmBtu)	████
Coke (kg)	████
Plastic packaging (mass percentage)	████
Shipping distance for packaging material (km)	████
Vehicle for packaging transport	53' dry van trailers
Wastes (kg)	████
Waste disposal	100% landfill
Waste management transport distance (km)	████
Vehicle for waste collection and transport	Garbage truck

Table 27. Annual manufacturing inputs and outputs for BLAZE-SHIELD® HP

Raw material	Huntington, IN
Electricity (kwh)	████
Natural gas (mmBtu)	████
Coke (kg)	████
Plastic packaging (mass percentage)	████
Shipping distance for packaging material (km)	████
Vehicle for packaging transport	53' dry van trailers
Wastes (kg)	████
Waste disposal	100% landfill
Waste management transport distance (km)	████
Vehicle for waste collection and transport	Garbage truck

3.2.3. Transportation to the building site (A4)

Products are packaged in the manufacturing plants and shipped directly to the construction site in the US. The distance to the construction site is estimated based on the guidance provided in the Smart EPD PCR Part B. **Table 28** outlines the key technical information related to the distribution stage (A4) for each product. The distribution of SFRMs from the manufacturing gate to the construction site is assumed to be 500 km (311 miles) by a single unit truck with an empty backhaul.

Table 28. Relevant technical information for distribution (A4)

Name	Value	Unit
Fuel type	Diesel	
Vehicle type	Truck	
Transportation distance		
Transport distance	500	km
Capacity utilization	50	%
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	=1	-
Gross density¹		
CAFCO® 300	240	kg/m ³
CAFCO® 300 AC	240	kg/m ³
CAFCO® 300 HS	240	kg/m ³
CAFCO® 3000	240	kg/m ³
CAFCO® 400 AC	320	kg/m ³
CAFCO® 400	320	kg/m ³
FENDOLITE® M-II	641-705	kg/m ³
FENDOLITE® M-II/P	800-881	kg/m ³
BLAZE-SHIELD® II	240	kg/m ³
BLAZE-SHIELD® II HS	240	kg/m ³
BLAZE-SHIELD® HP	320	kg/m ³

3.2.4. Installation (A5)

At the installation site, SFRMs are unpackaged and installed. All the Isolatek's products in this study are wet mix SFRMs. The material input scenarios, SFRM subcategories, and material output scenarios during the installation stage per declared unit were listed in **Table 29** and **Table 30**. The material input scenarios are based on the parameters outlined in Table 5 of the Smart EPD PCR Part B. BLAZE-SHIELD® II and BLAZE-SHIELD® II HS are classified under the CAFCO 300 SFRM subcategory, as both have a product density of 240 kg/m³. BLAZE-SHIELD® HP is classified under the CAFCO 400 SFRM subcategory, with a product density of 320 kg/m³.

No gasoline or diesel-powered equipment is assumed to be used during installation. Therefore, the net calorific value (i.e., Lower Heating Value, LHV) of fuels is considered to be zero in A5. The potential impact of the blower/sprayer, staples, and tape is assumed to be negligible since their use is spread out over hundreds of bags of product; therefore, they were not included in the model. It is assumed that no on-site combustion activities occur during the installation phase. Upstream emissions associated with electricity generation are accounted for using the U.S. average electricity dataset. In accordance with the Smart EPD PCR Part B, an application loss factor is not included in A5 due to the wide variability in conditions during application.

¹Density data were obtained from the technical data sheets available on the Isolatek website: <https://www.isolatek.com/construction/commercial-products/commercial-density/>

Table 29. Material input scenarios during the installation stage per declared unit (1,000 kg)

Product	SFRM subcategory	Density Class	Water (m ³)	Electricity (kwh)
CAFCO® 300	CAFCO 300	Standard density 15-20 pcf (240 – 320 kg/m ³)	1.377	6.3
CAFCO® 300 AC				
CAFCO® 300 HS				
CAFCO® 3000				
CAFCO® 400 AC	CAFCO 400	Medium density 20-35 pcf (320 – 561 kg/m ³)	1.398	7.3
CAFCO® 400				
FENDOLITE® M-II	Fendolite M-II	High density 35+ pcf (561+ kg/m ³)	0.876	11
FENDOLITE® M-II/P				
BLAZE-SHIELD® II	CAFCO 300	Standard density 15-20 pcf (240 – 320 kg/m ³)	1.377	6.3
BLAZE-SHIELD® II HS				
BLAZE-SHIELD® HP	CAFCO 400	Medium density 20-35 pcf (320 – 561 kg/m ³)	1.398	7.3

Table 30. Material output scenarios during the installation stage per declared unit (1,000 kg)

Product	Facility location	Waste packaging (kg)	Material type	Packaging waste disposal assumptions specified by route ²	Biogenic carbon packaging (kg)
CAFCO® 300	San Bernardino, CA	13.93	Pulp (kraft paper bag)	Recycling 9.01 kg; Landfill 3.96 kg; Incineration 0.96 kg	22.47
	Stanhope, NJ	14.55		Recycling 9.41 kg; Landfill 4.13 kg; Incineration 1.0 kg	23.47
	Houston, TX	12.84		Recycling 8.31 kg; Landfill 3.65 kg; Incineration 0.89 kg	20.72
CAFCO® 300 AC	San Bernardino, CA	14.22		Recycling 9.2 kg; Landfill 4.04 kg; Incineration 0.98 kg	22.94
	Stanhope, NJ	13.59		Recycling 8.79 kg; Landfill 3.86 kg; Incineration 0.94 kg	21.93
	Houston, TX	12.91		Recycling 8.35 kg; Landfill 3.67 kg; Incineration 0.89 kg	20.83
CAFCO® 300 HS	San Bernardino, CA	14.22		Recycling 9.2 kg; Landfill 4.04 kg; Incineration 0.98 kg	22.94
	Stanhope, NJ	21.46		Recycling 13.88 kg; Landfill 6.09 kg; Incineration 1.48 kg	34.62
	Houston, TX	13.18		Recycling 8.53 kg; Landfill 3.74 kg; Incineration 0.91 kg	21.26
CAFCO® 3000	San Bernardino, CA	14.22		Recycling 9.2 kg; Landfill 4.04 kg; Incineration 0.98 kg	22.94
	Stanhope, NJ	13.82		Recycling 8.94 kg; Landfill 3.92 kg; Incineration 0.95 kg	22.30
	Houston, TX	13.18		Recycling 8.53 kg; Landfill 3.74 kg; Incineration 0.91 kg	21.26

² Packaging disposal assumptions for the North American market are based on Table 2 of the Smart EPD PCR Part A.

CAFCO® 400 AC	San Bernardino, CA	14.21	Plastics (plastics bag)	Recycling 9.19 kg; Landfill 4.04 kg; Incineration 0.98 kg	22.93
	Stanhope, NJ	13.75		Recycling 8.90 kg; Landfill 3.91 kg; Incineration 0.95 kg	22.18
	Houston, TX	13.05		Recycling 8.44 kg; Landfill 3.71 kg; Incineration 0.90 kg	21.05
CAFCO® 400	San Bernardino, CA	13.73		Recycling 8.88 kg; Landfill 3.90 kg; Incineration 0.95 kg	22.15
	Stanhope, NJ	13.79		Recycling 8.92 kg; Landfill 3.92 kg; Incineration 0.95 kg	22.25
	Houston, TX	14.03		Recycling 9.08 kg; Landfill 3.98 kg; Incineration 0.97 kg	22.64
FENDOLITE® M-II	San Bernardino, CA	13.31		Recycling 8.61 kg; Landfill 3.78 kg; Incineration 0.92 kg	21.47
	Stanhope, NJ	12.64		Recycling 8.18 kg; Landfill 3.59 kg; Incineration 0.87 kg	20.39
	Houston, TX	14.61		Recycling 9.45 kg; Landfill 4.15 kg; Incineration 1.01 kg	23.57
FENDOLITE® M-II/P	Stanhope, NJ	12.61		Recycling 8.16 kg; Landfill 3.58 kg; Incineration 0.87 kg	20.34
	Houston, TX	14.61		Recycling 9.45 kg; Landfill 4.15 kg; Incineration 1.01 kg	23.57
BLAZE-SHIELD® II	Huntington, IN	3.0		Recycling 0.29 kg; Landfill 2.27 kg; Incineration 0.45 kg	0
BLAZE-SHIELD® II HS	Huntington, IN	3.0	Recycling 0.29 kg; Landfill 2.27 kg; Incineration 0.45 kg	0	
BLAZE-SHIELD® HP	Huntington, IN	3.0	Recycling 0.29 kg; Landfill 2.27 kg; Incineration 0.45 kg	0	

3.2.5. Additional information for biogenic carbon disclosure

This section discloses the biogenic carbon emissions associated with the final product disposal stage (C4). While the impacts from installation and product disposal are out of the scope of this cradle-to-installation study, ISO 21930:2017 requires that biogenic carbon emissions associated with the biogenic carbon content of products disposed are separately reported.

The biogenic carbon removals from packaging in the manufacturing stage (A3) are later accounted for as biogenic carbon emissions from packaging in the installation stage (A5). The biogenic carbon emissions from products in the raw material supply stage (A1) are later accounted for as biogenic carbon emissions from the products in the disposal stage (C4). The biogenic carbon emissions from product for all types of Isolatek products are detailed in **Table 31**.

Table 31. Biogenic carbon emissions from product for the SFRMs

Product	Facility location	Biogenic carbon in C4
CAFCO® 300	San Bernardino, CA	87.78 CO ₂
	Stanhope, NJ	1.39 CO ₂
	Houston, TX	76.63 CO ₂
CAFCO® 300 AC	San Bernardino, CA	89.17 CO ₂
	Stanhope, NJ	1.37 CO ₂
	Houston, TX	76.63 CO ₂
CAFCO® 300 HS	San Bernardino, CA	89.17 CO ₂
	Stanhope, NJ	2.79 CO ₂
	Houston, TX	64.09 CO ₂
CAFCO® 3000	San Bernardino, CA	89.17 CO ₂
	Stanhope, NJ	1.39 CO ₂
	Houston, TX	64.09 CO ₂
CAFCO® 400 AC	San Bernardino, CA	89.17 CO ₂
	Stanhope, NJ	1.39 CO ₂
	Houston, TX	62.70 CO ₂
CAFCO® 400	San Bernardino, CA	86.38 CO ₂
	Stanhope, NJ	1.39 CO ₂
	Houston, TX	68.27 CO ₂
FENDOLITE® M-II	San Bernardino, CA	0 kg CO ₂
	Stanhope, NJ	0 kg CO ₂
	Houston, TX	0 kg CO ₂
FENDOLITE® M-II/P	Stanhope, NJ	0 kg CO ₂
	Houston, TX	0 kg CO ₂
BLAZE-SHIELD® II	Huntington, IN	0 kg CO ₂
BLAZE-SHIELD® II HS	Huntington, IN	0 kg CO ₂
BLAZE-SHIELD® HP	Huntington, IN	0 kg CO ₂

3.3. Background data

This section details the background data sets used for modeling all relevant activities associated with the cradle-to-installation life cycle of passive fire protection products. Each table lists the data set name, database, reference year, and geography. The LCA model was created using SimaPro Craft 10.2 software. The ecoinvent v3.11 and US-EI 2.2 databases provided the life cycle inventory data for the raw materials and processes for modeling the products.

3.3.1. Materials

Data representing upstream and downstream raw materials were obtained from the ecoinvent v3.11 and US-EI 2.2 databases. Data sets matching each transportation mode were found in the available databases. Where country-specific data were unavailable, global or rest-of-world averages were used to represent transportation in those locations. No proxy data sets were chosen in the study. **Table 32** lists the most relevant LCI data sets used in modeling the raw materials.

Table 32. Key material data sets used in inventory analysis

Raw material	Data set	Database	Technology	Reference year	Geography ¹
Natural gypsum Plaster of Paris	Gypsum plasterboard {RoW} gypsum plasterboard production Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	Rest of World (RoW)
Mica Vermiculite	Expanded vermiculite {RoW} expanded vermiculite production Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	Rest of World (RoW)
Calcium Carbonate	Calcium carbonate, precipitated {RoW} calcium carbonate production, precipitated Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	Rest of World (RoW)
Feldspar	Feldspar {RoW} feldspar production Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	Rest of World (RoW)
Bentonite Clay	Bentonite {RoW} bentonite quarry operation Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	Rest of World (RoW)
Portland Cement Type 1L10	Cement, Portland {RoW} cement production, Portland Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	Rest of World (RoW)
Recycled Cellulose	Empty data set	N/A	N/A	N/A	N/A
Recycled Levy Slag	blast furnace slag, Recycled Content cut-off GLO	Ecoinvent v3.11	Appropriate technology	2023	Global
Kraft paper bag	Kraft paper {RoW} kraft paper production Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	Rest of World (RoW)
Plastic bag	Packaging film, low density polyethylene {RoW} production Conseq, U	Ecoinvent v3.11	Appropriate technology	2021	Rest of World (RoW)
Water use	Tap water {RoW} market for tap water Cut-off, U	Ecoinvent v3.11	Appropriate technology	2024	Rest of World (RoW)

3.3.2. Transportation

Average transportation distances and modes of transport are included for the transport of the raw materials to production facilities. Typical vehicles used include trailers and rail cars.

The ecoinvent datasets for transportation vehicles and fuels were used to model transportation. Truck transportation within the United States was modeled using the ecoinvent US truck transportation datasets. The vehicle types, fuel usage, and emissions for these transportation processes were developed based on the US Census Bureau Vehicle Inventory and Use Survey (2002) and US EPA emissions standards for heavy trucks. The truck empty return has been included in the ecoinvent US truck transportation data set.

Table 33. Key transportation datasets used in inventory analysis

Transport mode & legs	Data set	Database	Technology	Reference year	Geography
Bulk tanker	transport, freight, lorry >32 metric ton, EURO4 RoW	Ecoinvent v3.11	Appropriate technology	2024	Rest of World (RoW)
Intermodal freight					
53' Dry van					
48' Rail container	Transport, freight train {US} market for transport, freight train Cut-off, U	Ecoinvent v3.11	Appropriate technology	2024	The U.S.

3.3.3. Fuels and energy

National and regional averages for fuel inputs and electricity grid mixes were obtained from SimaPro. The grid mixes used were the most recent from eGRID for each subregion. For Huntington, IN, the RFCW electric grid is used. For San Bernardino, CA, the CAMX electric grid is used. For Stanhope, NJ, the RFCE

electric grid is used. For Houston, TX, the ERCT electric grid is used. **Table 34** shows the most relevant LCI datasets used in modeling the product systems.

Table 34. Key energy data sets used in inventory analysis

Energy source	Data set	Database	Reference year	Geography
Manufacturing electricity	Electricity mix, eGrid subregion, ERCT/US U	US-EI 2.2	2023	United States
	Electricity mix, eGrid subregion, CAMX/US U	US-EI 2.2	2023	United States
	Electricity mix, eGrid subregion, RFCW/US U	US-EI 2.2	2023	United States
	Electricity mix, eGrid subregion, RFCE/US U	US-EI 2.2	2023	United States
Natural gas for heat production	market for heat, district or industrial, natural gas RoW	Ecoinvent v3.11	2024	Rest of World (RoW)
Coke for heat production	Heat, central or small-scale, other than natural gas {RoW} heat production, hard coal coke, stove 5-15kW Cut-off, U	Ecoinvent v3.11	2024	Rest of World (RoW)

3.3.4. Disposal

Disposal processes were obtained from the ecoinvent v3.11 database. Processes specific to waste types, if available, were selected to correspond to the disposal of facility waste streams, upstream packaging waste, and wastewater treatment.

Table 35 lists the relevant disposal data sets used in the model.

Table 35. Key disposal data sets used in inventory analysis

Disposal activity	Data set	Database	Technology	Reference year	Geography ¹
Road transport for collecting municipal waste	Municipal waste collection service by 21 metric ton lorry {RoW} municipal waste collection service by 21 metric ton lorry Cut-off, U	Ecoinvent v3.11	Appropriate technology	2023	RoW
Landfilled municipal waste	Process-specific burdens, residual material landfill {RoW} market for process-specific burdens, residual material landfill Cut-off, U	Ecoinvent v3.11	Appropriate technology	2024	RoW
Waste paper incineration	Waste paperboard {GLO} treatment of waste paperboard, municipal incineration Cut-off, U	Ecoinvent v3.11	Appropriate technology	2024	Global
Waste paper landfill	Waste paperboard {RoW} treatment of waste paperboard, sanitary landfill Cut-off, U	Ecoinvent v3.11	Appropriate technology	2024	RoW
Waste plastic incineration	Waste plastic, mixture {RoW} treatment of waste plastic, mixture, municipal incineration Cut-off, U	Ecoinvent v3.11	Appropriate technology	2024	RoW
Waste plastic landfill	Waste plastic, mixture {RoW} treatment of waste plastic, mixture, sanitary landfill Cut-off, U	Ecoinvent v3.11	Appropriate technology	2024	RoW

3.4. Cut-off criteria

The cut-off criteria on a unit process level can be summarized as follows:

- All inputs and outputs to a (unit) process shall be included in the calculation of the pre-set parameters results, for which data are available. Data gaps shall be filled by conservative assumptions with average, generic or proxy data. Any assumptions for such choices shall be documented. Assumptions and proxies, whenever used, have been explained in this report.
- Mass – If a flow is less than 1% of the cumulative mass of the model it may be excluded, providing its environmental relevance is not a concern. Select mass flows have been omitted in this study where they were deemed environmentally irrelevant.
- Energy – If a flow is less than 1% of the cumulative energy of the model it may be excluded, providing its environmental relevance is not a concern. No known energy flow has been omitted in this study.
- Environmental relevance – If a flow meets the above criteria for exclusion, yet it is thought to potentially have a significant environmental impact, it is included. No hazardous materials were omitted in this study.
- Hazardous and toxic materials – The study shall include all hazardous and toxic materials in the inventory therefore the cutoff rules shall not apply to such substances. No substances required to be reported as hazardous were omitted in this study.
- The sum of the neglected material flows does not exceed 5% of mass, energy or environmental relevance for flows indirectly related to the process (e.g., operating materials).

In this report, no known flows or processes are deliberately excluded; therefore, these criteria have been met. The completeness of the bill of materials defined in this report satisfies the above-defined cut-off criteria.

3.5. Allocation

Whenever a system boundary is crossed, environmental inputs and outputs have to be assigned to the different products. Where multi-inputs or multi-outputs are considered, the same applies. The PCR prescribes to report where and how allocation occurs in the modeling of the LCA.

The model used in this report ensures that the sum of the allocated inputs and outputs of a unit process are equal to the inputs and outputs of the unit process before allocation. This means that no double counting or omissions of inputs or outputs through allocation is occurring.

The Isolatek manufacturing facilities included in this report all produce multiple products. Since only facility level data were available, allocation among a facility's co-products was necessary to determine the input and output flows associated with each product. Allocation of materials and energy was done on a mass basis for all products. Allocation of transportation was based on the weight of the outputs for the products from each facility.

3.6. Discussion of data quality

Inventory data quality is judged by its precision (measured, calculated, or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied on a study serving as a data source), and representativeness (geographical, temporal, and technological).

To cover these requirements and to ensure reliable results, first-hand industry data in combination with consistent background LCA information from the ecoinvent v3.11, and US-EI 2.2 databases were used.

Precision and completeness

- *Precision:* As the relevant foreground data is primary data or modeled based on primary information sources of the owner of the technology, precision is considered to be high. Background data are from the ecoinvent v3.11 and US-EI 2.2 databases with documented precision to the extent available.
- *Completeness:* Sustainable Minds worked with Isolatek and its manufacturing partners to obtain a comprehensive set of primary data associated with the manufacturing processes. The product system was checked for mass balance and completeness of the inventory. The data set was considered complete based on our understanding of the manufacturing site and a review with key stakeholders on the Isolatek team, and cut-off criteria were observed consistent with those prescribed in the PCR. Besides capital equipment, no data was knowingly omitted.

Consistency and reproducibility

- *Consistency:* Primary data were collected with a similar level of detail, while background data were sourced primarily from the ecoinvent database. Other databases were used if data were not available in ecoinvent or the data set was judged to be more representative. Other methodological choices were made consistently throughout the model.
- *Reproducibility:* Reproducibility is warranted as much as possible through the disclosure of input-output data, data set choices, and modeling approaches in this report. Based on this information, a knowledgeable third party should be able to approximate the results of this study using the same data and modeling approaches.

Representativeness

- *Temporal:* All primary data were collected for January 2024 to December 2024, ensuring the representativeness of the manufacturing process. Secondary data were obtained from the ecoinvent v3.11 and US-EI 2.2 databases and are typically representative of recent years.
- *Geographical:* The geographical coverage for this study is based on United States system boundaries for all processes and products. Whenever US background data was not readily available, rest of world (non-Europe) data or global data were used. Input and output data for modeling come from the manufacturing facility which is responsible for production.
- *Technological:* All primary and secondary data were modeled to be specific to the technologies under study. Technological representativeness is considered to be high.

3.7. Comparability

ISO 21930:2017 section 5.5 highlights the following limitations and clarifications in EPD comparability: EPDs are comparable only if they use the same PCR (or sub-category PCR where applicable), include all relevant information modules, and are based on equivalent scenarios with respect to the context of construction works.

EPDs can only be compared when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 section 5.5 are met. However, variations and deviations are possible. For example, different LCA software and background LCI data sets may lead to different results for the life cycle stages declared.

The environmental impact results of products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

3.8. Liability and ownership

- The EPD owner has sole ownership, liability, and responsibility for the EPD.

3.9. Assumptions and limitations

A life cycle assessment of a product system is broad and complex, and it inherently requires assumptions and simplifications. The following assumptions and limitations of the study should be recognized:

- Primary data were modeled based on the information provided by Isolatek. The data covers annual manufacturing data from January 2024 to December 2024 from four manufacturing facilities.
- US background data were used whenever possible, with European or global data substituted as proxies as necessary.
- An empty dataset is used for the recycled cellulose ingredient.
- 1,000 kg of SFRM is assumed to be considered the declared unit in the study, although the studied products are not typically produced to this size.
- Generic data sets used for material inputs, transportation, and waste processing are considered good quality, but actual impacts from material suppliers, transport carriers, and local waste processing may vary.
- The impact assessment methodology categories do not represent all possible environmental impact categories.
- Characterization factors used within the impact assessment methodology may contain varying levels of uncertainty.
- LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.
- Data required to calculate the energy efficiency (R1 factor) of waste incineration plants were not available.

4. IMPACT ASSESSMENT METHODS

4.1. Impact assessment characterization

The environmental indicators as required by the PCR are included as well as other indicators required to use the SM2013 Methodology [6]. The impact indicators are derived using the 100-year time horizon³ factors, where relevant, as defined by TRACI 2.2 classification and characterization [7]. Long-term emissions (>100 years) are not taken into consideration in the impact estimate (see **Table 36**). USEtox indicators⁴ are used to evaluate toxicity. Emissions from waste disposal are considered part of the product system under study, according to the “polluter pays principle”.

Table 36. Selected impact categories and units

Impact category	Unit	Description
Acidification	kg SO ₂ eq (sulphur dioxide)	Acidification processes increase the acidity of water and soil systems and causes damage to lakes, streams, rivers and various plants and animals as well as building materials, paints, and other human-built structures.
Ecotoxicity	CTUe	Ecotoxicity causes negative impacts to ecological receptors and, indirectly, to human receptors through the impacts to the ecosystem.
Freshwater eutrophication	kg P eq	Freshwater eutrophication is the enrichment of an aquatic ecosystem with nutrients (phosphates) that accelerate biological productivity (growth of algae and weeds) and an undesirable accumulation of algal biomass.
Global warming (GWP 100)	kg CO ₂ eq (carbon dioxide)	Global warming is an average increase in the temperature of the atmosphere near the Earth’s surface and in the troposphere.
Ozone depletion	kg CFC-11 eq	Ozone depletion is the reduction of ozone in the stratosphere caused by the release of ozone depleting chemicals.
Carcinogenics	CTUh	Carcinogens have the potential to form cancers in humans.
Non-carcinogenics	CTUh	Non-Carcinogens have the potential to causes non-cancerous adverse impacts to human health.
Respiratory effects	kg PM _{2.5} eq (fine particulates)	Particulate matter concentrations have a strong influence on chronic and acute respiratory symptoms and mortality rates.
Smog	kg O ₃ eq (ozone)	Smog formation (photochemical oxidant formation) is the formation of ozone molecules in the troposphere by complex chemical reactions.
Marine eutrophication	kg N eq	Marine eutrophication is the enrichment of an aquatic ecosystem with nutrients (nitrogen, ammonia, and nitrogen oxides) that accelerate biological productivity and an undesirable accumulation of algal biomass in marine environments..

With respect to global warming potential, biogenic carbon is included in impact category calculations. The biogenic carbon measured in this study originates from packaging materials, particleboard, and high-pressure laminate board. Greenhouse gas emissions from land-use change are expected to be insignificant and were not reported. Carbon emissions during carbonation and calcination were also considered in this study, and no carbonation or calcination is expected to occur

³ The 100-year period relates to the period in which the environmental impacts are modeled. This is different from the time period of the declared unit. The two periods are related as follows: all environmental impacts that are created in the period of the declared unit are modeled through life cycle impact assessment using a 100-year time horizon to understand the impacts that take place.

⁴ USEtox is available in TRACI and at <http://www.usetox.org/>

during the production and manufacture of the cubicles. No delayed emissions from a temporary carbon sequestration are expected to occur.

It shall be noted that the above impact categories represent impact potentials. They are approximations of environmental impacts that could occur if the emitted molecules follow the underlying impact pathway and meet certain conditions in the receiving environment while doing so. In addition, the inventory only captures that fraction of the total environmental load that corresponds to the chosen declared unit (relative approach).

The results from the impact assessment indicate potential environmental effects and do not predict actual impacts on category endpoints, the exceedance of thresholds, or safety margins or risks.

4.2. Normalization and weighting

To arrive at a single score indicator, normalization [8] and weighting [9] as shown in **Table 37** conforming to the SM 2013 Methodology were applied. The SM 2013 Methodology uses TRACI 2.1 impact categories developed by U.S. EPA, and North American normalization and weighting values developed by EPA and NIST respectively, to calculate single figure LCA results. Sustainable Minds recognizes that weighting is socially defined based on the importance that society attaches to the different environmental impact categories. However, these single score indicators serve as an easy starting point to get to know the product under consideration across all impact categories, rather than focusing all efforts on just one impact category (like global warming potential). The interpretation of the results starts with the Sustainable Minds single score results and then allows users to further explore the underlying impact categories individually. Details including the characterization models, factors, and methods used, including all assumptions and limitations, can be found in the SM 2013 Methodology Report [6].

Table 37. Normalization and weighting factors

Impact category	Normalization	Weighting (%)
Acidification	90.9	3.6
Ecotoxicity	11000	8.4
Eutrophication	21.6	7.2
Global warming	24200	34.9
Ozone depletion	0.161	2.4
Carcinogenics	5.07E-05	9.6
Non-carcinogenics	1.05E-03	6.0
Respiratory effects	24.3	10.8
Smog	1390	4.8
Fossil fuel depletion	17300	12.1

5. ASSESSMENT AND INTERPRETATION

This chapter includes the results from the LCA for the products studied. It details the results per declared unit, outlines the sensitivity analysis, and concludes with recommendations.

5.1. Data quality assessment

The quality of inventory data is evaluated based on its precision, completeness, consistency, and representativeness. The data used in this study is regarded as reliable and representative of the described systems, as well as their geographical, temporal, and technological contexts. When direct measurements were unavailable, the best engineering estimates based on actual production were applied. Every effort was made to ensure the highest data quality.

5.2. Resource use and waste flows

Resource use indicators, output flows and waste category indicators, and carbon emissions and removals are presented in this section. These life cycle inventory (LCI) indicators reflect the flows from and to nature for the product system, prior to characterization using an impact assessment methodology to calculate life cycle impact assessment (LCIA) results (as shown in section 5.3).

LCI flows were calculated with the help of American Center for Life Cycle Assessment's (ACLCA) guidance for calculating the ISO 21930:2017 metrics [10]. The consumption of freshwater indicator, which was calculated in accordance with this guidance, is reported in compliance with ISO 14046. Use of renewable and non-renewable energy resources with energy content were calculated using the Cumulative Energy Demand (LHV) impact assessment methodology [11]. Abiotic depletion potential was calculated using the CML impact assessment methodology [12]. LCI flows were reported in conformance to ISO 21930:2017.

Resource use indicators represent the amount of materials consumed to produce not only the product itself but also the raw materials, electricity, natural gas, etc. that go into the product's life cycle.

Primary energy is an energy form found in nature that has not been subjected to any conversion or transformation process and is expressed in energy demand from renewable and non-renewable resources. Efficiencies in energy conversion are considered when calculating primary energy demand from process energy consumption. Water use represents the total water used over the entire life cycle. No renewable energy was used in production beyond that accounted for in the eGRID datasets, and no energy was recovered.

Hazardous and non-hazardous wastes are calculated based on the amount of waste generated during the life cycle of each product studied, mainly during the manufacturing of the products. All waste treatments in models were considered based on the real facility activities. Waste treatments included within the system boundary are reported. Unrecyclable wastes are either disposed of in landfills or incinerated. **Table 38** represents all the resource use and waste flow indicators, with the acronyms used, evaluated in this study.

Table 38. Resource use and waste flow indicators

Indicators	Acronyms used
<i>Resource use indicators</i>	
Renewable primary energy used as energy carrier (fuel)	RPR _E
Renewable primary resources with energy content used as material	RPR _M
Total use of renewable primary resources with energy content	RPR _{total}
Non-renewable primary resources used as an energy carrier (fuel)	NRPR _E
Non-renewable primary resources with energy content used as material	NRPR _M
Total use of non-renewable primary resources with energy content	NRPR _{total}
Secondary materials	SM
Renewable secondary fuels	RSF
Non-renewable secondary fuels	NRSF
Recovered energy	RE
Use of net fresh water resources	FW
Abiotic depletion potential for fossil resources	ADP _{fossil}
<i>Output flows and waste category indicators</i>	
Hazardous waste disposed	HWD
Non-hazardous waste disposed	NHWD
High-level radioactive waste, conditioned, to final repository	HLRW
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW
Components for re-use	CRU
Materials for recycling	MR
Materials for energy recovery	MER
Exported energy	EE
<i>Carbon emissions and removals</i>	
Biogenic Carbon Removal from Product	BCRP
Biogenic Carbon Emission from Product	BCEP
Biogenic Carbon Removal from Packaging	BCRK
Biogenic Carbon Emission from Packaging	BCEK
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	BCEW
Calcination Carbon Emissions	CCE
Carbonation Carbon Removals	CCR
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	CWNR

Resource use, output flows, waste categories, and carbon emissions & removals for Isolatek passive fire protection products have been tabulated in the sections below.

5.2.1. CAFCO® 300

5.2.1.1 San Bernardino, CA

Table 39. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.21E+02	2.79E+00	5.59E+02	1.09E+00	7.90E+00	1.29E+03
RPR _M	MJ, NCV	8.31E+02	0.00E+00	8.03E+02	0.00E+00	0.00E+00	1.63E+03
RPR _{total}	MJ, NCV	1.55E+03	2.79E+00	1.36E+03	1.09E+00	7.90E+00	2.93E+03
NRPR _E	MJ, NCV	3.60E+03	1.48E+03	9.49E+02	5.74E+02	7.56E+01	6.68E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.60E+03	1.48E+03	9.49E+02	5.74E+02	7.56E+01	6.68E+03
SM	kg	6.30E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.30E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.21E+01	1.09E+00	3.74E+00	4.28E-01	1.07E+00	3.84E+01
ADP _{fossil}	MJ, NCV	3.20E+03	1.38E+03	7.76E+02	5.39E+02	5.24E+01	5.95E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.39E+01	3.39E+01
HLRW	kg	6.99E-04	1.90E-05	2.93E-04	7.41E-06	6.25E-05	1.08E-03
ILLRW	kg	1.85E-03	3.99E-05	6.55E-04	1.56E-05	2.15E-04	2.78E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-8.78E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.78E+01
BCEP	kg CO ₂	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	-2.24E+01	0.00E+00	0.00E+00	-2.24E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.24E+01	2.24E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.1.2 Stanhope, NJ

Table 40. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	8.04E+02	7.78E-01	4.90E+02	1.09E+00	7.90E+00	1.30E+03
RPR _M	MJ, NCV	1.32E+01	0.00E+00	8.41E+02	0.00E+00	0.00E+00	8.54E+02
RPR _{total}	MJ, NCV	8.17E+02	7.78E-01	1.33E+03	1.09E+00	7.90E+00	2.16E+03
NRPR _E	MJ, NCV	4.08E+03	4.11E+02	1.43E+03	5.74E+02	7.57E+01	6.57E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	4.08E+03	4.11E+02	1.43E+03	5.74E+02	7.57E+01	6.57E+03
SM	kg	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.44E+01	3.10E-01	4.39E+00	4.33E-01	1.06E+00	4.06E+01
ADP _{fossil}	MJ, NCV	3.62E+03	3.85E+02	1.03E+03	5.39E+02	5.25E+01	5.63E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.46E+01	3.46E+01
HLRW	kg	7.85E-04	5.30E-06	8.86E-04	7.41E-06	6.25E-05	1.75E-03
ILLRW	kg	2.07E-03	1.11E-05	1.98E-03	1.56E-05	2.15E-04	4.29E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-1.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.39E+00
BCEP	kg CO ₂	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	-2.35E+01	0.00E+00	0.00E+00	-2.35E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E+01	2.35E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.1.3 Houston, TX

Table 41. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.48E+02	1.58E+00	4.59E+02	1.09E+00	7.90E+00	1.22E+03
RPR _M	MJ, NCV	7.25E+02	0.00E+00	7.42E+02	0.00E+00	0.00E+00	1.47E+03
RPR _{total}	MJ, NCV	1.47E+03	1.58E+00	1.20E+03	1.09E+00	7.90E+00	2.68E+03
NRPR _E	MJ, NCV	3.66E+03	8.40E+02	1.10E+03	5.74E+02	7.55E+01	6.24E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.66E+03	8.40E+02	1.10E+03	5.74E+02	7.55E+01	6.24E+03
SM	kg	5.50E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.50E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.31E+01	6.06E-01	4.00E+00	4.36E-01	1.06E+00	3.92E+01
ADP _{fossil}	MJ, NCV	3.24E+03	7.88E+02	9.36E+02	5.39E+02	5.23E+01	5.56E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.28E+01	3.28E+01
HLRW	kg	7.29E-04	1.08E-05	2.04E-04	7.41E-06	6.25E-05	1.01E-03
ILLRW	kg	1.93E-03	2.26E-05	4.58E-04	1.56E-05	2.15E-04	2.64E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-7.66E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.66E+01
BCEP	kg CO ₂	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	-2.07E+01	0.00E+00	0.00E+00	-2.07E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.07E+01	2.07E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.2. CAFCO® 300 AC

5.2.2.1 San Bernardino, CA

Table 42. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.36E+02	2.83E+00	5.73E+02	1.09E+00	7.90E+00	1.32E+03
RPR _M	MJ, NCV	8.44E+02	0.00E+00	8.21E+02	0.00E+00	0.00E+00	1.67E+03
RPR _{total}	MJ, NCV	1.58E+03	2.83E+00	1.39E+03	1.09E+00	7.90E+00	2.99E+03
NRPR _E	MJ, NCV	3.67E+03	1.50E+03	9.69E+02	5.74E+02	7.57E+01	6.79E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.67E+03	1.50E+03	9.69E+02	5.74E+02	7.57E+01	6.79E+03
SM	kg	6.40E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.40E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.24E+01	1.09E+00	3.75E+00	4.21E-01	1.06E+00	3.87E+01
ADP _{fossil}	MJ, NCV	3.26E+03	1.40E+03	7.91E+02	5.39E+02	5.25E+01	6.05E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.42E+01	3.42E+01
HLRW	kg	7.14E-04	1.93E-05	3.03E-04	7.41E-06	6.25E-05	1.11E-03
ILLRW	kg	1.89E-03	4.05E-05	6.76E-04	1.56E-05	2.15E-04	2.83E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-8.92E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.92E+01
BCEP	kg CO ₂	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	-2.29E+01	0.00E+00	0.00E+00	-2.29E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E+01	2.29E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.2.2 Stanhope, NJ

Table 43. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 AC produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.52E+02	7.45E-01	4.59E+02	1.09E+00	7.90E+00	1.22E+03
RPR _M	MJ, NCV	1.32E+01	0.00E+00	7.85E+02	0.00E+00	0.00E+00	7.98E+02
RPR _{total}	MJ, NCV	7.65E+02	7.45E-01	1.24E+03	1.09E+00	7.90E+00	2.02E+03
NRPR _E	MJ, NCV	3.84E+03	3.95E+02	1.40E+03	5.74E+02	7.56E+01	6.28E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.84E+03	3.95E+02	1.40E+03	5.74E+02	7.56E+01	6.28E+03
SM	kg	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.33E+01	2.94E-01	4.24E+00	4.35E-01	1.06E+00	3.93E+01
ADP _{fossil}	MJ, NCV	3.41E+03	3.70E+02	1.01E+03	5.39E+02	5.24E+01	5.38E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.36E+01	3.36E+01
HLRW	kg	7.34E-04	5.09E-06	8.45E-04	7.41E-06	6.25E-05	1.65E-03
ILLRW	kg	1.94E-03	1.07E-05	1.89E-03	1.56E-05	2.15E-04	4.07E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-1.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.39E+00
BCEP	kg CO ₂	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	-2.19E+01	0.00E+00	0.00E+00	-2.19E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E+01	2.19E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.2.3 Houston, TX

Table 44. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 AC produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.52E+02	1.57E+00	4.61E+02	1.09E+00	7.90E+00	1.22E+03
RPR _M	MJ, NCV	7.25E+02	0.00E+00	7.46E+02	0.00E+00	0.00E+00	1.47E+03
RPR _{total}	MJ, NCV	1.48E+03	1.57E+00	1.21E+03	1.09E+00	7.90E+00	2.69E+03
NRPR _E	MJ, NCV	3.68E+03	8.37E+02	9.38E+02	5.74E+02	7.55E+01	6.10E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.68E+03	8.37E+02	9.38E+02	5.74E+02	7.55E+01	6.10E+03
SM	kg	5.50E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.50E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.33E+01	6.07E-01	3.84E+00	4.36E-01	1.06E+00	3.92E+01
ADP _{fossil}	MJ, NCV	3.26E+03	7.86E+02	7.94E+02	5.39E+02	5.23E+01	5.43E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.29E+01	3.29E+01
HLRW	kg	7.33E-04	1.08E-05	2.04E-04	7.41E-06	6.25E-05	1.02E-03
ILLRW	kg	1.94E-03	2.25E-05	4.56E-04	1.56E-05	2.15E-04	2.65E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-7.66E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.66E+01
BCEP	kg CO ₂	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	-2.08E+01	0.00E+00	0.00E+00	-2.08E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E+01	2.08E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.3. CAFCO® 300 HS

5.2.3.1 San Bernardino, CA

Table 45. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 HS produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.36E+02	2.83E+00	5.72E+02	1.09E+00	7.90E+00	1.32E+03
RPR _M	MJ, NCV	8.44E+02	0.00E+00	8.21E+02	0.00E+00	0.00E+00	1.67E+03
RPR _{total}	MJ, NCV	1.58E+03	2.83E+00	1.39E+03	1.09E+00	7.90E+00	2.99E+03
NRPR _E	MJ, NCV	3.67E+03	1.50E+03	9.69E+02	5.74E+02	7.56E+01	6.79E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.67E+03	1.50E+03	9.69E+02	5.74E+02	7.56E+01	6.79E+03
SM	kg	6.40E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.40E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.24E+01	1.09E+00	3.74E+00	4.21E-01	1.06E+00	3.87E+01
ADP _{fossil}	MJ, NCV	3.26E+03	1.40E+03	7.91E+02	5.39E+02	5.24E+01	6.05E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.42E+01	3.42E+01
HLRW	kg	7.14E-04	1.93E-05	3.03E-04	7.41E-06	6.25E-05	1.11E-03
ILLRW	kg	1.89E-03	4.05E-05	6.76E-04	1.56E-05	2.15E-04	2.83E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-8.92E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.92E+01
BCEP	kg CO ₂	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	-2.29E+01	0.00E+00	0.00E+00	-2.29E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E+01	2.29E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.3.2 Stanhope, NJ

Table 46. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 HS produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	5.67E+02	9.62E-01	7.25E+02	1.09E+00	7.92E+00	1.30E+03
RPR _M	MJ, NCV	2.64E+01	0.00E+00	1.24E+03	0.00E+00	0.00E+00	1.27E+03
RPR _{total}	MJ, NCV	5.94E+02	9.62E-01	1.96E+03	1.09E+00	7.92E+00	2.57E+03
NRPR _E	MJ, NCV	3.80E+03	5.09E+02	1.98E+03	5.74E+02	7.64E+01	6.94E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.80E+03	5.09E+02	1.98E+03	5.74E+02	7.64E+01	6.94E+03
SM	kg	2.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.02E+01	4.25E-01	6.37E+00	4.86E-01	1.16E+00	3.87E+01
ADP _{fossil}	MJ, NCV	3.41E+03	4.78E+02	1.39E+03	5.39E+02	5.31E+01	5.88E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	2.15E+01	4.15E+01
HLRW	kg	5.76E-04	6.57E-06	1.33E-03	7.41E-06	6.26E-05	1.98E-03
ILLRW	kg	1.49E-03	1.38E-05	2.96E-03	1.56E-05	2.15E-04	4.70E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-2.79E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.79E+00
BCEP	kg CO ₂	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	-3.46E+01	0.00E+00	0.00E+00	-3.46E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.46E+01	3.46E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.3.3 Houston, TX

Table 47. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 300 HS produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.68E+02	1.52E+00	4.70E+02	1.09E+00	7.90E+00	1.25E+03
RPR _M	MJ, NCV	6.07E+02	0.00E+00	7.61E+02	0.00E+00	0.00E+00	1.37E+03
RPR _{total}	MJ, NCV	1.37E+03	1.52E+00	1.23E+03	1.09E+00	7.90E+00	2.62E+03
NRPR _E	MJ, NCV	3.75E+03	8.11E+02	9.40E+02	5.74E+02	7.56E+01	6.15E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.75E+03	8.11E+02	9.40E+02	5.74E+02	7.56E+01	6.15E+03
SM	kg	4.60E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.38E+01	5.91E-01	3.88E+00	4.35E-01	1.06E+00	3.98E+01
ADP _{fossil}	MJ, NCV	3.32E+03	7.61E+02	7.96E+02	5.39E+02	5.24E+01	5.47E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.32E+01	3.32E+01
HLRW	kg	7.48E-04	1.05E-05	2.05E-04	7.41E-06	6.25E-05	1.03E-03
ILLRW	kg	1.98E-03	2.18E-05	4.58E-04	1.56E-05	2.15E-04	2.69E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-6.41E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.41E+01
BCEP	kg CO ₂	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	-2.13E+01	0.00E+00	0.00E+00	-2.13E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+01	2.13E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.4. CAFCO® 3000

5.2.4.1 San Bernardino, CA

Table 48. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 3000 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.36E+02	2.83E+00	5.72E+02	1.09E+00	7.90E+00	1.32E+03
RPR _M	MJ, NCV	8.44E+02	0.00E+00	8.21E+02	0.00E+00	0.00E+00	1.67E+03
RPR _{total}	MJ, NCV	1.58E+03	2.83E+00	1.39E+03	1.09E+00	7.90E+00	2.99E+03
NRPR _E	MJ, NCV	3.67E+03	1.50E+03	8.10E+02	5.74E+02	7.57E+01	6.63E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.67E+03	1.50E+03	8.10E+02	5.74E+02	7.57E+01	6.63E+03
SM	kg	6.40E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.40E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.24E+01	1.09E+00	3.57E+00	4.21E-01	1.06E+00	3.86E+01
ADP _{fossil}	MJ, NCV	3.26E+03	1.40E+03	6.48E+02	5.39E+02	5.25E+01	5.90E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.42E+01	3.42E+01
HLRW	kg	7.14E-04	1.93E-05	3.02E-04	7.41E-06	6.25E-05	1.10E-03
ILLRW	kg	1.89E-03	4.05E-05	6.73E-04	1.56E-05	2.15E-04	2.83E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-8.92E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.92E+01
BCEP	kg CO ₂	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	-2.29E+01	0.00E+00	0.00E+00	-2.29E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E+01	2.29E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.4.2 Stanhope, NJ

Table 49. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 3000 produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.64E+02	7.53E-01	4.65E+02	1.09E+00	7.90E+00	1.24E+03
RPR _M	MJ, NCV	1.32E+01	0.00E+00	7.98E+02	0.00E+00	0.00E+00	8.12E+02
RPR _{total}	MJ, NCV	7.78E+02	7.53E-01	1.26E+03	1.09E+00	7.90E+00	2.05E+03
NRPR _E	MJ, NCV	3.89E+03	3.98E+02	9.20E+02	5.74E+02	7.56E+01	5.86E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.89E+03	3.98E+02	9.20E+02	5.74E+02	7.56E+01	5.86E+03
SM	kg	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.38E+01	2.98E-01	3.76E+00	4.35E-01	1.06E+00	3.94E+01
ADP _{fossil}	MJ, NCV	3.46E+03	3.74E+02	5.82E+02	5.39E+02	5.24E+01	5.01E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.38E+01	3.38E+01
HLRW	kg	7.46E-04	5.14E-06	8.43E-04	7.41E-06	6.25E-05	1.66E-03
ILLRW	kg	1.97E-03	1.08E-05	1.88E-03	1.56E-05	2.15E-04	4.09E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-1.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.39E+00
BCEP	kg CO ₂	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	-2.23E+01	0.00E+00	0.00E+00	-2.23E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.23E+01	2.23E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.4.3 Houston, TX

Table 50. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 3000 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.68E+02	1.52E+00	4.71E+02	1.09E+00	7.90E+00	1.25E+03
RPR _M	MJ, NCV	6.07E+02	0.00E+00	7.61E+02	0.00E+00	0.00E+00	1.37E+03
RPR _{total}	MJ, NCV	1.37E+03	1.52E+00	1.23E+03	1.09E+00	7.90E+00	2.62E+03
NRPR _E	MJ, NCV	3.75E+03	8.11E+02	1.10E+03	5.74E+02	7.56E+01	6.31E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.75E+03	8.11E+02	1.10E+03	5.74E+02	7.56E+01	6.31E+03
SM	kg	4.60E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.38E+01	5.91E-01	4.05E+00	4.35E-01	1.06E+00	4.00E+01
ADP _{fossil}	MJ, NCV	3.32E+03	7.61E+02	9.39E+02	5.39E+02	5.24E+01	5.61E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.32E+01	3.32E+01
HLRW	kg	7.48E-04	1.05E-05	2.06E-04	7.41E-06	6.25E-05	1.03E-03
ILLRW	kg	1.98E-03	2.18E-05	4.61E-04	1.56E-05	2.15E-04	2.69E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-6.41E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.41E+01
BCEP	kg CO ₂	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	-2.13E+01	0.00E+00	0.00E+00	-2.13E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+01	2.13E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.5. CAFCO® 400 AC

5.2.5.1 San Bernardino, CA

Table 51. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 400 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.35E+02	2.83E+00	5.72E+02	1.09E+00	8.89E+00	1.32E+03
RPR _M	MJ, NCV	1.32E+01	0.00E+00	7.94E+02	0.00E+00	0.00E+00	8.07E+02
RPR _{total}	MJ, NCV	7.49E+02	2.83E+00	1.37E+03	1.09E+00	8.89E+00	2.13E+03
NRPR _E	MJ, NCV	3.67E+03	1.49E+03	9.69E+02	5.74E+02	8.49E+01	6.79E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.67E+03	1.49E+03	9.69E+02	5.74E+02	8.49E+01	6.79E+03
SM	kg	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.24E+01	1.09E+00	3.82E+00	4.21E-01	1.13E+00	3.89E+01
ADP _{fossil}	MJ, NCV	3.26E+03	1.40E+03	7.91E+02	5.39E+02	5.85E+01	6.05E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.38E+01	3.38E+01
HLRW	kg	7.14E-04	1.93E-05	3.03E-04	7.41E-06	7.11E-05	1.11E-03
ILLRW	kg	1.89E-03	4.05E-05	6.76E-04	1.56E-05	2.46E-04	2.86E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-1.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.39E+00
BCEP	kg CO ₂	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	-2.22E+01	0.00E+00	0.00E+00	-2.22E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E+01	2.22E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.5.2 Stanhope, NJ

Table 52. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 400 ACproduced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.61E+02	7.52E-01	4.65E+02	1.09E+00	8.89E+00	1.24E+03
RPR _M	MJ, NCV	8.44E+02	0.00E+00	8.21E+02	0.00E+00	0.00E+00	1.66E+03
RPR _{total}	MJ, NCV	1.61E+03	7.52E-01	1.29E+03	1.09E+00	8.89E+00	2.90E+03
NRPR _E	MJ, NCV	3.89E+03	3.98E+02	1.40E+03	5.74E+02	8.48E+01	6.35E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.89E+03	3.98E+02	1.40E+03	5.74E+02	8.48E+01	6.35E+03
SM	kg	6.40E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.40E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.37E+01	2.98E-01	4.35E+00	4.35E-01	1.14E+00	4.00E+01
ADP _{fossil}	MJ, NCV	3.46E+03	3.73E+02	1.01E+03	5.39E+02	5.84E+01	5.44E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.42E+01	3.42E+01
HLRW	kg	7.45E-04	5.13E-06	8.46E-04	7.41E-06	7.11E-05	1.67E-03
ILLRW	kg	1.97E-03	1.08E-05	1.89E-03	1.56E-05	2.46E-04	4.13E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-8.92E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.92E+01
BCEP	kg CO ₂	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	-2.29E+01	0.00E+00	0.00E+00	-2.29E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E+01	2.29E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.5.3 Houston, TX

Table 53. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 400 AC produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	7.61E+02	1.52E+00	4.67E+02	1.09E+00	8.88E+00	1.24E+03
RPR _M	MJ, NCV	5.93E+02	0.00E+00	7.54E+02	0.00E+00	0.00E+00	1.35E+03
RPR _{total}	MJ, NCV	1.35E+03	1.52E+00	1.22E+03	1.09E+00	8.88E+00	2.59E+03
NRPR _E	MJ, NCV	3.75E+03	8.08E+02	1.10E+03	5.74E+02	8.48E+01	6.31E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.75E+03	8.08E+02	1.10E+03	5.74E+02	8.48E+01	6.31E+03
SM	kg	4.50E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.50E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.37E+01	5.89E-01	4.11E+00	4.35E-01	1.14E+00	3.99E+01
ADP _{fossil}	MJ, NCV	3.32E+03	7.58E+02	9.39E+02	5.39E+02	5.84E+01	5.62E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.31E+01	3.31E+01
HLRW	kg	7.44E-04	1.04E-05	2.05E-04	7.41E-06	7.11E-05	1.04E-03
ILLRW	kg	1.97E-03	2.18E-05	4.60E-04	1.56E-05	2.46E-04	2.71E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-6.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.27E+01
BCEP	kg CO ₂	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	-2.11E+01	0.00E+00	0.00E+00	-2.11E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E+01	2.11E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.6. CAFCO® 400

5.2.6.1 San Bernardino, CA

Table 54. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 400 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	1.99E+02	2.82E+00	5.52E+02	1.49E+00	8.89E+00	7.64E+02
RPR _M	MJ, NCV	8.18E+02	0.00E+00	7.93E+02	0.00E+00	0.00E+00	1.61E+03
RPR _{total}	MJ, NCV	1.02E+03	2.82E+00	1.35E+03	1.49E+00	8.89E+00	2.38E+03
NRPR _E	MJ, NCV	3.71E+03	1.49E+03	9.47E+02	7.87E+02	8.48E+01	7.02E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.71E+03	1.49E+03	9.47E+02	7.87E+02	8.48E+01	7.02E+03
SM	kg	6.20E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.20E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.86E+01	1.92E+00	6.51E+00	1.02E+00	1.45E+00	3.95E+01
ADP _{fossil}	MJ, NCV	3.40E+03	1.40E+03	7.74E+02	7.38E+02	5.84E+01	6.37E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.37E+01	3.37E+01
HLRW	kg	3.70E-04	1.92E-05	2.93E-04	1.02E-05	7.11E-05	7.63E-04
ILLRW	kg	8.06E-04	4.04E-05	6.53E-04	2.14E-05	2.46E-04	1.77E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-8.64E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.64E+01
BCEP	kg CO ₂	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	-2.22E+01	0.00E+00	0.00E+00	-2.22E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E+01	2.22E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.6.2 Stanhope, NJ

Table 55. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 400 produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	2.10E+02	6.50E-01	4.65E+02	1.49E+00	8.89E+00	6.87E+02
RPR _M	MJ, NCV	1.32E+01	0.00E+00	7.97E+02	0.00E+00	0.00E+00	8.10E+02
RPR _{total}	MJ, NCV	2.23E+02	6.50E-01	1.26E+03	1.49E+00	8.89E+00	1.50E+03
NRPR _E	MJ, NCV	3.92E+03	3.44E+02	1.40E+03	7.87E+02	8.48E+01	6.53E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.92E+03	3.44E+02	1.40E+03	7.87E+02	8.48E+01	6.53E+03
SM	kg	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.06E+01	4.67E-01	7.12E+00	1.08E+00	1.45E+00	4.07E+01
ADP _{fossil}	MJ, NCV	3.59E+03	3.23E+02	1.01E+03	7.38E+02	5.84E+01	5.72E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.38E+01	3.38E+01
HLRW	kg	3.88E-04	4.44E-06	8.46E-04	1.02E-05	7.11E-05	1.32E-03
ILLRW	kg	8.49E-04	9.32E-06	1.89E-03	2.14E-05	2.46E-04	3.01E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-1.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.39E+00
BCEP	kg CO ₂	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	-2.22E+01	0.00E+00	0.00E+00	-2.22E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E+01	2.22E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.6.3 Houston, TX

Table 56. Resource use, output and waste flows, and carbon emissions and removals for CAFCO® 400 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	1.97E+02	1.75E+00	4.99E+02	1.49E+00	8.89E+00	7.08E+02
RPR _M	MJ, NCV	6.46E+02	0.00E+00	8.10E+02	0.00E+00	0.00E+00	1.46E+03
RPR _{total}	MJ, NCV	8.43E+02	1.75E+00	1.31E+03	1.49E+00	8.89E+00	2.17E+03
NRPR _E	MJ, NCV	3.75E+03	9.29E+02	1.13E+03	7.87E+02	8.49E+01	6.68E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.75E+03	9.29E+02	1.13E+03	7.87E+02	8.49E+01	6.68E+03
SM	kg	4.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.90E+01
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.91E+01	1.16E+00	7.07E+00	1.01E+00	1.45E+00	3.98E+01
ADP _{fossil}	MJ, NCV	3.44E+03	8.71E+02	9.62E+02	7.38E+02	5.85E+01	6.07E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.40E+01	3.40E+01
HLRW	kg	3.75E-04	1.20E-05	2.18E-04	1.02E-05	7.11E-05	6.86E-04
ILLRW	kg	8.15E-04	2.50E-05	4.88E-04	2.14E-05	2.46E-04	1.60E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	-6.83E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.83E+01
BCEP	kg CO ₂	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	-2.26E+01	0.00E+00	0.00E+00	-2.26E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+01	2.26E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.7. FENDOLITE® M-II

5.2.7.1 San Bernardino, CA

Table 57. Resource use, output and waste flows, and carbon emissions and removals for FENDOLITE® M-II produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	2.36E+02	3.46E+00	5.36E+02	1.09E+00	1.17E+01	7.88E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	7.69E+02	0.00E+00	0.00E+00	7.69E+02
RPR _{total}	MJ, NCV	2.36E+02	3.46E+00	1.30E+03	1.09E+00	1.17E+01	1.56E+03
NRPR _E	MJ, NCV	4.12E+03	1.83E+03	9.26E+02	5.74E+02	1.11E+02	7.56E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	4.12E+03	1.83E+03	9.26E+02	5.74E+02	1.11E+02	7.56E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.02E+01	2.12E+00	4.49E+00	6.67E-01	1.35E+00	3.89E+01
ADP _{fossil}	MJ, NCV	3.78E+03	1.72E+03	7.58E+02	5.39E+02	7.43E+01	6.87E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.33E+01	3.33E+01
HLRW	kg	4.01E-04	2.36E-05	2.83E-04	7.41E-06	9.86E-05	8.13E-04
ILLRW	kg	8.85E-04	4.96E-05	6.32E-04	1.56E-05	3.50E-04	1.93E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	0.00E+00	0.00E+00	-2.15E+01	0.00E+00	0.00E+00	-2.15E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E+01	2.15E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.7.2 Stanhope, NJ

Table 58. Resource use, output and waste flows, and carbon emissions and removals for FENDOLITE® M-II produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	2.37E+02	8.72E-01	4.25E+02	1.09E+00	1.17E+01	6.75E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	7.30E+02	0.00E+00	0.00E+00	7.30E+02
RPR _{total}	MJ, NCV	2.37E+02	8.72E-01	1.15E+03	1.09E+00	1.17E+01	1.41E+03
NRPR _E	MJ, NCV	4.12E+03	4.60E+02	1.17E+03	5.74E+02	1.11E+02	6.43E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	4.12E+03	4.60E+02	1.17E+03	5.74E+02	1.11E+02	6.43E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.15E+01	6.13E-01	4.98E+00	7.65E-01	1.37E+00	3.92E+01
ADP _{fossil}	MJ, NCV	3.78E+03	4.32E+02	8.29E+02	5.39E+02	7.43E+01	5.65E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.26E+01	3.26E+01
HLRW	kg	3.98E-04	5.94E-06	7.65E-04	7.41E-06	9.85E-05	1.28E-03
ILLRW	kg	8.83E-04	1.25E-05	1.71E-03	1.56E-05	3.50E-04	2.97E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	0.00E+00	0.00E+00	-2.04E+01	0.00E+00	0.00E+00	-2.04E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E+01	2.04E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.7.3 Houston, TX

Table 59. Resource use, output and waste flows, and carbon emissions and removals for FENDOLITE® M-II produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	2.05E+02	1.68E+00	4.50E+02	1.07E+00	1.14E+01	6.69E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	8.44E+02	0.00E+00	0.00E+00	8.44E+02
RPR _{total}	MJ, NCV	2.05E+02	1.68E+00	1.29E+03	1.07E+00	1.14E+01	1.51E+03
NRPR _E	MJ, NCV	3.85E+03	8.49E+02	1.05E+03	5.40E+02	1.05E+02	6.40E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	3.85E+03	8.49E+02	1.05E+03	5.40E+02	1.05E+02	6.40E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	2.95E+01	1.06E+00	5.43E+00	6.74E-01	1.36E+00	3.80E+01
ADP _{fossil}	MJ, NCV	3.77E+03	8.47E+02	9.83E+02	5.39E+02	7.44E+01	6.21E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.46E+01	3.46E+01
HLRW	kg	4.07E-04	1.16E-05	2.30E-04	7.41E-06	9.86E-05	7.55E-04
ILLRW	kg	8.91E-04	2.45E-05	5.15E-04	1.56E-05	3.50E-04	1.80E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	0.00E+00	0.00E+00	-2.36E+01	0.00E+00	0.00E+00	-2.36E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E+01	2.36E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.8. FENDOLITE® M-II/P

5.2.8.1 Stanhope, NJ

Table 60. Resource use, output and waste flows, and carbon emissions and removals for FENDOLITE® M-II/P produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	2.37E+02	8.72E-01	4.25E+02	1.09E+00	1.17E+01	6.75E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	7.28E+02	0.00E+00	0.00E+00	7.28E+02
RPR _{total}	MJ, NCV	2.37E+02	8.72E-01	1.15E+03	1.09E+00	1.17E+01	1.40E+03
NRPR _E	MJ, NCV	4.12E+03	4.60E+02	1.17E+03	5.74E+02	1.11E+02	6.43E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	4.12E+03	4.60E+02	1.17E+03	5.74E+02	1.11E+02	6.43E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.15E+01	6.13E-01	4.98E+00	7.65E-01	1.37E+00	3.92E+01
ADP _{fossil}	MJ, NCV	3.78E+03	4.32E+02	8.29E+02	5.39E+02	7.42E+01	5.65E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.26E+01	3.26E+01
HLRW	kg	3.98E-04	5.94E-06	7.65E-04	7.41E-06	9.85E-05	1.28E-03
ILLRW	kg	8.83E-04	1.25E-05	1.71E-03	1.56E-05	3.50E-04	2.97E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	0.00E+00	0.00E+00	-2.03E+01	0.00E+00	0.00E+00	-2.03E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E+01	2.03E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.8.2 Houston, TX

Table 61. Resource use, output and waste flows, and carbon emissions and removals for FENDOLITE® M-II/P produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	2.23E+02	1.71E+00	5.21E+02	1.09E+00	1.17E+01	7.59E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	8.44E+02	0.00E+00	0.00E+00	8.44E+02
RPR _{total}	MJ, NCV	2.23E+02	1.71E+00	1.37E+03	1.09E+00	1.17E+01	1.60E+03
NRPR _E	MJ, NCV	4.11E+03	9.02E+02	1.15E+03	5.74E+02	1.11E+02	6.86E+03
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _{total}	MJ, NCV	4.11E+03	9.02E+02	1.15E+03	5.74E+02	1.11E+02	6.86E+03
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.02E+01	2.12E+00	4.49E+00	6.67E-01	1.35E+00	3.89E+01
ADP _{fossil}	MJ, NCV	3.77E+03	8.47E+02	9.83E+02	5.39E+02	7.44E+01	6.21E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	1.46E+01	3.46E+01
HLRW	kg	4.07E-04	1.16E-05	2.30E-04	7.41E-06	9.86E-05	7.55E-04
ILLRW	kg	8.91E-04	2.45E-05	5.15E-04	1.56E-05	3.50E-04	1.80E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	0.00E+00	0.00E+00	-2.36E+01	0.00E+00	0.00E+00	-2.36E+01
BCEK	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E+01	2.36E+01
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.9. BLAZE-SHIELD® II

Table 62. Resource use, output and waste flows, and carbon emissions and removals for BLAZE-SHIELD® II produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	4.89E+01	4.32E-01	9.17E+01	1.09E+00	7.88E+00	1.50E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, NCV	4.89E+01	4.32E-01	9.17E+01	1.09E+00	7.88E+00	1.50E+02
NRPR _E	MJ, NCV	1.15E+03	2.28E+02	9.02E+03	5.74E+02	7.50E+01	1.10E+04
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	6.66E+01	0.00E+00	0.00E+00	6.66E+01
NRPR _{total}	MJ, NCV	1.15E+03	2.28E+02	9.08E+03	5.74E+02	7.50E+01	1.11E+04
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.18E+01	4.72E-01	1.95E+01	1.19E+00	2.67E+00	3.57E+01
ADP _{fossil}	MJ, NCV	1.04E+03	7.53E+02	6.80E+03	1.06E+03	5.19E+01	9.72E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	3.00E+00	2.30E+01
HLRW	kg	1.33E-04	2.94E-06	2.06E-03	7.41E-06	6.24E-05	2.26E-03
ILLRW	kg	2.91E-04	6.19E-06	4.69E-03	1.56E-05	2.15E-04	5.22E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	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
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.10. BLAZE-SHIELD® II HS

Table 63. Resource use, output and waste flows, and carbon emissions and removals for BLAZE-SHIELD® II HS produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	4.89E+01	4.32E-01	9.17E+01	1.09E+00	7.88E+00	1.50E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, NCV	4.89E+01	4.32E-01	9.17E+01	1.09E+00	7.88E+00	1.50E+02
NRPR _E	MJ, NCV	1.15E+03	2.28E+02	9.02E+03	5.74E+02	7.50E+01	1.10E+04
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	6.66E+01	0.00E+00	0.00E+00	6.66E+01
NRPR _{total}	MJ, NCV	1.15E+03	2.28E+02	9.08E+03	5.74E+02	7.50E+01	1.11E+04
SM	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.18E+01	4.72E-01	1.95E+01	1.19E+00	2.67E+00	3.57E+01
ADP _{fossil}	MJ, NCV	1.04E+03	7.53E+02	6.80E+03	1.06E+03	5.19E+01	9.72E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	3.00E+00	2.30E+01
HLRW	kg	1.33E-04	2.94E-06	2.06E-03	7.41E-06	6.24E-05	2.26E-03
ILLRW	kg	2.91E-04	6.19E-06	4.69E-03	1.56E-05	2.15E-04	5.22E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	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
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.2.11. BLAZE-SHIELD® HP

Table 64. Resource use, output and waste flows, and carbon emissions and removals for BLAZE-SHIELD® HP produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
Resource use indicators							
RPR _E	MJ, NCV	4.89E+01	4.32E-01	9.17E+01	1.09E+00	8.87E+00	1.51E+02
RPR _M	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RPR _{total}	MJ, NCV	4.89E+01	4.32E-01	9.17E+01	1.09E+00	8.87E+00	1.51E+02
NRPR _E	MJ, NCV	1.15E+03	2.28E+02	9.02E+03	5.74E+02	8.42E+01	1.11E+04
NRPR _M	MJ, NCV	0.00E+00	0.00E+00	6.66E+01	0.00E+00	0.00E+00	6.66E+01
NRPR _{total}	MJ, NCV	1.15E+03	2.28E+02	9.08E+03	5.74E+02	8.42E+01	1.11E+04
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.18E+01	4.62E-01	1.93E+01	1.16E+00	2.13E+00	3.48E+01
ADP _{fossil}	MJ, NCV	1.04E+03	7.53E+02	6.80E+03	1.06E+03	5.79E+01	9.72E+03
Output flows and waste category indicators							
HWD	kg	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	2.00E+01	0.00E+00	3.00E+00	2.30E+01
HLRW	kg	1.33E-04	2.94E-06	2.06E-03	7.41E-06	7.10E-05	2.27E-03
ILLRW	kg	2.91E-04	6.19E-06	4.69E-03	1.56E-05	2.45E-04	5.25E-03
CRU	kg	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
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon emissions and removals							
BCRP	kg CO ₂	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
BCRK	kg CO ₂	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
CBCEW	kg CO ₂	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
CCR	kg CO ₂	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

5.3. Life cycle impact assessment (LCIA)

It shall be reiterated at this point that the reported impact categories represent impact potentials; they are approximations of environmental impacts that could occur if the emitted molecules follow the underlying impact pathway and meet certain conditions in the receiving environment while doing so. In addition, the inventory only captures that fraction of the total environmental load that corresponds to the chosen declared unit (relative approach). LCIA results are therefore relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks.

Life cycle impact assessment (LCIA) results are presented per declared unit for all Isolatek passive fire protection products. Unlike life cycle inventories, which only report sums for individual inventory flows, the LCIA includes a classification of individual emissions with regard to the impacts they are associated with and subsequently a characterization of the emissions by a factor expressing their respective contribution to the impact category indicator. The end result is a single metric for quantifying each potential impact, such as "Global Warming Potential".

The impact assessment results are calculated using characterization factors published by the United States Environmental Protection Agency. The TRACI 2.2 (Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts 2.2) methodology is the most widely applied impact assessment method for U.S. LCA studies. Per the Smart EPD PCR Part A, 100-year time horizon GWP factors as provided by the Intergovernmental Panel on Climate Change (IPCC) 2021 Sixth Assessment Report (AR6) shall be used for conformance with ISO 21930. The SM 2013 Methodology is also applied to come up with single score results for the sole purpose of representing total impacts per life cycle phase to explain where in the product life cycle greatest impacts are occurring and what is contributing to the impacts.

TRACI 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. All impact categories from TRACI are used to calculate single score millipoints using the SM2013 Methodology, but it should be noted that there are known limitations related to these impact categories due to their high degree of uncertainty.

Section 5.3.1 to 5.3.11 show the LCIA results and contributions of each stage of the life cycle for the Isolatek SFRMs produced at the corresponding manufacturing facilities. Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building or construction works has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase only when product or construction works performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparisons can be inaccurate and could lead to erroneous selection of materials or products that are higher-impact, at least in some impact categories.

5.3.1. CAFCO® 300

5.3.1.1 San Bernardino, CA

Table 65. LCIA results for CAFCO® 300 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.19E+02	1.07E+02	3.20E+01	4.16E+01	2.68E+01	4.26E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-8.78E+01	0.00E+00	-2.24E+01	0.00E+00	2.24E+01	-8.78E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.06E+02	1.07E+02	5.44E+01	4.16E+01	4.36E+00	5.13E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.05E-01	5.63E-03	4.13E-02	2.21E-03	3.23E-03	4.58E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.18E+02	1.05E+02	3.10E+01	4.10E+01	3.10E+01	4.26E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-8.78E+01	0.00E+00	-2.24E+01	0.00E+00	2.24E+01	-8.78E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.06E+02	1.05E+02	5.34E+01	4.10E+01	8.54E+00	5.14E+02
Ozone depletion	kg CFC-11 eq	8.74E-06	1.44E-06	1.03E-06	5.59E-07	1.93E-08	1.18E-05
Smog	kg O ₃ eq	2.33E+00	3.80E-01	1.34E-01	1.42E-01	1.37E-02	3.00E+00
Acidification	kg SO ₂ eq	4.00E-07	4.05E-08	6.67E-08	1.60E-08	1.77E-08	5.41E-07
Carcinogenics	CTUh	3.18E+01	1.04E+01	2.11E+00	3.83E+00	1.64E-01	4.83E+01
Non carcinogenics	CTUh	1.58E+02	3.29E+02	8.29E+00	1.31E+02	1.05E+00	6.27E+02
Respiratory effects	kg PM _{2.5} eq	4.01E-05	1.59E-05	1.91E-06	6.32E-06	3.39E-07	6.45E-05
Ecotoxicity	CTUe	4.06E-01	4.36E-02	1.55E-02	1.68E-02	9.25E-03	4.91E-01
Freshwater eutrophication	kg P eq	5.60E-03	3.32E-04	8.61E-04	1.32E-04	1.86E-04	7.11E-03
Marine eutrophication	kg N eq	2.89E-01	8.75E-02	1.89E-02	3.22E-02	1.75E-03	4.29E-01

Table 66. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	51.34%	25.08%	7.52%	9.77%	6.29%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	51.16%	24.70%	7.26%	9.62%	7.26%	100%
Ozone depletion	kg CFC-11 eq	74.14%	12.19%	8.76%	4.75%	0.16%	100%
Smog	kg O ₃ eq	77.69%	12.66%	4.47%	4.72%	0.46%	100%
Acidification	kg SO ₂ eq	73.93%	7.49%	12.34%	2.96%	3.28%	100%
Carcinogenics	CTUh	65.81%	21.56%	4.37%	7.92%	0.34%	100%
Non carcinogenics	CTUh	25.15%	52.49%	1.32%	20.87%	0.17%	100%
Respiratory effects	kg PM _{2.5} eq	62.05%	24.67%	2.96%	9.80%	0.53%	100%
Ecotoxicity	CTUe	82.63%	8.88%	3.17%	3.43%	1.89%	100%
Freshwater eutrophication	kg P eq	78.77%	4.66%	12.10%	1.85%	2.61%	100%
Marine eutrophication	kg N eq	67.32%	20.38%	4.40%	7.49%	0.41%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 67**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 56% of the total. This is followed by the transportation of raw materials (A2), which contributes around 25%, and the transportation to the building site phase (A4), which adds roughly 10%.

Table 67. SM millipoint scores for CAFCO® 300 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.62E+01	7.25E+00	2.12E+00	2.84E+00	2.91E-01	2.87E+01
	%	56.52%	25.22%	7.37%	9.88%	1.01%	100.00%

5.3.1.2 Stanhope, NJ

Table 68. LCIA results for CAFCO® 300 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	3.45E+02	2.97E+01	4.79E+01	4.16E+01	2.78E+01	4.92E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.35E+01	0.00E+00	2.35E+01	-1.39E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.46E+02	2.97E+01	7.14E+01	4.16E+01	4.36E+00	4.93E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.53E-01	1.58E-03	4.37E-02	2.21E-03	3.23E-03	5.04E-01
GWP, TRACI _{Total}	kg CO ₂ eq	3.44E+02	2.93E+01	4.66E+01	4.10E+01	3.22E+01	4.93E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.35E+01	0.00E+00	2.35E+01	-1.39E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.46E+02	2.93E+01	7.01E+01	4.10E+01	8.73E+00	4.95E+02
Ozone depletion	kg CFC-11 eq	9.75E-06	4.00E-07	2.23E-06	5.59E-07	1.94E-08	1.30E-05
Smog	kg O ₃ eq	2.63E+00	1.01E-01	1.61E-01	1.42E-01	1.38E-02	3.05E+00
Acidification	kg SO ₂ eq	4.46E-07	1.14E-08	7.90E-08	1.60E-08	1.79E-08	5.70E-07
Carcinogenics	CTUh	3.58E+01	2.74E+00	2.68E+00	3.83E+00	1.65E-01	4.53E+01
Non carcinogenics	CTUh	1.75E+02	9.35E+01	9.45E+00	1.31E+02	1.06E+00	4.10E+02
Respiratory effects	kg PM _{2.5} eq	4.47E-05	4.52E-06	2.02E-06	6.32E-06	3.44E-07	5.79E-05
Ecotoxicity	CTUe	4.55E-01	1.20E-02	1.73E-02	1.68E-02	9.26E-03	5.11E-01
Freshwater eutrophication	kg P eq	6.26E-03	9.40E-05	9.88E-04	1.32E-04	1.87E-04	7.66E-03
Marine eutrophication	kg N eq	3.25E-01	2.30E-02	2.38E-02	3.22E-02	1.77E-03	4.06E-01

Table 69. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	70.10%	6.04%	9.74%	8.45%	5.66%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	69.77%	5.94%	9.45%	8.31%	6.53%	100%
Ozone depletion	kg CFC-11 eq	75.22%	3.08%	17.23%	4.32%	0.15%	100%
Smog	kg O ₃ eq	86.32%	3.32%	5.27%	4.64%	0.45%	100%
Acidification	kg SO ₂ eq	78.19%	2.01%	13.87%	2.81%	3.13%	100%
Carcinogenics	CTUh	79.19%	6.05%	5.93%	8.46%	0.36%	100%
Non carcinogenics	CTUh	42.73%	22.79%	2.31%	31.91%	0.26%	100%
Respiratory effects	kg PM _{2.5} eq	77.20%	7.80%	3.49%	10.92%	0.59%	100%
Ecotoxicity	CTUe	89.14%	2.36%	3.39%	3.30%	1.81%	100%
Freshwater eutrophication	kg P eq	81.72%	1.23%	12.89%	1.72%	2.45%	100%
Marine eutrophication	kg N eq	80.10%	5.67%	5.86%	7.93%	0.44%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 70**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 70% of the total. This is followed by the transportation to the building site phase (A4), which contributes around 11%, and manufacturing (A3), which adds roughly 10%.

Table 70. SM millipoint scores for CAFCO® 300 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.83E+01	2.03E+00	2.69E+00	2.84E+00	2.95E-01	2.61E+01
	%	69.93%	7.77%	10.29%	10.88%	1.13%	100.00%

5.3.1.3 Houston, TX

Table 71. LCIA results for CAFCO® 300 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.32E+02	6.08E+01	4.41E+01	4.16E+01	2.51E+01	4.03E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-7.66E+01	0.00E+00	-2.07E+01	0.00E+00	2.07E+01	-7.66E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.08E+02	6.08E+01	6.49E+01	4.16E+01	4.35E+00	4.80E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.23E-01	3.13E-03	3.86E-02	2.21E-03	3.22E-03	4.70E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.32E+02	6.00E+01	4.31E+01	4.10E+01	2.89E+01	4.05E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-7.66E+01	0.00E+00	-2.07E+01	0.00E+00	2.07E+01	-7.66E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.08E+02	6.00E+01	6.38E+01	4.10E+01	8.21E+00	4.81E+02
Ozone depletion	kg CFC-11 eq	9.16E-06	8.16E-07	1.10E-06	5.59E-07	1.92E-08	1.17E-05
Smog	kg O ₃ eq	2.26E+00	2.45E-01	1.44E-01	1.42E-01	1.36E-02	2.81E+00
Acidification	kg SO ₂ eq	4.07E-07	2.19E-08	6.90E-08	1.60E-08	1.75E-08	5.31E-07
Carcinogenics	CTUh	3.07E+01	6.99E+00	2.36E+00	3.83E+00	1.63E-01	4.40E+01
Non carcinogenics	CTUh	1.64E+02	1.75E+02	8.05E+00	1.31E+02	1.02E+00	4.79E+02
Respiratory effects	kg PM _{2.5} eq	4.13E-05	8.48E-06	1.77E-06	6.32E-06	3.30E-07	5.82E-05
Ecotoxicity	CTUe	4.10E-01	2.54E-02	1.49E-02	1.68E-02	9.25E-03	4.76E-01
Freshwater eutrophication	kg P eq	5.74E-03	1.78E-04	9.29E-04	1.32E-04	1.82E-04	7.16E-03
Marine eutrophication	kg N eq	2.80E-01	5.86E-02	2.09E-02	3.22E-02	1.72E-03	3.93E-01

Table 72. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 per produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	57.47%	15.07%	10.94%	10.30%	6.21%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	57.24%	14.83%	10.65%	10.14%	7.15%	100%
Ozone depletion	kg CFC-11 eq	78.63%	7.00%	9.40%	4.80%	0.16%	100%
Smog	kg O ₃ eq	80.61%	8.74%	5.12%	5.05%	0.48%	100%
Acidification	kg SO ₂ eq	76.59%	4.13%	12.98%	3.01%	3.29%	100%
Carcinogenics	CTUh	69.68%	15.88%	5.36%	8.70%	0.37%	100%
Non carcinogenics	CTUh	34.20%	36.56%	1.68%	27.35%	0.21%	100%
Respiratory effects	kg PM _{2.5} eq	70.93%	14.58%	3.05%	10.87%	0.57%	100%
Ecotoxicity	CTUe	86.06%	5.34%	3.13%	3.54%	1.94%	100%
Freshwater eutrophication	kg P eq	80.17%	2.48%	12.97%	1.84%	2.54%	100%
Marine eutrophication	kg N eq	71.17%	14.91%	5.32%	8.18%	0.44%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 73**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 63% of the total. This is followed by the transportation of raw materials (A2), which contributes around 16%, and the transportation to the building site phase (A4), which adds roughly 11%.

Table 73. SM millipoint scores for CAFCO® 300 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.65E+01	4.05E+00	2.40E+00	2.84E+00	2.84E-01	2.60E+01
	%	63.20%	15.57%	9.24%	10.91%	1.09%	100.00%

5.3.2. CAFCO® 300 AC

5.3.2.1 San Bernardino, CA

Table 74. LCIA results for CAFCO® 300 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.23E+02	1.08E+02	3.26E+01	4.16E+01	2.73E+01	4.33E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.12E+02	1.08E+02	5.56E+01	4.16E+01	4.36E+00	5.21E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.14E-01	5.72E-03	4.23E-02	2.21E-03	3.23E-03	4.67E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.23E+02	1.07E+02	3.16E+01	4.10E+01	3.16E+01	4.34E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.12E+02	1.07E+02	5.45E+01	4.10E+01	8.63E+00	5.23E+02
Ozone depletion	kg CFC-11 eq	8.91E-06	1.46E-06	1.06E-06	5.59E-07	1.94E-08	1.20E-05
Smog	kg O ₃ eq	2.38E+00	3.80E-01	1.38E-01	1.42E-01	1.37E-02	3.05E+00
Acidification	kg SO ₂ eq	4.07E-07	4.12E-08	6.85E-08	1.60E-08	1.78E-08	5.50E-07
Carcinogenics	CTUh	3.23E+01	1.04E+01	2.16E+00	3.83E+00	1.65E-01	4.89E+01
Non carcinogenics	CTUh	1.61E+02	3.36E+02	8.49E+00	1.31E+02	1.05E+00	6.37E+02
Respiratory effects	kg PM _{2.5} eq	4.09E-05	1.63E-05	1.96E-06	6.32E-06	3.41E-07	6.57E-05
Ecotoxicity	CTUe	4.14E-01	4.41E-02	1.59E-02	1.68E-02	9.26E-03	5.00E-01
Freshwater eutrophication	kg P eq	5.71E-03	3.38E-04	8.82E-04	1.32E-04	1.86E-04	7.25E-03
Marine eutrophication	kg N eq	2.94E-01	8.71E-02	1.93E-02	3.22E-02	1.76E-03	4.34E-01

Table 75. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	51.52%	25.02%	7.54%	9.61%	6.31%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	51.34%	24.64%	7.28%	9.46%	7.28%	100%
Ozone depletion	kg CFC-11 eq	74.25%	12.13%	8.80%	4.66%	0.16%	100%
Smog	kg O ₃ eq	77.92%	12.46%	4.52%	4.65%	0.45%	100%
Acidification	kg SO ₂ eq	73.92%	7.49%	12.45%	2.91%	3.23%	100%
Carcinogenics	CTUh	66.20%	21.22%	4.42%	7.83%	0.34%	100%
Non carcinogenics	CTUh	25.22%	52.74%	1.33%	20.54%	0.17%	100%
Respiratory effects	kg PM _{2.5} eq	62.17%	24.72%	2.98%	9.62%	0.52%	100%
Ecotoxicity	CTUe	82.76%	8.83%	3.19%	3.37%	1.85%	100%
Freshwater eutrophication	kg P eq	78.79%	4.67%	12.16%	1.81%	2.57%	100%
Marine eutrophication	kg N eq	67.68%	20.06%	4.45%	7.41%	0.41%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 76**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 57% of the total. This is followed by the transportation of raw materials (A2), which contributes around 25%.

Table 76. SM millipoint scores for CAFCO® 300 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.66E+01	7.37E+00	2.16E+00	2.84E+00	2.93E-01	2.92E+01
	%	56.66%	25.21%	7.40%	9.72%	1.00%	100.00%

5.3.2.2 Stanhope, NJ

Table 77. LCIA results for CAFCO® 300 AC produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	3.24E+02	2.86E+01	4.77E+01	4.16E+01	2.63E+01	4.68E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.19E+01	0.00E+00	2.19E+01	-1.39E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.25E+02	2.86E+01	6.96E+01	4.16E+01	4.36E+00	4.69E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.23E-01	1.50E-03	4.09E-02	2.21E-03	3.23E-03	4.71E-01
GWP, TRACI _{Total}	kg CO ₂ eq	3.24E+02	2.82E+01	4.65E+01	4.10E+01	3.04E+01	4.70E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.19E+01	0.00E+00	2.19E+01	-1.39E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.25E+02	2.82E+01	6.84E+01	4.10E+01	8.43E+00	4.71E+02
Ozone depletion	kg CFC-11 eq	9.13E-06	3.84E-07	2.16E-06	5.59E-07	1.93E-08	1.23E-05
Smog	kg O ₃ eq	2.48E+00	1.03E-01	1.54E-01	1.42E-01	1.37E-02	2.89E+00
Acidification	kg SO ₂ eq	4.20E-07	1.08E-08	7.48E-08	1.60E-08	1.76E-08	5.39E-07
Carcinogenics	CTUh	3.38E+01	2.85E+00	2.58E+00	3.83E+00	1.64E-01	4.33E+01
Non carcinogenics	CTUh	1.65E+02	8.74E+01	8.91E+00	1.31E+02	1.04E+00	3.93E+02
Respiratory effects	kg PM _{2.5} eq	4.19E-05	4.23E-06	1.92E-06	6.32E-06	3.36E-07	5.47E-05
Ecotoxicity	CTUe	4.27E-01	1.17E-02	1.65E-02	1.68E-02	9.25E-03	4.82E-01
Freshwater eutrophication	kg P eq	5.87E-03	8.81E-05	9.28E-04	1.32E-04	1.84E-04	7.20E-03
Marine eutrophication	kg N eq	3.07E-01	2.39E-02	2.28E-02	3.22E-02	1.74E-03	3.88E-01

Table 78. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 AC produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	69.22%	6.10%	10.18%	8.88%	5.61%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	68.91%	6.00%	9.89%	8.73%	6.46%	100%
Ozone depletion	kg CFC-11 eq	74.53%	3.13%	17.61%	4.56%	0.16%	100%
Smog	kg O ₃ eq	85.72%	3.58%	5.32%	4.91%	0.47%	100%
Acidification	kg SO ₂ eq	77.90%	2.00%	13.87%	2.97%	3.27%	100%
Carcinogenics	CTUh	78.23%	6.58%	5.96%	8.85%	0.38%	100%
Non carcinogenics	CTUh	41.92%	22.24%	2.27%	33.32%	0.26%	100%
Respiratory effects	kg PM _{2.5} eq	76.58%	7.73%	3.50%	11.57%	0.61%	100%
Ecotoxicity	CTUe	88.74%	2.43%	3.42%	3.50%	1.92%	100%
Freshwater eutrophication	kg P eq	81.51%	1.22%	12.88%	1.83%	2.56%	100%
Marine eutrophication	kg N eq	79.21%	6.17%	5.88%	8.29%	0.45%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 79**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 70% of the total. This is followed by the transportation to the building site phase (A4), which contributes around 11%, and the manufacturing phase (A3), which adds roughly 11%.

Table 79. SM millipoint scores for CAFCO® 300 AC produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.72E+01	1.94E+00	2.61E+00	2.84E+00	2.89E-01	2.48E+01
	%	69.11%	7.79%	10.50%	11.43%	1.16%	100.00%

5.3.2.3 Houston, TX

Table 80. LCIA results for CAFCO® 300 AC produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.33E+02	6.06E+01	3.51E+01	4.16E+01	2.52E+01	3.96E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-7.66E+01	0.00E+00	-2.08E+01	0.00E+00	2.08E+01	-7.66E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.10E+02	6.06E+01	5.60E+01	4.16E+01	4.36E+00	4.72E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.25E-01	3.13E-03	3.86E-02	2.21E-03	3.22E-03	4.72E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.33E+02	5.98E+01	3.42E+01	4.10E+01	2.91E+01	3.97E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-7.66E+01	0.00E+00	-2.08E+01	0.00E+00	2.08E+01	-7.66E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.10E+02	5.98E+01	5.51E+01	4.10E+01	8.23E+00	4.74E+02
Ozone depletion	kg CFC-11 eq	9.21E-06	8.13E-07	9.41E-07	5.59E-07	1.92E-08	1.15E-05
Smog	kg O ₃ eq	2.28E+00	2.41E-01	1.38E-01	1.42E-01	1.36E-02	2.81E+00
Acidification	kg SO ₂ eq	4.09E-07	2.20E-08	6.83E-08	1.60E-08	1.75E-08	5.33E-07
Carcinogenics	CTUh	3.08E+01	6.83E+00	2.19E+00	3.83E+00	1.63E-01	4.38E+01
Non carcinogenics	CTUh	1.64E+02	1.76E+02	7.94E+00	1.31E+02	1.02E+00	4.80E+02
Respiratory effects	kg PM _{2.5} eq	4.15E-05	8.53E-06	1.74E-06	6.32E-06	3.30E-07	5.84E-05
Ecotoxicity	CTUe	4.12E-01	2.53E-02	1.44E-02	1.68E-02	9.25E-03	4.78E-01
Freshwater eutrophication	kg P eq	5.77E-03	1.78E-04	9.30E-04	1.32E-04	1.82E-04	7.19E-03
Marine eutrophication	kg N eq	2.81E-01	5.74E-02	1.95E-02	3.22E-02	1.72E-03	3.92E-01

Table 81. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 AC per produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	58.96%	15.30%	8.88%	10.50%	6.36%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	58.70%	15.05%	8.62%	10.32%	7.31%	100%
Ozone depletion	kg CFC-11 eq	79.80%	7.04%	8.15%	4.85%	0.17%	100%
Smog	kg O ₃ eq	80.98%	8.58%	4.91%	5.04%	0.48%	100%
Acidification	kg SO ₂ eq	76.76%	4.13%	12.83%	3.00%	3.28%	100%
Carcinogenics	CTUh	70.29%	15.60%	5.00%	8.74%	0.37%	100%
Non carcinogenics	CTUh	34.25%	36.63%	1.65%	27.25%	0.21%	100%
Respiratory effects	kg PM _{2.5} eq	71.03%	14.60%	2.98%	10.83%	0.57%	100%
Ecotoxicity	CTUe	86.23%	5.29%	3.02%	3.53%	1.94%	100%
Freshwater eutrophication	kg P eq	80.24%	2.48%	12.92%	1.83%	2.53%	100%
Marine eutrophication	kg N eq	71.75%	14.64%	4.97%	8.20%	0.44%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 82**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 60% of the total. This is followed by the transportation of raw materials (A2), which contributes around 16%, and the transportation to the building site phase (A4), which adds roughly 11%.

Table 82. SM millipoint scores for CAFCO® 300 AC produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.65E+01	4.05E+00	2.11E+00	2.84E+00	2.85E-01	2.58E+01
	%	64.04%	15.68%	8.19%	11.00%	1.10%	100.00%

5.3.3. CAFCO® 300 HS

5.3.3.1 San Bernardino, CA

Table 83. LCIA results for CAFCO® 300 HS produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.23E+02	1.08E+02	3.26E+01	4.16E+01	2.73E+01	4.33E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.12E+02	1.08E+02	5.56E+01	4.16E+01	4.36E+00	5.21E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.14E-01	5.72E-03	4.22E-02	2.21E-03	3.23E-03	4.67E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.23E+02	1.07E+02	3.16E+01	4.10E+01	3.16E+01	4.33E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.12E+02	1.07E+02	5.45E+01	4.10E+01	8.63E+00	5.23E+02
Ozone depletion	kg CFC-11 eq	8.91E-06	1.46E-06	1.06E-06	5.59E-07	1.93E-08	1.20E-05
Smog	kg O ₃ eq	2.38E+00	3.80E-01	1.38E-01	1.42E-01	1.37E-02	3.05E+00
Acidification	kg SO ₂ eq	4.07E-07	4.12E-08	6.85E-08	1.60E-08	1.75E-08	5.50E-07
Carcinogenics	CTUh	3.23E+01	1.04E+01	2.16E+00	3.83E+00	1.64E-01	4.89E+01
Non carcinogenics	CTUh	1.61E+02	3.36E+02	8.48E+00	1.31E+02	1.05E+00	6.37E+02
Respiratory effects	kg PM _{2.5} eq	4.09E-05	1.63E-05	1.95E-06	6.32E-06	3.39E-07	6.57E-05
Ecotoxicity	CTUe	4.14E-01	4.41E-02	1.59E-02	1.68E-02	9.26E-03	5.00E-01
Freshwater eutrophication	kg P eq	5.71E-03	3.38E-04	8.80E-04	1.32E-04	1.86E-04	7.25E-03
Marine eutrophication	kg N eq	2.94E-01	8.71E-02	1.93E-02	3.22E-02	1.76E-03	4.34E-01

Table 84. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 HS produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	51.52%	25.02%	7.54%	9.61%	6.31%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	51.34%	24.64%	7.28%	9.46%	7.28%	100%
Ozone depletion	kg CFC-11 eq	74.25%	12.13%	8.80%	4.66%	0.16%	100%
Smog	kg O ₃ eq	77.93%	12.46%	4.51%	4.65%	0.45%	100%
Acidification	kg SO ₂ eq	73.96%	7.50%	12.45%	2.91%	3.18%	100%
Carcinogenics	CTUh	66.20%	21.22%	4.41%	7.83%	0.34%	100%
Non carcinogenics	CTUh	25.22%	52.75%	1.33%	20.54%	0.16%	100%
Respiratory effects	kg PM _{2.5} eq	62.17%	24.72%	2.97%	9.62%	0.51%	100%
Ecotoxicity	CTUe	82.77%	8.83%	3.18%	3.37%	1.85%	100%
Freshwater eutrophication	kg P eq	78.81%	4.67%	12.14%	1.81%	2.57%	100%
Marine eutrophication	kg N eq	67.68%	20.06%	4.44%	7.41%	0.40%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 85**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 56% of the total. This is followed by the transportation of raw materials (A2), which contributes around 25%.

Table 85. SM millipoint scores for CAFCO® 300 HS produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.66E+01	7.37E+00	2.16E+00	2.84E+00	2.92E-01	2.92E+01
	%	56.67%	25.22%	7.40%	9.72%	1.00%	100.00%

5.3.3.2 Stanhope, NJ

Table 86. LCIA results for CAFCO® 300 HS produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	3.25E+02	3.68E+01	6.27E+01	4.16E+01	3.90E+01	5.05E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-2.79E+00	0.00E+00	-3.46E+01	0.00E+00	3.46E+01	-2.79E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.27E+02	3.68E+01	9.73E+01	4.16E+01	4.41E+00	5.07E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	3.16E-01	1.94E-03	6.44E-02	2.21E-03	3.26E-03	3.87E-01
GWP, TRACI _{Total}	kg CO ₂ eq	3.23E+02	3.63E+01	6.10E+01	4.10E+01	4.55E+01	5.07E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-2.79E+00	0.00E+00	-3.46E+01	0.00E+00	3.46E+01	-2.79E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.26E+02	3.63E+01	9.56E+01	4.10E+01	1.09E+01	5.10E+02
Ozone depletion	kg CFC-11 eq	6.66E-06	4.95E-07	3.18E-06	5.59E-07	2.02E-08	1.09E-05
Smog	kg O ₃ eq	2.82E+00	1.33E-01	2.31E-01	1.42E-01	1.43E-02	3.34E+00
Acidification	kg SO ₂ eq	3.72E-07	1.39E-08	1.17E-07	1.60E-08	1.96E-08	5.38E-07
Carcinogenics	CTUh	4.00E+01	3.65E+00	3.73E+00	3.83E+00	1.72E-01	5.14E+01
Non carcinogenics	CTUh	1.25E+02	1.13E+02	1.38E+01	1.31E+02	1.24E+00	3.84E+02
Respiratory effects	kg PM _{2.5} eq	3.34E-05	5.46E-06	2.94E-06	6.32E-06	4.01E-07	4.85E-05
Ecotoxicity	CTUe	3.98E-01	1.51E-02	2.49E-02	1.68E-02	9.32E-03	4.64E-01
Freshwater eutrophication	kg P eq	4.91E-03	1.14E-04	1.46E-03	1.32E-04	2.09E-04	6.83E-03
Marine eutrophication	kg N eq	3.54E-01	3.07E-02	3.32E-02	3.22E-02	2.00E-03	4.52E-01

Table 87. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 HS produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	64.33%	7.30%	12.41%	8.23%	7.73%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	63.75%	7.17%	12.02%	8.09%	8.97%	100%
Ozone depletion	kg CFC-11 eq	60.99%	4.54%	29.16%	5.13%	0.19%	100%
Smog	kg O ₃ eq	84.46%	3.97%	6.90%	4.24%	0.43%	100%
Acidification	kg SO ₂ eq	69.12%	2.58%	21.69%	2.97%	3.64%	100%
Carcinogenics	CTUh	77.82%	7.12%	7.27%	7.45%	0.34%	100%
Non carcinogenics	CTUh	32.59%	29.40%	3.60%	34.09%	0.32%	100%
Respiratory effects	kg PM _{2.5} eq	68.83%	11.25%	6.06%	13.03%	0.83%	100%
Ecotoxicity	CTUe	85.76%	3.25%	5.36%	3.63%	2.01%	100%
Freshwater eutrophication	kg P eq	71.94%	1.67%	21.40%	1.93%	3.06%	100%
Marine eutrophication	kg N eq	78.32%	6.79%	7.34%	7.11%	0.44%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 88**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 63% of the total. This is followed by and manufacturing (A3), which contributes around 14%, and the transportation to the building site phase (A4), which adds roughly 11%.

Table 88. SM millipoint scores for CAFCO® 300 HS produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.62E+01	2.50E+00	3.70E+00	2.84E+00	3.41E-01	2.56E+01
	%	63.37%	9.76%	14.45%	11.09%	1.33%	100.00%

5.3.3.3 Houston, TX

Table 89. LCIA results for CAFCO® 300 HS produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.52E+02	5.87E+01	3.49E+01	4.16E+01	2.56E+01	4.13E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-6.41E+01	0.00E+00	-2.13E+01	0.00E+00	2.13E+01	-6.41E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.16E+02	5.87E+01	5.62E+01	4.16E+01	4.36E+00	4.76E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.34E-01	3.04E-03	3.95E-02	2.21E-03	3.22E-03	4.82E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.52E+02	5.79E+01	3.40E+01	4.10E+01	2.96E+01	4.14E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-6.41E+01	0.00E+00	-2.13E+01	0.00E+00	2.13E+01	-6.41E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.16E+02	5.79E+01	5.53E+01	4.10E+01	8.30E+00	4.78E+02
Ozone depletion	kg CFC-11 eq	9.40E-06	7.88E-07	9.43E-07	5.59E-07	1.93E-08	1.17E-05
Smog	kg O ₃ eq	2.32E+00	2.29E-01	1.39E-01	1.42E-01	1.36E-02	2.84E+00
Acidification	kg SO ₂ eq	4.17E-07	2.15E-08	6.92E-08	1.60E-08	1.75E-08	5.41E-07
Carcinogenics	CTUh	3.14E+01	6.44E+00	2.21E+00	3.83E+00	1.64E-01	4.40E+01
Non carcinogenics	CTUh	1.68E+02	1.72E+02	8.09E+00	1.31E+02	1.03E+00	4.80E+02
Respiratory effects	kg PM _{2.5} eq	4.23E-05	8.36E-06	1.76E-06	6.32E-06	3.33E-07	5.91E-05
Ecotoxicity	CTUe	4.20E-01	2.44E-02	1.46E-02	1.68E-02	9.25E-03	4.85E-01
Freshwater eutrophication	kg P eq	5.89E-03	1.75E-04	9.46E-04	1.32E-04	1.83E-04	7.32E-03
Marine eutrophication	kg N eq	2.86E-01	5.41E-02	1.97E-02	3.22E-02	1.73E-03	3.94E-01

Table 90. Percent contributions of each life cycle stage to each impact category for CAFCO® 300 HS per produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	61.05%	14.22%	8.46%	10.07%	6.21%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	60.77%	13.98%	8.21%	9.90%	7.14%	100%
Ozone depletion	kg CFC-11 eq	80.27%	6.73%	8.06%	4.78%	0.16%	100%
Smog	kg O ₃ eq	81.60%	8.04%	4.89%	4.99%	0.48%	100%
Acidification	kg SO ₂ eq	77.04%	3.97%	12.79%	2.96%	3.24%	100%
Carcinogenics	CTUh	71.27%	14.63%	5.03%	8.70%	0.37%	100%
Non carcinogenics	CTUh	34.93%	35.92%	1.68%	27.26%	0.21%	100%
Respiratory effects	kg PM _{2.5} eq	71.61%	14.14%	2.99%	10.70%	0.56%	100%
Ecotoxicity	CTUe	86.58%	5.02%	3.02%	3.47%	1.91%	100%
Freshwater eutrophication	kg P eq	80.40%	2.38%	12.92%	1.80%	2.50%	100%
Marine eutrophication	kg N eq	72.68%	13.72%	5.00%	8.16%	0.44%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 91**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 65% of the total. This is followed by the transportation of raw materials (A2), which contributes around 15%, and the transportation to the building site phase (A4), which adds roughly 11%.

Table 91. SM millipoint scores for CAFCO® 300 HS produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.69E+01	3.93E+00	2.13E+00	2.84E+00	2.86E-01	2.60E+01
	%	64.73%	15.10%	8.17%	10.90%	1.10%	100.00%

5.3.4. CAFCO® 3000

5.3.4.1 San Bernardino, CA

Table 92. LCIA results for CAFCO® 3000 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.23E+02	1.08E+02	2.37E+01	4.16E+01	2.73E+01	4.24E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.12E+02	1.08E+02	4.66E+01	4.16E+01	4.36E+00	5.12E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.14E-01	5.72E-03	4.20E-02	2.21E-03	3.23E-03	4.67E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.23E+02	1.07E+02	2.28E+01	4.10E+01	3.16E+01	4.25E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.12E+02	1.07E+02	4.57E+01	4.10E+01	8.63E+00	5.14E+02
Ozone depletion	kg CFC-11 eq	8.91E-06	1.46E-06	9.00E-07	5.59E-07	1.94E-08	1.18E-05
Smog	kg O ₃ eq	2.38E+00	3.80E-01	1.31E-01	1.42E-01	1.37E-02	3.04E+00
Acidification	kg SO ₂ eq	4.07E-07	4.12E-08	6.77E-08	1.60E-08	1.78E-08	5.50E-07
Carcinogenics	CTUh	3.23E+01	1.04E+01	1.98E+00	3.83E+00	1.65E-01	4.87E+01
Non carcinogenics	CTUh	1.61E+02	3.36E+02	8.34E+00	1.31E+02	1.05E+00	6.37E+02
Respiratory effects	kg PM _{2.5} eq	4.09E-05	1.63E-05	1.92E-06	6.32E-06	3.41E-07	6.57E-05
Ecotoxicity	CTUe	4.14E-01	4.41E-02	1.54E-02	1.68E-02	9.26E-03	4.99E-01
Freshwater eutrophication	kg P eq	5.71E-03	3.38E-04	8.78E-04	1.32E-04	1.86E-04	7.25E-03
Marine eutrophication	kg N eq	2.94E-01	8.71E-02	1.78E-02	3.22E-02	1.76E-03	4.33E-01

Table 93. Percent contributions of each life cycle stage to each impact category for CAFCO® 3000 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	52.61%	25.55%	5.59%	9.81%	6.44%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	52.40%	25.15%	5.36%	9.66%	7.43%	100%
Ozone depletion	kg CFC-11 eq	75.22%	12.29%	7.60%	4.72%	0.16%	100%
Smog	kg O ₃ eq	78.08%	12.49%	4.32%	4.66%	0.45%	100%
Acidification	kg SO ₂ eq	74.03%	7.50%	12.32%	2.91%	3.24%	100%
Carcinogenics	CTUh	66.43%	21.29%	4.07%	7.86%	0.34%	100%
Non carcinogenics	CTUh	25.23%	52.76%	1.31%	20.54%	0.17%	100%
Respiratory effects	kg PM _{2.5} eq	62.21%	24.74%	2.91%	9.63%	0.52%	100%
Ecotoxicity	CTUe	82.85%	8.83%	3.09%	3.37%	1.85%	100%
Freshwater eutrophication	kg P eq	78.84%	4.67%	12.11%	1.82%	2.57%	100%
Marine eutrophication	kg N eq	67.91%	20.13%	4.12%	7.43%	0.41%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 94**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 57% of the total. This is followed by the transportation of raw materials (A2), which contributes around 25%, and the transportation to the building site phase (A4), which adds roughly 10%.

Table 94. SM millipoint scores for CAFCO® 3000 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.66E+01	7.37E+00	1.87E+00	2.84E+00	2.93E-01	2.89E+01
	%	57.24%	25.47%	6.46%	9.82%	1.01%	100.00%

5.3.4.2 Stanhope, NJ

Table 95. LCIA results for CAFCO® 3000 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	3.29E+02	2.88E+01	2.06E+01	4.16E+01	2.67E+01	4.47E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.23E+01	0.00E+00	2.23E+01	-1.39E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.30E+02	2.88E+01	4.29E+01	4.16E+01	4.36E+00	4.48E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.30E-01	1.52E-03	4.09E-02	2.21E-03	3.23E-03	4.78E-01
GWP, TRACI _{Total}	kg CO ₂ eq	3.29E+02	2.84E+01	1.99E+01	4.10E+01	3.08E+01	4.49E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.23E+01	0.00E+00	2.23E+01	-1.39E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.30E+02	2.84E+01	4.22E+01	4.10E+01	8.50E+00	4.50E+02
Ozone depletion	kg CFC-11 eq	9.28E-06	3.88E-07	1.69E-06	5.59E-07	1.93E-08	1.19E-05
Smog	kg O ₃ eq	2.51E+00	1.03E-01	1.36E-01	1.42E-01	1.37E-02	2.91E+00
Acidification	kg SO ₂ eq	4.26E-07	1.09E-08	7.30E-08	1.60E-08	1.77E-08	5.44E-07
Carcinogenics	CTUh	3.43E+01	2.82E+00	2.08E+00	3.83E+00	1.64E-01	4.32E+01
Non carcinogenics	CTUh	1.67E+02	8.88E+01	8.59E+00	1.31E+02	1.04E+00	3.96E+02
Respiratory effects	kg PM _{2.5} eq	4.25E-05	4.29E-06	1.81E-06	6.32E-06	3.38E-07	5.53E-05
Ecotoxicity	CTUe	4.34E-01	1.18E-02	1.51E-02	1.68E-02	9.25E-03	4.87E-01
Freshwater eutrophication	kg P eq	5.96E-03	8.94E-05	9.30E-04	1.32E-04	1.85E-04	7.30E-03
Marine eutrophication	kg N eq	3.11E-01	2.37E-02	1.86E-02	3.22E-02	1.75E-03	3.88E-01

Table 96. Percent contributions of each life cycle stage to each impact category for CAFCO® 3000 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	73.66%	6.45%	4.62%	9.31%	5.97%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	73.22%	6.34%	4.44%	9.14%	6.86%	100%
Ozone depletion	kg CFC-11 eq	77.72%	3.25%	14.18%	4.69%	0.16%	100%
Smog	kg O ₃ eq	86.45%	3.54%	4.67%	4.87%	0.47%	100%
Acidification	kg SO ₂ eq	78.38%	2.01%	13.42%	2.94%	3.25%	100%
Carcinogenics	CTUh	79.43%	6.53%	4.80%	8.86%	0.38%	100%
Non carcinogenics	CTUh	42.17%	22.39%	2.17%	33.01%	0.26%	100%
Respiratory effects	kg PM _{2.5} eq	76.91%	7.76%	3.28%	11.44%	0.61%	100%
Ecotoxicity	CTUe	89.12%	2.42%	3.10%	3.46%	1.90%	100%
Freshwater eutrophication	kg P eq	81.69%	1.23%	12.74%	1.80%	2.54%	100%
Marine eutrophication	kg N eq	80.34%	6.12%	4.79%	8.30%	0.45%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 97**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 72% of the total. This is followed by the transportation to the building site phase (A4), which contributes around 12%, and the raw material transportation (A2), which adds roughly 8%.

Table 97. SM millipoint scores for CAFCO® 3000 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.74E+01	1.96E+00	1.74E+00	2.84E+00	2.90E-01	2.43E+01
	%	71.86%	8.07%	7.16%	11.71%	1.20%	100.00%

5.3.4.3 Houston, TX

Table 98. LCIA results for CAFCO® 3000 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.52E+02	5.87E+01	4.38E+01	4.16E+01	2.56E+01	4.22E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-6.41E+01	0.00E+00	-2.13E+01	0.00E+00	2.13E+01	-6.41E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.16E+02	5.87E+01	6.51E+01	4.16E+01	4.36E+00	4.85E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.34E-01	3.04E-03	3.97E-02	2.21E-03	3.22E-03	4.82E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.52E+02	5.79E+01	4.28E+01	4.10E+01	2.96E+01	4.23E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-6.41E+01	0.00E+00	-2.13E+01	0.00E+00	2.13E+01	-6.41E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.16E+02	5.79E+01	6.40E+01	4.10E+01	8.30E+00	4.87E+02
Ozone depletion	kg CFC-11 eq	9.40E-06	7.88E-07	1.10E-06	5.59E-07	1.93E-08	1.19E-05
Smog	kg O ₃ eq	2.32E+00	2.29E-01	1.45E-01	1.42E-01	1.36E-02	2.85E+00
Acidification	kg SO ₂ eq	4.17E-07	2.15E-08	6.99E-08	1.60E-08	1.75E-08	5.42E-07
Carcinogenics	CTUh	3.14E+01	6.44E+00	2.39E+00	3.83E+00	1.64E-01	4.42E+01
Non carcinogenics	CTUh	1.68E+02	1.72E+02	8.23E+00	1.31E+02	1.03E+00	4.80E+02
Respiratory effects	kg PM _{2.5} eq	4.23E-05	8.36E-06	1.80E-06	6.32E-06	3.33E-07	5.91E-05
Ecotoxicity	CTUe	4.20E-01	2.44E-02	1.51E-02	1.68E-02	9.25E-03	4.86E-01
Freshwater eutrophication	kg P eq	5.89E-03	1.75E-04	9.49E-04	1.32E-04	1.83E-04	7.32E-03
Marine eutrophication	kg N eq	2.86E-01	5.41E-02	2.12E-02	3.22E-02	1.73E-03	3.96E-01

Table 99. Percent contributions of each life cycle stage to each impact category for CAFCO® 3000 per produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	59.75%	13.92%	10.40%	9.86%	6.08%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	59.51%	13.69%	10.11%	9.70%	6.99%	100%
Ozone depletion	kg CFC-11 eq	79.22%	6.64%	9.26%	4.72%	0.16%	100%
Smog	kg O ₃ eq	81.42%	8.02%	5.10%	4.97%	0.48%	100%
Acidification	kg SO ₂ eq	76.93%	3.97%	12.92%	2.95%	3.24%	100%
Carcinogenics	CTUh	70.99%	14.57%	5.40%	8.66%	0.37%	100%
Non carcinogenics	CTUh	34.92%	35.91%	1.71%	27.25%	0.21%	100%
Respiratory effects	kg PM _{2.5} eq	71.56%	14.13%	3.05%	10.70%	0.56%	100%
Ecotoxicity	CTUe	86.50%	5.02%	3.12%	3.47%	1.90%	100%
Freshwater eutrophication	kg P eq	80.37%	2.38%	12.95%	1.80%	2.50%	100%
Marine eutrophication	kg N eq	72.41%	13.67%	5.35%	8.13%	0.44%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 100**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 64% of the total. This is followed by the transportation of raw materials (A2), which contributes around 15%, and the transportation to the building site phase (A4), which adds roughly 11%.

Table 100. SM millipoint scores for CAFCO® 3000 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.69E+01	3.93E+00	2.42E+00	2.84E+00	2.86E-01	2.63E+01
	%	64.01%	14.94%	9.19%	10.78%	1.09%	100.00%

5.3.5. CAFCO® 400 AC

5.3.5.1 San Bernardino, CA

Table 101. LCIA results for CAFCO® 400 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	3.11E+02	1.08E+02	3.34E+01	4.16E+01	2.70E+01	5.21E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.22E+01	0.00E+00	2.22E+01	-1.39E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.12E+02	1.08E+02	5.56E+01	4.16E+01	4.85E+00	5.22E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.13E-01	5.72E-03	4.22E-02	2.21E-03	3.47E-03	4.67E-01
GWP, TRACI _{Total}	kg CO ₂ eq	3.10E+02	1.07E+02	3.23E+01	4.10E+01	3.13E+01	5.22E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.22E+01	0.00E+00	2.22E+01	-1.39E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.12E+02	1.07E+02	5.45E+01	4.10E+01	9.11E+00	5.23E+02
Ozone depletion	kg CFC-11 eq	8.91E-06	1.46E-06	1.06E-06	5.59E-07	2.08E-08	1.20E-05
Smog	kg O ₃ eq	2.38E+00	3.80E-01	1.38E-01	1.42E-01	1.48E-02	3.05E+00
Acidification	kg SO ₂ eq	4.07E-07	4.12E-08	6.85E-08	1.60E-08	1.95E-08	5.52E-07
Carcinogenics	CTUh	3.23E+01	1.04E+01	2.16E+00	3.83E+00	1.77E-01	4.88E+01
Non carcinogenics	CTUh	1.61E+02	3.36E+02	8.48E+00	1.31E+02	1.12E+00	6.37E+02
Respiratory effects	kg PM _{2.5} eq	4.08E-05	1.62E-05	1.95E-06	6.32E-06	3.65E-07	6.57E-05
Ecotoxicity	CTUe	4.13E-01	4.41E-02	1.59E-02	1.68E-02	1.04E-02	5.01E-01
Freshwater eutrophication	kg P eq	5.71E-03	3.38E-04	8.80E-04	1.32E-04	2.05E-04	7.27E-03
Marine eutrophication	kg N eq	2.94E-01	8.70E-02	1.93E-02	3.22E-02	1.87E-03	4.34E-01

Table 102. Percent contributions of each life cycle stage to each impact category for CAFCO® 400 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	59.65%	20.77%	6.41%	7.98%	5.19%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	59.48%	20.46%	6.19%	7.86%	6.00%	100%
Ozone depletion	kg CFC-11 eq	74.24%	12.13%	8.80%	4.66%	0.17%	100%
Smog	kg O ₃ eq	77.90%	12.45%	4.52%	4.65%	0.49%	100%
Acidification	kg SO ₂ eq	73.69%	7.47%	12.41%	2.90%	3.53%	100%
Carcinogenics	CTUh	66.18%	21.20%	4.41%	7.84%	0.36%	100%
Non carcinogenics	CTUh	25.22%	52.73%	1.33%	20.55%	0.18%	100%
Respiratory effects	kg PM _{2.5} eq	62.14%	24.71%	2.97%	9.62%	0.55%	100%
Ecotoxicity	CTUe	82.57%	8.80%	3.18%	3.37%	2.09%	100%
Freshwater eutrophication	kg P eq	78.59%	4.65%	12.12%	1.81%	2.82%	100%
Marine eutrophication	kg N eq	67.67%	20.05%	4.44%	7.41%	0.43%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 103**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 57% of the total. This is followed by the transportation of raw materials (A2), which contributes around 25%, and the transportation to the building site phase (A4), which adds roughly 10%.

Table 103. SM millipoint scores for CAFCO® 400 AC produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.65E+01	7.36E+00	2.16E+00	2.84E+00	3.17E-01	2.92E+01
	%	56.62%	25.18%	7.40%	9.72%	1.08%	100.00%

5.3.5.2 Stanhope, NJ

Table 104. LCIA results for CAFCO® 400 AC produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.41E+02	2.88E+01	4.68E+01	4.16E+01	2.78E+01	3.86E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.30E+02	2.88E+01	6.97E+01	4.16E+01	4.85E+00	4.75E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.29E-01	1.52E-03	4.15E-02	2.21E-03	3.47E-03	4.78E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.40E+02	2.84E+01	4.56E+01	4.10E+01	3.19E+01	3.87E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-8.92E+01	0.00E+00	-2.29E+01	0.00E+00	2.29E+01	-8.92E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.30E+02	2.84E+01	6.85E+01	4.10E+01	8.97E+00	4.77E+02
Ozone depletion	kg CFC-11 eq	9.25E-06	3.87E-07	2.16E-06	5.59E-07	2.07E-08	1.24E-05
Smog	kg O ₃ eq	2.51E+00	1.03E-01	1.55E-01	1.42E-01	1.48E-02	2.92E+00
Acidification	kg SO ₂ eq	4.25E-07	1.09E-08	7.53E-08	1.60E-08	1.94E-08	5.46E-07
Carcinogenics	CTUh	3.42E+01	2.82E+00	2.59E+00	3.83E+00	1.76E-01	4.37E+01
Non carcinogenics	CTUh	1.67E+02	8.86E+01	9.01E+00	1.31E+02	1.10E+00	3.96E+02
Respiratory effects	kg PM _{2.5} eq	4.24E-05	4.29E-06	1.93E-06	6.32E-06	3.61E-07	5.53E-05
Ecotoxicity	CTUe	4.33E-01	1.18E-02	1.66E-02	1.68E-02	1.04E-02	4.88E-01
Freshwater eutrophication	kg P eq	5.94E-03	8.93E-05	9.39E-04	1.32E-04	2.04E-04	7.30E-03
Marine eutrophication	kg N eq	3.11E-01	2.37E-02	2.30E-02	3.22E-02	1.85E-03	3.91E-01

Table 105. Percent contributions of each life cycle stage to each impact category for CAFCO® 400 AC produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	62.44%	7.46%	12.13%	10.77%	7.20%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	62.08%	7.33%	11.77%	10.59%	8.23%	100%
Ozone depletion	kg CFC-11 eq	74.74%	3.13%	17.45%	4.52%	0.17%	100%
Smog	kg O ₃ eq	85.83%	3.52%	5.29%	4.85%	0.51%	100%
Acidification	kg SO ₂ eq	77.75%	1.99%	13.79%	2.93%	3.55%	100%
Carcinogenics	CTUh	78.43%	6.46%	5.94%	8.77%	0.40%	100%
Non carcinogenics	CTUh	42.03%	22.37%	2.27%	33.04%	0.28%	100%
Respiratory effects	kg PM _{2.5} eq	76.65%	7.76%	3.50%	11.44%	0.65%	100%
Ecotoxicity	CTUe	88.61%	2.41%	3.40%	3.45%	2.14%	100%
Freshwater eutrophication	kg P eq	81.33%	1.22%	12.85%	1.80%	2.79%	100%
Marine eutrophication	kg N eq	79.39%	6.05%	5.87%	8.22%	0.47%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 106**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 70% of the total. This is followed by the transportation to the building site phase (A4), which contributes around 11%, and manufacturing (A3), which adds roughly 10%.

Table 106. SM millipoint scores for CAFCO® 400 AC produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.74E+01	1.95E+00	2.62E+00	2.84E+00	3.14E-01	2.51E+01
	%	69.25%	7.78%	10.42%	11.31%	1.25%	100.00%

5.3.5.3 Houston, TX

Table 107. LCIA results for CAFCO® 400 AC produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	2.53E+02	5.84E+01	4.40E+01	4.16E+01	2.59E+01	4.23E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-6.27E+01	0.00E+00	-2.11E+01	0.00E+00	2.11E+01	-6.27E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	3.15E+02	5.84E+01	6.50E+01	4.16E+01	4.85E+00	4.85E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.31E-01	3.03E-03	3.94E-02	2.21E-03	3.46E-03	4.79E-01
GWP, TRACI _{Total}	kg CO ₂ eq	2.53E+02	5.77E+01	4.29E+01	4.10E+01	2.98E+01	4.24E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-6.27E+01	0.00E+00	-2.11E+01	0.00E+00	2.11E+01	-6.27E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	3.15E+02	5.77E+01	6.40E+01	4.10E+01	8.76E+00	4.87E+02
Ozone depletion	kg CFC-11 eq	9.34E-06	7.85E-07	1.10E-06	5.59E-07	2.07E-08	1.18E-05
Smog	kg O ₃ eq	2.31E+00	2.28E-01	1.45E-01	1.42E-01	1.47E-02	2.84E+00
Acidification	kg SO ₂ eq	4.14E-07	2.14E-08	6.97E-08	1.60E-08	1.92E-08	5.40E-07
Carcinogenics	CTUh	3.12E+01	6.41E+00	2.38E+00	3.83E+00	1.76E-01	4.40E+01
Non carcinogenics	CTUh	1.66E+02	1.72E+02	8.18E+00	1.31E+02	1.09E+00	4.78E+02
Respiratory effects	kg PM _{2.5} eq	4.20E-05	8.33E-06	1.80E-06	6.32E-06	3.55E-07	5.88E-05
Ecotoxicity	CTUe	4.18E-01	2.43E-02	1.51E-02	1.68E-02	1.04E-02	4.84E-01
Freshwater eutrophication	kg P eq	5.84E-03	1.74E-04	9.43E-04	1.32E-04	2.02E-04	7.29E-03
Marine eutrophication	kg N eq	2.85E-01	5.38E-02	2.11E-02	3.22E-02	1.83E-03	3.94E-01

Table 108. Percent contributions of each life cycle stage to each impact category for CAFCO® 400 AC per produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	59.82%	13.82%	10.40%	9.83%	6.13%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	59.58%	13.60%	10.12%	9.67%	7.03%	100%
Ozone depletion	kg CFC-11 eq	79.13%	6.65%	9.30%	4.74%	0.17%	100%
Smog	kg O ₃ eq	81.35%	8.02%	5.11%	5.00%	0.52%	100%
Acidification	kg SO ₂ eq	76.63%	3.96%	12.90%	2.96%	3.55%	100%
Carcinogenics	CTUh	70.95%	14.56%	5.41%	8.69%	0.40%	100%
Non carcinogenics	CTUh	34.78%	35.93%	1.71%	27.36%	0.23%	100%
Respiratory effects	kg PM _{2.5} eq	71.41%	14.17%	3.06%	10.76%	0.60%	100%
Ecotoxicity	CTUe	86.25%	5.01%	3.11%	3.48%	2.15%	100%
Freshwater eutrophication	kg P eq	80.11%	2.39%	12.93%	1.80%	2.76%	100%
Marine eutrophication	kg N eq	72.36%	13.66%	5.36%	8.16%	0.46%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 109**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 64% of the total. This is followed by the transportation of raw materials (A2), which contributes around 15%, and the transportation to the building site phase (A4), which adds roughly 11%.

Table 109. SM millipoint scores for CAFCO® 400 AC produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	1.68E+01	3.92E+00	2.42E+00	2.84E+00	3.09E-01	2.63E+01
	%	63.91%	14.92%	9.19%	10.81%	1.18%	100.00%

5.3.6. CAFCO® 400

5.3.6.1 San Bernardino, CA

Table 110. LCIA results for CAFCO® 400 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	5.52E+02	1.08E+02	3.21E+01	5.69E+01	2.70E+01	7.76E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-8.64E+01	0.00E+00	-2.22E+01	0.00E+00	2.22E+01	-8.64E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.39E+02	1.08E+02	5.43E+01	5.69E+01	4.85E+00	8.63E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.04E-01	5.70E-03	4.07E-02	3.02E-03	3.46E-03	1.57E-01
GWP, TRACI _{Total}	kg CO ₂ eq	5.49E+02	1.06E+02	3.11E+01	5.62E+01	3.11E+01	7.74E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-8.64E+01	0.00E+00	-2.22E+01	0.00E+00	2.22E+01	-8.64E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.36E+02	1.06E+02	5.33E+01	5.62E+01	8.96E+00	8.61E+02
Ozone depletion	kg CFC-11 eq	2.31E-06	1.45E-06	1.03E-06	7.66E-07	2.07E-08	5.58E-06
Smog	kg O ₃ eq	2.46E+00	3.79E-01	1.33E-01	1.94E-01	1.48E-02	3.18E+00
Acidification	kg SO ₂ eq	1.18E-06	4.11E-08	6.62E-08	2.19E-08	1.94E-08	1.33E-06
Carcinogenics	CTUh	4.47E+01	1.03E+01	2.10E+00	5.24E+00	1.76E-01	6.26E+01
Non carcinogenics	CTUh	6.65E+01	3.35E+02	8.19E+00	1.79E+02	1.10E+00	5.90E+02
Respiratory effects	kg PM _{2.5} eq	2.89E-05	1.62E-05	1.89E-06	8.66E-06	3.61E-07	5.61E-05
Ecotoxicity	CTUe	2.82E-01	4.40E-02	1.54E-02	2.31E-02	1.04E-02	3.74E-01
Freshwater eutrophication	kg P eq	3.41E-03	3.37E-04	8.50E-04	1.80E-04	2.04E-04	4.98E-03
Marine eutrophication	kg N eq	3.89E-01	8.67E-02	1.87E-02	4.40E-02	1.85E-03	5.40E-01

Table 111. Percent contributions of each life cycle stage to each impact category for CAFCO® 400 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	71.15%	13.90%	4.14%	7.33%	3.48%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	70.95%	13.75%	4.02%	7.26%	4.02%	100%
Ozone depletion	kg CFC-11 eq	41.41%	26.01%	18.47%	13.73%	0.37%	100%
Smog	kg O ₃ eq	77.33%	11.91%	4.20%	6.11%	0.47%	100%
Acidification	kg SO ₂ eq	88.84%	3.09%	4.97%	1.65%	1.46%	100%
Carcinogenics	CTUh	71.50%	16.49%	3.35%	8.38%	0.28%	100%
Non carcinogenics	CTUh	11.27%	56.78%	1.39%	30.37%	0.19%	100%
Respiratory effects	kg PM _{2.5} eq	51.61%	28.91%	3.37%	15.46%	0.64%	100%
Ecotoxicity	CTUe	75.20%	11.74%	4.11%	6.16%	2.79%	100%
Freshwater eutrophication	kg P eq	68.45%	6.78%	17.06%	3.62%	4.09%	100%
Marine eutrophication	kg N eq	71.98%	16.05%	3.47%	8.16%	0.34%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 112**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 60% of the total. This is followed by the transportation of raw materials (A2), which contributes around 22%, and the transportation to the building site phase (A4), which adds roughly 11%.

Table 112. SM millipoint scores for CAFCO® 400 produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.04E+01	7.34E+00	2.11E+00	3.89E+00	3.13E-01	3.41E+01
	%	59.91%	21.56%	6.19%	11.42%	0.92%	100.00%

5.3.6.2 Stanhope, NJ

Table 113. LCIA results for CAFCO® 400 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	6.57E+02	2.49E+01	4.75E+01	5.69E+01	2.71E+01	8.14E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.22E+01	0.00E+00	2.22E+01	-1.39E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.58E+02	2.49E+01	6.97E+01	5.69E+01	4.85E+00	8.15E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.11E-01	1.31E-03	4.15E-02	3.02E-03	3.47E-03	1.60E-01
GWP, TRACI _{Total}	kg CO ₂ eq	6.54E+02	2.46E+01	4.63E+01	5.62E+01	3.12E+01	8.12E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-1.39E+00	0.00E+00	-2.22E+01	0.00E+00	2.22E+01	-1.39E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.55E+02	2.46E+01	6.85E+01	5.62E+01	8.98E+00	8.14E+02
Ozone depletion	kg CFC-11 eq	2.46E-06	3.35E-07	2.16E-06	7.66E-07	2.07E-08	5.74E-06
Smog	kg O ₃ eq	2.61E+00	8.96E-02	1.55E-01	1.94E-01	1.48E-02	3.06E+00
Acidification	kg SO ₂ eq	1.20E-06	9.41E-09	7.53E-08	2.19E-08	1.94E-08	1.33E-06
Carcinogenics	CTUh	4.71E+01	2.46E+00	2.59E+00	5.24E+00	1.76E-01	5.76E+01
Non carcinogenics	CTUh	6.95E+01	7.65E+01	9.01E+00	1.79E+02	1.11E+00	3.35E+02
Respiratory effects	kg PM _{2.5} eq	2.99E-05	3.70E-06	1.93E-06	8.66E-06	3.61E-07	4.45E-05
Ecotoxicity	CTUe	2.98E-01	1.02E-02	1.66E-02	2.31E-02	1.04E-02	3.58E-01
Freshwater eutrophication	kg P eq	3.57E-03	7.71E-05	9.39E-04	1.80E-04	2.04E-04	4.97E-03
Marine eutrophication	kg N eq	4.09E-01	2.07E-02	2.30E-02	4.40E-02	1.85E-03	4.98E-01

Table 114. Percent contributions of each life cycle stage to each impact category for CAFCO® 400 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	80.77%	3.06%	5.84%	7.00%	3.33%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	80.51%	3.03%	5.70%	6.92%	3.85%	100%
Ozone depletion	kg CFC-11 eq	42.83%	5.84%	37.63%	13.35%	0.36%	100%
Smog	kg O ₃ eq	85.21%	2.92%	5.04%	6.34%	0.48%	100%
Acidification	kg SO ₂ eq	90.52%	0.71%	5.66%	1.65%	1.46%	100%
Carcinogenics	CTUh	81.80%	4.28%	4.51%	9.11%	0.31%	100%
Non carcinogenics	CTUh	20.72%	22.80%	2.69%	53.46%	0.33%	100%
Respiratory effects	kg PM _{2.5} eq	67.10%	8.30%	4.34%	19.45%	0.81%	100%
Ecotoxicity	CTUe	83.18%	2.84%	4.63%	6.44%	2.91%	100%
Freshwater eutrophication	kg P eq	71.82%	1.55%	18.90%	3.63%	4.10%	100%
Marine eutrophication	kg N eq	82.03%	4.15%	4.61%	8.84%	0.37%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 115**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 71% of the total. This is followed by the transportation to the building site phase (A4), which contributes around 13%, and manufacturing (A3), which adds roughly 9%.

Table 115. SM millipoint scores for CAFCO® 400 produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.12E+01	1.69E+00	2.62E+00	3.89E+00	3.14E-01	2.97E+01
	%	71.36%	5.69%	8.81%	13.09%	1.06%	100.00%

5.3.6.3 Houston, TX

Table 116. LCIA results for CAFCO® 400 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	5.70E+02	6.72E+01	4.43E+01	5.69E+01	2.75E+01	7.66E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	-6.83E+01	0.00E+00	-2.26E+01	0.00E+00	2.26E+01	-6.83E+01
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.39E+02	6.72E+01	6.69E+01	5.69E+01	4.85E+00	8.34E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.05E-01	3.49E-03	4.20E-02	3.02E-03	3.47E-03	1.57E-01
GWP, TRACI _{Total}	kg CO ₂ eq	5.67E+02	6.63E+01	4.32E+01	5.62E+01	3.17E+01	7.65E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	-6.83E+01	0.00E+00	-2.26E+01	0.00E+00	2.26E+01	-6.83E+01
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.36E+02	6.63E+01	6.58E+01	5.62E+01	9.05E+00	8.33E+02
Ozone depletion	kg CFC-11 eq	2.36E-06	9.03E-07	1.13E-06	7.66E-07	2.08E-08	5.18E-06
Smog	kg O ₃ eq	2.44E+00	2.60E-01	1.53E-01	1.94E-01	1.48E-02	3.06E+00
Acidification	kg SO ₂ eq	1.18E-06	2.47E-08	7.41E-08	2.19E-08	1.95E-08	1.32E-06
Carcinogenics	CTUh	4.45E+01	7.29E+00	2.49E+00	5.24E+00	1.77E-01	5.97E+01
Non carcinogenics	CTUh	6.63E+01	1.99E+02	8.69E+00	1.79E+02	1.11E+00	4.54E+02
Respiratory effects	kg PM _{2.5} eq	2.87E-05	9.62E-06	1.90E-06	8.66E-06	3.63E-07	4.93E-05
Ecotoxicity	CTUe	2.81E-01	2.79E-02	1.59E-02	2.31E-02	1.04E-02	3.58E-01
Freshwater eutrophication	kg P eq	3.39E-03	2.01E-04	1.01E-03	1.80E-04	2.05E-04	4.98E-03
Marine eutrophication	kg N eq	3.86E-01	6.12E-02	2.21E-02	4.40E-02	1.86E-03	5.15E-01

Table 117. Percent contributions of each life cycle stage to each impact category for CAFCO® 400 per produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	74.44%	8.77%	5.78%	7.43%	3.59%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	74.19%	8.67%	5.64%	7.35%	4.14%	100%
Ozone depletion	kg CFC-11 eq	45.57%	17.43%	21.79%	14.80%	0.40%	100%
Smog	kg O ₃ eq	79.71%	8.48%	4.99%	6.34%	0.48%	100%
Acidification	kg SO ₂ eq	89.36%	1.87%	5.62%	1.66%	1.48%	100%
Carcinogenics	CTUh	74.52%	12.22%	4.17%	8.79%	0.30%	100%
Non carcinogenics	CTUh	14.61%	43.73%	1.92%	39.50%	0.24%	100%
Respiratory effects	kg PM _{2.5} eq	58.30%	19.51%	3.87%	17.58%	0.74%	100%
Ecotoxicity	CTUe	78.42%	7.78%	4.45%	6.44%	2.91%	100%
Freshwater eutrophication	kg P eq	68.07%	4.03%	20.18%	3.62%	4.10%	100%
Marine eutrophication	kg N eq	74.93%	11.88%	4.29%	8.55%	0.36%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 118**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 65% of the total. This is followed by the transportation of raw materials (A2), which contributes around 14%, and the transportation to the building site phase (A4), which adds roughly 12%.

Table 118. SM millipoint scores for CAFCO® 400 produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.04E+01	4.51E+00	2.50E+00	3.89E+00	3.15E-01	3.16E+01
	%	64.53%	14.27%	7.90%	12.30%	1.00%	100.00%

5.3.7. FENDOLITE® M-II

5.3.7.1 San Bernardino, CA

Table 119. LCIA results for FENDOLITE® M-II produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	6.69E+02	1.32E+02	3.16E+01	4.16E+01	2.76E+01	9.02E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.15E+01	0.00E+00	2.15E+01	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.69E+02	1.32E+02	5.31E+01	4.16E+01	6.08E+00	9.02E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.21E-01	7.03E-03	3.96E-02	2.21E-03	3.54E-03	1.73E-01
GWP, TRACI _{Total}	kg CO ₂ eq	6.66E+02	1.31E+02	3.06E+01	4.10E+01	3.15E+01	8.99E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.15E+01	0.00E+00	2.15E+01	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.66E+02	1.31E+02	5.21E+01	4.10E+01	1.01E+01	8.99E+02
Ozone depletion	kg CFC-11 eq	2.55E-06	1.78E-06	1.01E-06	5.59E-07	2.17E-08	5.91E-06
Smog	kg O ₃ eq	2.96E+00	4.51E-01	1.30E-01	1.42E-01	1.62E-02	3.70E+00
Acidification	kg SO ₂ eq	1.19E-06	5.09E-08	6.42E-08	1.60E-08	2.39E-08	1.35E-06
Carcinogenics	CTUh	5.18E+01	1.22E+01	2.04E+00	3.83E+00	1.85E-01	7.00E+01
Non carcinogenics	CTUh	7.34E+01	4.17E+02	7.96E+00	1.31E+02	1.19E+00	6.30E+02
Respiratory effects	kg PM _{2.5} eq	3.13E-05	2.01E-05	1.84E-06	6.32E-06	4.06E-07	6.00E-05
Ecotoxicity	CTUe	3.30E-01	5.36E-02	1.50E-02	1.68E-02	1.40E-02	4.29E-01
Freshwater eutrophication	kg P eq	3.84E-03	4.19E-04	8.25E-04	1.32E-04	2.61E-04	5.48E-03
Marine eutrophication	kg N eq	4.49E-01	1.02E-01	1.83E-02	3.22E-02	1.93E-03	6.03E-01

Table 120. Percent contributions of each life cycle stage to each impact category for FENDOLITE® M-II produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	74.16%	14.67%	3.51%	4.61%	3.06%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	74.01%	14.52%	3.40%	4.56%	3.51%	100%
Ozone depletion	kg CFC-11 eq	43.04%	30.11%	17.02%	9.46%	0.37%	100%
Smog	kg O ₃ eq	80.04%	12.19%	3.50%	3.83%	0.44%	100%
Acidification	kg SO ₂ eq	88.49%	3.78%	4.76%	1.19%	1.78%	100%
Carcinogenics	CTUh	73.94%	17.41%	2.92%	5.47%	0.26%	100%
Non carcinogenics	CTUh	11.65%	66.13%	1.26%	20.77%	0.19%	100%
Respiratory effects	kg PM _{2.5} eq	52.15%	33.57%	3.06%	10.54%	0.68%	100%
Ecotoxicity	CTUe	76.83%	12.50%	3.49%	3.93%	3.26%	100%
Freshwater eutrophication	kg P eq	70.15%	7.64%	15.05%	2.40%	4.75%	100%
Marine eutrophication	kg N eq	74.35%	16.97%	3.03%	5.33%	0.32%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 121**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 61% of the total. This is followed by the transportation of raw materials (A2), which contributes around 25%, and the transportation to the building site phase (A4), which adds roughly 8%.

Table 121. SM millipoint scores for FENDOLITE® M-II produced at San Bernardino, CA facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.20E+01	9.04E+00	2.06E+00	2.84E+00	3.72E-01	3.63E+01
	%	60.62%	24.87%	5.67%	7.81%	1.02%	100.00%

5.3.7.2 Stanhope, NJ

Table 122. LCIA results for FENDOLITE® M-II produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	6.53E+02	3.33E+01	3.74E+01	4.16E+01	2.65E+01	7.92E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.04E+01	0.00E+00	2.04E+01	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.53E+02	3.33E+01	5.78E+01	4.16E+01	6.08E+00	7.92E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.22E-01	1.77E-03	3.77E-02	2.21E-03	3.54E-03	1.67E-01
GWP, TRACI _{Total}	kg CO ₂ eq	6.50E+02	3.29E+01	3.64E+01	4.10E+01	3.02E+01	7.91E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.04E+01	0.00E+00	2.04E+01	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.50E+02	3.29E+01	5.68E+01	4.10E+01	9.85E+00	7.91E+02
Ozone depletion	kg CFC-11 eq	2.56E-06	4.48E-07	1.86E-06	5.59E-07	2.16E-08	5.45E-06
Smog	kg O ₃ eq	2.98E+00	1.14E-01	1.37E-01	1.42E-01	1.61E-02	3.39E+00
Acidification	kg SO ₂ eq	1.15E-06	1.28E-08	6.80E-08	1.60E-08	2.37E-08	1.27E-06
Carcinogenics	CTUh	5.16E+01	3.07E+00	2.27E+00	3.83E+00	1.84E-01	6.09E+01
Non carcinogenics	CTUh	7.26E+01	1.05E+02	8.14E+00	1.31E+02	1.17E+00	3.18E+02
Respiratory effects	kg PM _{2.5} eq	3.07E-05	5.07E-06	1.74E-06	6.32E-06	4.01E-07	4.42E-05
Ecotoxicity	CTUe	3.30E-01	1.35E-02	1.49E-02	1.68E-02	1.40E-02	3.90E-01
Freshwater eutrophication	kg P eq	3.81E-03	1.05E-04	8.54E-04	1.32E-04	2.58E-04	5.16E-03
Marine eutrophication	kg N eq	4.47E-01	2.58E-02	2.01E-02	3.22E-02	1.90E-03	5.27E-01

Table 123. Percent contributions of each life cycle stage to each impact category for FENDOLITE® M-II produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	82.49%	4.20%	4.72%	5.25%	3.34%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	82.23%	4.16%	4.60%	5.19%	3.83%	100%
Ozone depletion	kg CFC-11 eq	46.96%	8.23%	34.15%	10.27%	0.40%	100%
Smog	kg O ₃ eq	87.94%	3.35%	4.05%	4.19%	0.48%	100%
Acidification	kg SO ₂ eq	90.50%	1.01%	5.36%	1.26%	1.87%	100%
Carcinogenics	CTUh	84.66%	5.03%	3.72%	6.28%	0.30%	100%
Non carcinogenics	CTUh	22.85%	33.02%	2.56%	41.20%	0.37%	100%
Respiratory effects	kg PM _{2.5} eq	69.37%	11.47%	3.94%	14.31%	0.91%	100%
Ecotoxicity	CTUe	84.81%	3.47%	3.81%	4.32%	3.59%	100%
Freshwater eutrophication	kg P eq	73.86%	2.04%	16.54%	2.55%	5.01%	100%
Marine eutrophication	kg N eq	84.83%	4.89%	3.82%	6.10%	0.36%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 121**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 74% of the total. This is followed by the transportation to the building site phase (A4), which contributes around 10%, and raw material transportation (A2), which adds roughly 8%.

Table 124. SM millipoint scores for FENDOLITE® M-II produced at Stanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.17E+01	2.28E+00	2.20E+00	2.84E+00	3.67E-01	2.94E+01
	%	73.86%	7.75%	7.48%	9.67%	1.25%	100.00%

5.3.7.3 Houston, TX

Table 125. LCIA results for FENDOLITE® M-II per declared unit produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	6.85E+02	6.53E+01	4.50E+01	4.16E+01	2.97E+01	8.66E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.36E+01	0.00E+00	2.36E+01	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.85E+02	6.53E+01	6.86E+01	4.16E+01	6.09E+00	8.66E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.17E-01	3.47E-03	4.38E-02	2.21E-03	3.55E-03	1.70E-01
GWP, TRACI _{Total}	kg CO ₂ eq	6.82E+02	6.44E+01	4.39E+01	4.10E+01	3.40E+01	8.65E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.36E+01	0.00E+00	2.36E+01	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.82E+02	6.44E+01	6.74E+01	4.10E+01	1.05E+01	8.65E+02
Ozone depletion	kg CFC-11 eq	2.57E-06	8.79E-07	1.16E-06	5.59E-07	2.18E-08	5.19E-06
Smog	kg O ₃ eq	2.78E+00	2.23E-01	1.59E-01	1.42E-01	1.63E-02	3.32E+00
Acidification	kg SO ₂ eq	1.24E-06	2.51E-08	7.76E-08	1.60E-08	2.43E-08	1.39E-06
Carcinogenics	CTUh	4.97E+01	6.01E+00	2.57E+00	3.83E+00	1.86E-01	6.23E+01
Non carcinogenics	CTUh	7.23E+01	2.06E+02	9.06E+00	1.31E+02	1.22E+00	4.19E+02
Respiratory effects	kg PM _{2.5} eq	3.12E-05	9.94E-06	1.99E-06	6.32E-06	4.17E-07	4.99E-05
Ecotoxicity	CTUe	3.16E-01	2.65E-02	1.66E-02	1.68E-02	1.40E-02	3.89E-01
Freshwater eutrophication	kg P eq	3.75E-03	2.07E-04	1.05E-03	1.32E-04	2.65E-04	5.41E-03
Marine eutrophication	kg N eq	4.31E-01	5.05E-02	2.29E-02	3.22E-02	1.97E-03	5.38E-01

Table 126. Percent contributions of each life cycle stage to each impact category for FENDOLITE® M-II produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	79.05%	7.54%	5.19%	4.80%	3.42%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	78.80%	7.45%	5.07%	4.74%	3.93%	100%
Ozone depletion	kg CFC-11 eq	49.57%	16.94%	22.28%	10.78%	0.42%	100%
Smog	kg O ₃ eq	83.73%	6.71%	4.80%	4.27%	0.49%	100%
Acidification	kg SO ₂ eq	89.68%	1.81%	5.60%	1.15%	1.75%	100%
Carcinogenics	CTUh	79.76%	9.66%	4.14%	6.15%	0.30%	100%
Non carcinogenics	CTUh	17.26%	49.06%	2.16%	31.23%	0.29%	100%
Respiratory effects	kg PM _{2.5} eq	62.60%	19.91%	3.98%	12.67%	0.84%	100%
Ecotoxicity	CTUe	81.03%	6.80%	4.26%	4.33%	3.59%	100%
Freshwater eutrophication	kg P eq	69.38%	3.82%	19.47%	2.43%	4.90%	100%
Marine eutrophication	kg N eq	80.03%	9.39%	4.25%	5.97%	0.37%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 127**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 69% of the total. This is followed by the transportation of raw materials (A2), which contributes around 14%, and the transportation to the building site phase (A4), which adds roughly 9%.

Table 127. SM millipoint scores for FENDOLITE® M-II produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.21E+01	4.46E+00	2.56E+00	2.84E+00	3.80E-01	3.24E+01
	%	68.37%	13.78%	7.92%	8.77%	1.17%	100.00%

5.3.8. FENDOLITE® M-II/P

5.3.8.1 Stanhope, NJ

Table 128. LCIA results for FENDOLITE® M-II/P produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	6.53E+02	3.33E+01	3.74E+01	4.16E+01	2.64E+01	7.92E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.03E+01	0.00E+00	2.03E+01	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.53E+02	3.33E+01	5.78E+01	4.16E+01	6.08E+00	7.92E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.22E-01	1.77E-03	3.77E-02	2.21E-03	3.54E-03	1.67E-01
GWP, TRACI _{Total}	kg CO ₂ eq	6.50E+02	3.29E+01	3.64E+01	4.10E+01	3.02E+01	7.91E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.03E+01	0.00E+00	2.03E+01	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.50E+02	3.29E+01	5.68E+01	4.10E+01	9.84E+00	7.91E+02
Ozone depletion	kg CFC-11 eq	2.56E-06	4.48E-07	1.86E-06	5.59E-07	2.16E-08	5.45E-06
Smog	kg O ₃ eq	2.98E+00	1.14E-01	1.37E-01	1.42E-01	1.61E-02	3.39E+00
Acidification	kg SO ₂ eq	1.15E-06	1.28E-08	6.80E-08	1.60E-08	2.37E-08	1.27E-06
Carcinogenics	CTUh	5.16E+01	3.07E+00	2.27E+00	3.83E+00	1.84E-01	6.09E+01
Non carcinogenics	CTUh	7.26E+01	1.05E+02	8.14E+00	1.31E+02	1.17E+00	3.18E+02
Respiratory effects	kg PM _{2.5} eq	3.07E-05	5.07E-06	1.74E-06	6.32E-06	4.00E-07	4.42E-05
Ecotoxicity	CTUe	3.30E-01	1.35E-02	1.49E-02	1.68E-02	1.40E-02	3.90E-01
Freshwater eutrophication	kg P eq	3.81E-03	1.05E-04	8.54E-04	1.32E-04	2.58E-04	5.16E-03
Marine eutrophication	kg N eq	4.47E-01	2.58E-02	2.01E-02	3.22E-02	1.90E-03	5.27E-01

Table 129. Percent contributions of each life cycle stage to each impact category for FENDOLITE® M-II/P produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	82.49%	4.20%	4.72%	5.25%	3.34%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	82.23%	4.16%	4.61%	5.19%	3.82%	100%
Ozone depletion	kg CFC-11 eq	46.96%	8.23%	34.15%	10.27%	0.40%	100%
Smog	kg O ₃ eq	87.94%	3.35%	4.05%	4.19%	0.48%	100%
Acidification	kg SO ₂ eq	90.50%	1.01%	5.36%	1.26%	1.87%	100%
Carcinogenics	CTUh	84.66%	5.03%	3.72%	6.28%	0.30%	100%
Non carcinogenics	CTUh	22.85%	33.02%	2.56%	41.20%	0.37%	100%
Respiratory effects	kg PM _{2.5} eq	69.37%	11.47%	3.94%	14.31%	0.91%	100%
Ecotoxicity	CTUe	84.81%	3.47%	3.81%	4.32%	3.59%	100%
Freshwater eutrophication	kg P eq	73.87%	2.04%	16.54%	2.55%	5.00%	100%
Marine eutrophication	kg N eq	84.83%	4.89%	3.82%	6.10%	0.36%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 130**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 74% of the total. This is followed by the transportation to the building site phase (A4), which contributes around 10%, and raw material transportation (A2), which adds roughly 8%.

Table 130. SM millipoint scores for FENDOLITE® M-II/P produced at Sanhope, NJ facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.17E+01	2.28E+00	2.20E+00	2.84E+00	3.67E-01	2.94E+01
	%	73.86%	7.75%	7.48%	9.67%	1.25%	100.00%

5.3.8.2 Houston, TX

Table 131. LCIA results for FENDOLITE® M-II/P produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	6.85E+02	6.53E+01	4.50E+01	4.16E+01	2.97E+01	8.66E+02
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.36E+01	0.00E+00	2.36E+01	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	6.85E+02	6.53E+01	6.86E+01	4.16E+01	6.09E+00	8.66E+02
GWP, IPCC _{Luluc}	kg CO ₂ eq	1.17E-01	3.47E-03	4.38E-02	2.21E-03	3.55E-03	1.70E-01
GWP, TRACI _{Total}	kg CO ₂ eq	6.82E+02	6.44E+01	4.39E+01	4.10E+01	3.40E+01	8.65E+02
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	-2.36E+01	0.00E+00	2.36E+01	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	6.82E+02	6.44E+01	6.74E+01	4.10E+01	1.05E+01	8.65E+02
Ozone depletion	kg CFC-11 eq	2.57E-06	8.79E-07	1.16E-06	5.59E-07	2.18E-08	5.19E-06
Smog	kg O ₃ eq	2.78E+00	2.23E-01	1.59E-01	1.42E-01	1.63E-02	3.32E+00
Acidification	kg SO ₂ eq	1.24E-06	2.51E-08	7.76E-08	1.60E-08	2.43E-08	1.39E-06
Carcinogenics	CTUh	4.97E+01	6.01E+00	2.57E+00	3.83E+00	1.86E-01	6.23E+01
Non carcinogenics	CTUh	7.23E+01	2.06E+02	9.06E+00	1.31E+02	1.22E+00	4.19E+02
Respiratory effects	kg PM _{2.5} eq	3.12E-05	9.94E-06	1.99E-06	6.32E-06	4.17E-07	4.99E-05
Ecotoxicity	CTUe	3.16E-01	2.65E-02	1.66E-02	1.68E-02	1.40E-02	3.89E-01
Freshwater eutrophication	kg P eq	3.75E-03	2.07E-04	1.05E-03	1.32E-04	2.65E-04	5.41E-03
Marine eutrophication	kg N eq	4.31E-01	5.05E-02	2.29E-02	3.22E-02	1.97E-03	5.38E-01

Table 132. Percent contributions of each life cycle stage to each impact category for FENDOLITE® M-II/P produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	79.05%	7.54%	5.19%	4.80%	3.42%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	78.80%	7.45%	5.07%	4.74%	3.93%	100%
Ozone depletion	kg CFC-11 eq	49.57%	16.94%	22.28%	10.78%	0.42%	100%
Smog	kg O ₃ eq	83.73%	6.71%	4.80%	4.27%	0.49%	100%
Acidification	kg SO ₂ eq	89.68%	1.81%	5.60%	1.15%	1.75%	100%
Carcinogenics	CTUh	79.76%	9.66%	4.14%	6.15%	0.30%	100%
Non carcinogenics	CTUh	17.26%	49.06%	2.16%	31.23%	0.29%	100%
Respiratory effects	kg PM _{2.5} eq	62.60%	19.91%	3.98%	12.67%	0.84%	100%
Ecotoxicity	CTUe	81.03%	6.80%	4.26%	4.33%	3.59%	100%
Freshwater eutrophication	kg P eq	69.38%	3.82%	19.47%	2.43%	4.90%	100%
Marine eutrophication	kg N eq	80.03%	9.39%	4.25%	5.97%	0.37%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 133**. In terms of single-score results and overall environmental impacts, the raw material supply phase (A1) is the most significant contributor, accounting for approximately 69% of the total. This is followed by the transportation of raw materials (A2), which contributes around 14%, and the transportation to the building site phase (A4), which adds roughly 9%.

Table 133. SM millipoint scores for FENDOLITE® M-II/P produced at Houston, TX facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	2.21E+01	4.46E+00	2.56E+00	2.84E+00	3.80E-01	3.24E+01
	%	68.37%	13.78%	7.92%	8.77%	1.17%	100.00%

5.3.9. BLAZE-SHIELD® II

Table 134. LCIA results for BLAZE-SHIELD® II produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	1.98E+02	1.65E+01	9.42E+02	4.16E+01	5.55E+00	1.20E+03
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	1.98E+02	1.65E+01	9.42E+02	4.16E+01	5.55E+00	1.20E+03
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.05E-02	8.77E-04	3.04E-02	2.21E-03	3.19E-03	7.72E-02
GWP, TRACI _{Total}	kg CO ₂ eq	1.98E+02	1.63E+01	9.33E+02	4.10E+01	5.49E+00	1.19E+03
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	1.98E+02	1.63E+01	9.33E+02	4.10E+01	5.49E+00	1.19E+03
Ozone depletion	kg CFC-11 eq	8.28E-07	2.22E-07	5.43E-06	5.59E-07	1.87E-08	7.06E-06
Smog	kg O ₃ eq	5.12E-01	5.63E-02	4.69E+00	1.42E-01	1.29E-02	5.41E+00
Acidification	kg SO ₂ eq	4.25E-07	6.35E-09	1.10E-06	1.60E-08	1.97E-08	1.56E-06
Carcinogenics	CTUh	1.11E+01	1.52E+00	2.43E+01	3.83E+00	1.60E-01	4.09E+01
Non carcinogenics	CTUh	2.93E+01	5.20E+01	9.37E+01	1.31E+02	2.20E+00	3.08E+02
Respiratory effects	kg PM _{2.5} eq	8.87E-06	2.51E-06	5.37E-05	6.32E-06	2.71E-07	7.17E-05
Ecotoxicity	CTUe	7.31E-02	6.69E-03	5.75E-01	1.68E-02	9.17E-03	6.81E-01
Freshwater eutrophication	kg P eq	9.38E-04	5.22E-05	1.16E-02	1.32E-04	1.44E-04	1.29E-02
Marine eutrophication	kg N eq	9.70E-02	1.28E-02	2.14E-01	3.22E-02	1.39E-03	3.57E-01

Table 135. Percent contributions of each life cycle stage to each impact category for BLAZE-SHIELD® II produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	16.48%	1.37%	78.24%	3.45%	0.46%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	16.55%	1.36%	78.19%	3.44%	0.46%	100%
Ozone depletion	kg CFC-11 eq	11.73%	3.15%	76.93%	7.92%	0.26%	100%
Smog	kg O ₃ eq	9.47%	1.04%	86.63%	2.62%	0.24%	100%
Acidification	kg SO ₂ eq	27.18%	0.41%	70.13%	1.02%	1.26%	100%
Carcinogenics	CTUh	27.18%	3.71%	59.36%	9.35%	0.39%	100%
Non carcinogenics	CTUh	9.51%	16.87%	30.41%	42.49%	0.72%	100%
Respiratory effects	kg PM _{2.5} eq	12.39%	3.50%	74.90%	8.83%	0.38%	100%
Ecotoxicity	CTUe	10.74%	0.98%	84.45%	2.47%	1.35%	100%
Freshwater eutrophication	kg P eq	7.28%	0.41%	90.18%	1.02%	1.12%	100%
Marine eutrophication	kg N eq	27.18%	3.58%	59.84%	9.01%	0.39%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 136**. In terms of single-score results and overall environmental impacts, the manufacturing phase (A3) is the most significant contributor, accounting for approximately 73% of the total. This is followed by the raw material supply phase (A1), which contributes around 16%, and the transportation to the building site phase (A4), which adds roughly 8%.

Table 136. SM millipoint scores for BLAZE-SHIELD® II per declared unit produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	6.37E+00	1.13E+00	2.83E+01	2.84E+00	2.45E-01	3.88E+01
	%	16.39%	2.90%	72.77%	7.31%	0.63%	100.00%

5.3.10. BLAZE-SHIELD® II HS

Table 137. LCIA results for BLAZE-SHIELD® II HS produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	1.98E+02	1.65E+01	9.42E+02	4.16E+01	5.55E+00	1.20E+03
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	1.98E+02	1.65E+01	9.42E+02	4.16E+01	5.55E+00	1.20E+03
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.05E-02	8.77E-04	3.04E-02	2.21E-03	3.19E-03	7.72E-02
GWP, TRACI _{Total}	kg CO ₂ eq	1.98E+02	1.63E+01	9.33E+02	4.10E+01	5.49E+00	1.19E+03
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	1.98E+02	1.63E+01	9.33E+02	4.10E+01	5.49E+00	1.19E+03
Ozone depletion	kg CFC-11 eq	8.28E-07	2.22E-07	5.43E-06	5.59E-07	1.87E-08	7.06E-06
Smog	kg O ₃ eq	5.12E-01	5.63E-02	4.69E+00	1.42E-01	1.29E-02	5.41E+00
Acidification	kg SO ₂ eq	4.25E-07	6.35E-09	1.10E-06	1.60E-08	1.97E-08	1.56E-06
Carcinogenics	CTUh	1.11E+01	1.52E+00	2.43E+01	3.83E+00	1.60E-01	4.09E+01
Non carcinogenics	CTUh	2.93E+01	5.20E+01	9.37E+01	1.31E+02	2.20E+00	3.08E+02
Respiratory effects	kg PM _{2.5} eq	8.87E-06	2.51E-06	5.37E-05	6.32E-06	2.71E-07	7.17E-05
Ecotoxicity	CTUe	7.31E-02	6.69E-03	5.75E-01	1.68E-02	9.17E-03	6.81E-01
Freshwater eutrophication	kg P eq	9.38E-04	5.22E-05	1.16E-02	1.32E-04	1.44E-04	1.29E-02
Marine eutrophication	kg N eq	9.70E-02	1.28E-02	2.14E-01	3.22E-02	1.39E-03	3.57E-01

Table 138. Percent contributions of each life cycle stage to each impact category for BLAZE-SHIELD® II HS produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	16.48%	1.37%	78.24%	3.45%	0.46%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	16.55%	1.36%	78.19%	3.44%	0.46%	100%
Ozone depletion	kg CFC-11 eq	11.73%	3.15%	76.93%	7.92%	0.26%	100%
Smog	kg O ₃ eq	9.47%	1.04%	86.63%	2.62%	0.24%	100%
Acidification	kg SO ₂ eq	27.18%	0.41%	70.13%	1.02%	1.26%	100%
Carcinogenics	CTUh	27.18%	3.71%	59.36%	9.35%	0.39%	100%
Non carcinogenics	CTUh	9.51%	16.87%	30.41%	42.49%	0.72%	100%
Respiratory effects	kg PM _{2.5} eq	12.39%	3.50%	74.90%	8.83%	0.38%	100%
Ecotoxicity	CTUe	10.74%	0.98%	84.45%	2.47%	1.35%	100%
Freshwater eutrophication	kg P eq	7.28%	0.41%	90.18%	1.02%	1.12%	100%
Marine eutrophication	kg N eq	27.18%	3.58%	59.84%	9.01%	0.39%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 139**. In terms of single-score results and overall environmental impacts, the manufacturing phase (A3) is the most significant contributor, accounting for approximately 73% of the total. This is followed by the raw material supply phase (A1), which contributes around 16%, and the transportation to the building site phase (A4), which adds roughly 7%.

Table 139. SM millipoint scores for BLAZE-SHIELD® II HS produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	6.37E+00	1.13E+00	2.83E+01	2.84E+00	2.45E-01	3.88E+01
	%	16.39%	2.90%	72.77%	7.31%	0.63%	100.00%

5.3.11. BLAZE-SHIELD® HP

Table 140. LCIA results for BLAZE-SHIELD® HP produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	1.98E+02	1.65E+01	9.42E+02	4.16E+01	6.04E+00	1.20E+03
GWP, IPCC _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP, IPCC _{Fossil}	kg CO ₂ eq	1.98E+02	1.65E+01	9.42E+02	4.16E+01	6.04E+00	1.20E+03
GWP, IPCC _{Luluc}	kg CO ₂ eq	4.05E-02	8.77E-04	3.04E-02	2.21E-03	3.43E-03	7.74E-02
GWP, TRACI _{Total}	kg CO ₂ eq	1.98E+02	1.63E+01	9.33E+02	4.10E+01	5.98E+00	1.19E+03
GWP, TRACI _{Biogenic}	kg CO ₂ eq	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP, TRACI _{Fossil}	kg CO ₂ eq	1.98E+02	1.63E+01	9.33E+02	4.10E+01	5.98E+00	1.19E+03
Ozone depletion	kg CFC-11 eq	8.28E-07	2.22E-07	5.43E-06	5.59E-07	2.01E-08	7.06E-06
Smog	kg O ₃ eq	5.12E-01	5.63E-02	4.69E+00	1.42E-01	1.40E-02	5.41E+00
Acidification	kg SO ₂ eq	4.25E-07	6.35E-09	1.10E-06	1.60E-08	2.14E-08	1.56E-06
Carcinogenics	CTUh	1.11E+01	1.52E+00	2.43E+01	3.83E+00	1.72E-01	4.09E+01
Non carcinogenics	CTUh	2.93E+01	5.20E+01	9.37E+01	1.31E+02	2.27E+00	3.08E+02
Respiratory effects	kg PM _{2.5} eq	8.87E-06	2.51E-06	5.37E-05	6.32E-06	2.94E-07	7.17E-05
Ecotoxicity	CTUe	7.31E-02	6.69E-03	5.75E-01	1.68E-02	1.04E-02	6.82E-01
Freshwater eutrophication	kg P eq	9.38E-04	5.22E-05	1.16E-02	1.32E-04	1.63E-04	1.29E-02
Marine eutrophication	kg N eq	9.70E-02	1.28E-02	2.14E-01	3.22E-02	1.50E-03	3.57E-01

Table 141. Percent contributions of each life cycle stage to each impact category for BLAZE-SHIELD® HP produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
GWP, IPCC _{Total}	kg CO ₂ eq	16.47%	1.37%	78.20%	3.45%	0.50%	100%
GWP, TRACI _{Total}	kg CO ₂ eq	16.54%	1.36%	78.16%	3.43%	0.50%	100%
Ozone depletion	kg CFC-11 eq	11.73%	3.15%	76.91%	7.92%	0.28%	100%
Smog	kg O ₃ eq	9.47%	1.04%	86.62%	2.62%	0.26%	100%
Acidification	kg SO ₂ eq	27.15%	0.41%	70.05%	1.02%	1.37%	100%
Carcinogenics	CTUh	27.18%	3.71%	59.34%	9.35%	0.42%	100%
Non carcinogenics	CTUh	9.51%	16.87%	30.41%	42.48%	0.74%	100%
Respiratory effects	kg PM _{2.5} eq	12.38%	3.50%	74.88%	8.82%	0.41%	100%
Ecotoxicity	CTUe	10.72%	0.98%	84.31%	2.47%	1.52%	100%
Freshwater eutrophication	kg P eq	7.27%	0.40%	90.05%	1.02%	1.26%	100%
Marine eutrophication	kg N eq	27.18%	3.58%	59.82%	9.01%	0.42%	100%

The SM2013 Methodology single figure millipoint (mPt) score by life cycle module for this product is presented in **Table 142**. In terms of single-score results and overall environmental impacts, the manufacturing phase (A3) is the most significant contributor, accounting for approximately 73% of the total. This is followed by the raw material supply phase (A1), which contributes around 16%, and the transportation to the building site phase (A4), which adds roughly 7%.

Table 142. SM millipoint scores for BLAZE-SHIELD® HP produced at Huntington, IN facility per declared unit

Impact category	Unit	A1 - Raw Material supply	A2 - Transport	A3 - Manufacturing	A4 - Transport to the Building Site	A5 - Installation	Total
SM single figure score	mPts	6.37E+00	1.13E+00	2.83E+01	2.84E+00	2.68E-01	3.89E+01
	%	16.38%	2.90%	72.72%	7.31%	0.69%	100.00%

5.4. Sensitivity analysis

Sensitivity analyses were conducted to assess the robustness of the results, focusing on areas with the highest potential environmental impacts. Among all the environmental impact indicators, the 100-year Global Warming Potential (GWP) values from the IPCC 2021 Sixth Assessment Report (AR6) was selected for the analysis.

For CAFCO® 300, CAFCO® 400, and FENDOLITE® M-II, materials with higher carbon footprints were selected for the sensitivity analysis, as they contributed more significantly to the overall environmental impacts. Specifically, the mass of natural gypsum in CAFCO® 300, Portland cement in CAFCO® 400, and Portland cement in FENDOLITE® M-II was varied by +/-20%. In the case of BLAZE-SHIELD®, coke consumption was selected for sensitivity analysis and also varied by +/-20%, as the majority of its environmental impact originates from the manufacturing phase.

The results of the sensitivity analyses indicate that the cradle-to-installation life cycle impacts are highly sensitive to the quantities of materials and energy sources with higher carbon footprints used in the production of the products. Variations in the consumption of these materials and energy inputs resulted in noticeable changes in the total IPCC global warming potential for each product.

Specifically, CAFCO® 300 experienced a change of approximately +/-8.9%, CAFCO® 400 saw a +/-13% change, and FENDOLITE® M-II showed a +/-12.5% change. For BLAZE-SHIELD®, changes in coke consumption resulted in a +/-13.9% change in total IPCC global warming potential. The results for all four passive fire protection products are summarized in **Table 143**.

Table 143. Sensitivity of raw material and coke consumption on total impact assessment results per declared unit

	IPCC, GWP _{Total}	
	kg CO ₂ eq emissions	% change
CAFCO® 300 - CA		
Baseline	4.26E+02	N/A
+20% gypsum plaster	4.63E+02	8.9%
-20% gypsum plaster	3.88E+02	-8.9%
CAFCO® 400 – Stanhope, NJ		
Baseline	8.14E+02	N/A
+20% Portland cement	9.19E+02	13.0%
-20% Portland cement	7.08E+02	-13.0%
FENDOLITE® M-II – Houston, TX		
Baseline	8.66E+02	N/A
+20% Portland cement	9.75E+02	12.5%
-20% Portland cement	7.58E+02	-12.5%
BLAZE-SHIELD® - Huntington, IN		
Baseline	1.20E+03	N/A
+20% coke consumption	1.37E+03	13.9%
-20% coke consumption	1.04E+03	-13.9%

5.5. Overview of relevant findings

This study assessed a broad range of inventory and environmental indicators. Overall, the environmental performance of the CAFCO® 300 series, CAFCO® 400 series, and FENDOLITE® M-II series is primarily influenced by the raw material supply phase (A1). In contrast, the BLAZE-SHIELD® series exhibits environmental performance that is largely driven by the manufacturing phase (A3).

For gypsum based SFRMs such as the CAFCO® 300 series and CAFCO® 400 AC, total CO₂-equivalent emissions across the cradle-to-installation life cycle stages are estimated to range from 386 to 521 kg CO₂ eq according to the IPCC AR6 methodology, and from 387 to 522 kg CO₂ eq based on the TRACI 2.2 methodology. The raw material supply phase (A1) is the primary contributor to global warming potential, accounting for approximately 50–60% of total emissions. This impact is largely driven by the use of natural gypsum, which alone accounts for about 40% of CO₂-equivalent emissions within the A1 phase.

In contrast, for Portland cement based SFRMs, specifically CAFCO® 400 and FENDOLITE® M-II Series, the estimated cradle-to-installation CO₂-equivalent emissions are higher, ranging from 766 to 902 kg CO₂ eq (IPCC AR6) and from 765 to 899 kg CO₂ eq (TRACI 2.2). As with gypsum-based products, the raw material supply phase (A1) dominates the global warming potential, contributing approximately 70–80% of total emissions. This is primarily due to the use of Portland cement, which is responsible for about 60% of the CO₂-equivalent emissions in the A1 phase.

For the BLAZE-SHIELD® series, the majority of the environmental impact originates from the manufacturing phase (A3), which accounts for approximately 80% of the total impact. This significant contribution is attributed to the use of coke-fired furnaces needed to melt recycled slag and rock into mineral wool.

When examining non-carcinogenic effects, phase A2 (transport of raw materials) is typically the main contributor for the CAFCO® 300 series, CAFCO® 400 series, and FENDOLITE® M-II series. This is due to emissions such as nitrogen oxides (NO_x) and particulate matter, which are linked to non-carcinogenic health effects. However, for products manufactured at the Stanhope, NJ facility, phase A4 (transport to the site) is the dominant contributor. This is because the inbound transport of raw materials to this facility is minimal compared to other locations.

5.6. Conclusion and recommendations

The goal of this study was to conduct a cradle-to-installation life cycle assessment (LCA) of Isolatek's spray applied fireproofing products, in order to provide science-based research findings and support the development of a Transparency Report [EPD]™. The creation of this TR will allow consumers in the building and construction industry to make better informed decisions about the environmental impacts associated with the products they choose.

The results indicate that the greatest opportunities for reducing environmental impact are found in the raw material supply, raw material transportation, and manufacturing phases. Strategies such as increasing the recycled content and sourcing suppliers located closer to manufacturing sites can help lower the environmental footprint of Isolatek's products.

Compared to previous LCA studies, an increase in potential impacts was reflected for the BLAZE-SHIELD series. This increase was largely due to having a more

accurate and up-to-date LCI data set for heat production from burning coke-coal, along with other updates to the underlying data sets. Together, these enhancements provide a more complete picture of each product's environmental performance. Moving forward, similar products modeled with the latest data sets are expected to show corresponding changes in potential impacts and results.

Additionally, regular updates to this LCA and the associated Transparency Reports [EPDs][™] would enable high-quality year-over-year comparisons and serve as the basis for a potential optimized EPD, which is assigned a higher credit value under the Materials and Resources category in LEED and would help clients looking to increase the performance of their building projects. A post-study review may provide opportunities for improving the data collection process in future years and for continuing to align with Isolatek's goals for sustainability.

6. REFERENCES

- [1] ISO 14025, “Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures”, ISO14025:2006
- [2] ISO 14044, “Environmental management - Life cycle assessment - Requirements and guidelines”, ISO14044:2006.
- [3] ISO 21930, “Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services”, ISO 21930:2017.
- [4] Smart EPD Part A Product Category Rules for Building and Construction Products and Services, Standard 1000. Version 1.01. January 2024. www.smartepd.com
- [5] Smart EPD (2023) Part B Product Category Rules for Spray-applied Fire-Resistive Materials (SFRM). Version 4.0. www.smartepd.com.
- [6] Joep Meijer, Sustainable Minds SM2013 Methodology and Database, April 25, 2013. For a summary, see the Sustainable Minds single score page: <http://www.sustainableminds.com/showroom/shared/learn-single-score.html>
- [7] Bare, J. 2014. Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI) TRACI version 2.1 User’s Guide. US EPA Office of Research and Development, Washington, DC, EPA/600/R-12/554, <http://nepis.epa.gov/Adobe/PDF/P100HN53.pdf>
- [8] Ryberg, M., Vieira, M.D.M., Zgola, M. et al. (2014). ‘Updated US and Canadian normalization factors for TRACI 2.1.’ Clean Technologies and Environmental Policy 16: 329. doi:10.1007/s10098-013-0629-z
- [9] Gloria, T. P., B. C. Lippiatt & J. Cooper (2007). ‘Life cycle impact assessment weights to support environmentally preferable purchasing in the United States.’ Environmental Science & Technology, 41(21), 7551-7557
- [10] "ACLCA Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017", ACLCA PCR committee working group for ISO 21930 metric calculation guidance, May 2019.
- [11] Frischknecht R., Jungbluth N., et.al. (2003). Implementation of Life Cycle Impact Assessment Methods. Final report ecoinvent 2000, Swiss Centre for LCI. Duebendorf, CH, www.ecoinvent.ch.
- [12] Heijungs R., Guinée J.B., Huppes G., Lankreijer R.M., Udo de Haes H.A., Wegener Sleeswijk A. Environmental Life Cycle Assessment of Products: Guide and Backgrounds. CML. Leiden University, Leiden, 1992.

ACRONYMS

ACLCA	American Center for Life Cycle Assessment
BOM	Bill of materials
ESL	Estimated service life
ISO	International Standardization Organization
LCA	Life cycle assessment
LCI	Life cycle inventory
LCIA	Life cycle impact analysis
PCR	Product Category Rule document
REC	Renewable energy certificates
RSL	Reference service life
TR	Transparency Report [EPD] TM

GLOSSARY

For the purposes of this report, the terms and definitions given in ISO 14020, ISO 14025, the ISO 14040 series, and ISO 21930 apply. The most important ones are included here.

Allocation	Partitioning the input or output flows of a process or a product system between the product system under study and one or more other product systems
Close loop & open loop	A closed-loop allocation procedure applies to closed-loop product systems. It also applies to open-loop product systems where no changes occur in the inherent properties of the recycled material. In such cases, the need for allocation is avoided since the use of secondary material displaces the use of virgin (primary) materials. An open-loop allocation procedure applies to open-loop product systems where the material is recycled into other product systems, and the material undergoes a change to its inherent properties.
Cradle to grave	Addresses the environmental aspects and potential environmental impacts (e.g., use of resources and environmental consequences of releases) throughout a product's life cycle from raw material acquisition until the end of life
Cradle to gate	Addresses the environmental aspects and potential environmental impacts (e.g. use of resources and environmental consequences of releases) throughout a product's life cycle from raw material acquisition until the end of the production process ("gate of the factory"). It may also include transportation until use phase
Declared unit	Quantity of a product for use as a reference unit in an EPD based on one or more information modules
Life cycle	Consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal
Life cycle assessment - LCA	Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle
Life cycle impact assessment - LCIA	Phase of life cycle assessment aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts for a product system throughout the life cycle of the product
Life cycle inventory - LCI	phase of life cycle assessment involving the compilation and quantification of inputs and outputs for a product throughout its life cycle
Life cycle interpretation	Phase of life cycle assessment in which the findings of either the inventory analysis or the impact assessment, or both, are evaluated in relation to the defined goal and scope in order to reach conclusions and recommendations

APPENDIX

