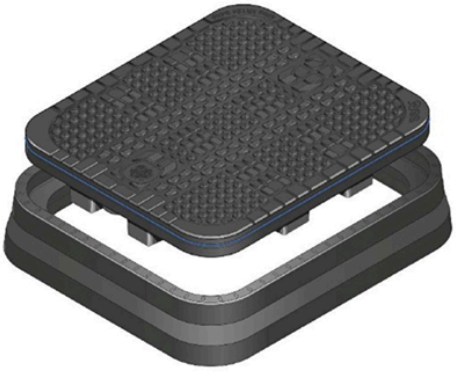
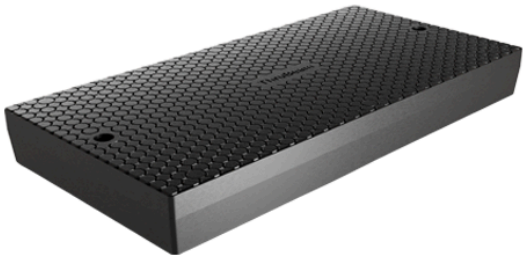
ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2:2019/AC:2021

Composite Trench Covers and Manhole Covers





ThruBeam® COVERS

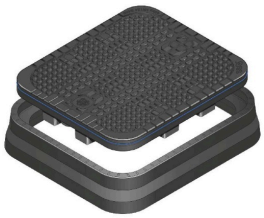
SMART EPD CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION

SmartEPD-2026-146-0962-01.2

Date of Issue	Expiration Date	Last Updated
Jun 29, 2026	Jun 29, 2031	Jul 20, 2026

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information



Structural Science Composites Ltd

Structural Science Composites Company Unit 8 James Freel Court, James Freel Close, Barrow in Furness, UK, LA14 2NG

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Product Name:	Composite Trench Covers and Manhole Covers
Declared Unit:	1 kg of a composite manhole or trench cover
Declaration Number:	SmartEPD-2026-146-0962-01.2
Date of Issue:	June 29, 2026
Expiration:	June 29, 2031
Last updated:	July 20, 2026
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	Europe, North America

General Organization Information

Structural Science Composites Ltd. is a UK-based manufacturer specializing in lightweight composite access cover and trench cover systems for infrastructure, utility, industrial, transportation, and data center applications. The company manufactures and supplies products under the ThruBeam brand name, which represents its composite access cover and trench cover product line. ThruBeam products are designed as lightweight alternatives to traditional cast iron and concrete systems, utilizing Glass Reinforced Plastic (GRP) composite materials to improve handling safety, corrosion resistance, installation efficiency, and long-term durability. The organization supplies products across multiple load classifications and applications including utility access chambers, drainage systems, trench covers, highways, commercial developments, and critical infrastructure projects.

Limitations, Liability and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and EN 15804+A2:2019/AC:2021
Core PCR:	EPD International PCR for Construction Products 2019:14 (EN 15804:A2:2019/AC:2021) v2.0.1 Date of issue: June 05, 2025

Valid until: April 07, 2030

Sub-category PCR review panel: Contact Smart EPD for more information.

General Program Instructions: Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

LCA Author/Creator:
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585 Grove St., Ste. 145, Herndon, VA 20170, USA

Verification:

Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External
Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External
Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Product Information

Declared Unit: 1 kg of a composite manhole or trench cover

Mass: 1 kg

Product Specificity:
✗ Product Average
✓ Product Specific
✗ Representative Product EPD

Product Description

Composite Access Covers and Trench Covers are lightweight Glass Reinforced Plastic (GRP) composite products designed for infrastructure, utility, industrial, commercial, and data center applications. The product range includes manhole covers, access covers, chamber covers, and trench cover systems manufactured in multiple load classes and dimensional configurations. Compared to traditional cast iron or concrete alternatives, the products are designed to provide reduced weight, corrosion resistance, improved handling safety, anti-slip surface performance, and long-term durability in demanding environments. Products are manufactured for applications including pedestrian areas, utility corridors, roadways, drainage systems, and cable management infrastructure.

Further information can be found at: https://thrubeam.co.uk/product-category/manhole-covers/

Product Specifications

Product SKU(s):

EU Manhole Covers	US Manhole Covers	Trench Covers
BM3030	T15M1212	DT 1495
BM6045	T15M2418	DT 1214
BM6060	T15M2424	DT 935
BM8080	T15M3232	HT54.5-24
BM8080 vented	T15M3232V	HT53-24
CR90	H20R36	HT43-24
CR90-DC	H20R36-DC	HT41-24
CR106	H20R42	HT39-24
CR106DC	H20R42-DC	HT37-24
DM6	H20R24	
DM9	H20R30	
DR60	H40R24	
DR76	H40R30	
DR90	H40R36	
DR106	H40R42	
DR106DC	H40R42-DC	
DS6 PRM	H40M2824	
DS6	H40M3624	
	H40M2424P	

Product Classification Codes: EC3 - CastDecksAndUnderlayment

Table 1. Material Composition

Material/Component Category	Origin	% Mass
Ancillary Component	UK	0.03
Auxiliary Chemical	UK	3.21
Metal	UK	0.50
Fiberglass and Mineral Fillers	UK	43.85
Polymeric Material	UK	52.40

Packaging Material	Origin	kg Mass
Cardboard		0.000224
Pallet wrap		0.0014
Wood pallet		0.014

Biogenic Carbon Content	kg C per kg
Biogenic carbon content in product	0None

Biogenic Carbon Content	kg C per kg
Biogenic carbon content in accompanying packaging	0.01

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: 01/01/2025 - 12/31/2025

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Multiple trench cover and manhole cover products made from the same patented ThruBeam composite material are manufactured at the same facility. These products were grouped together, and a weighted sales average was used for calculation purposes.

Table 2. System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND

End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

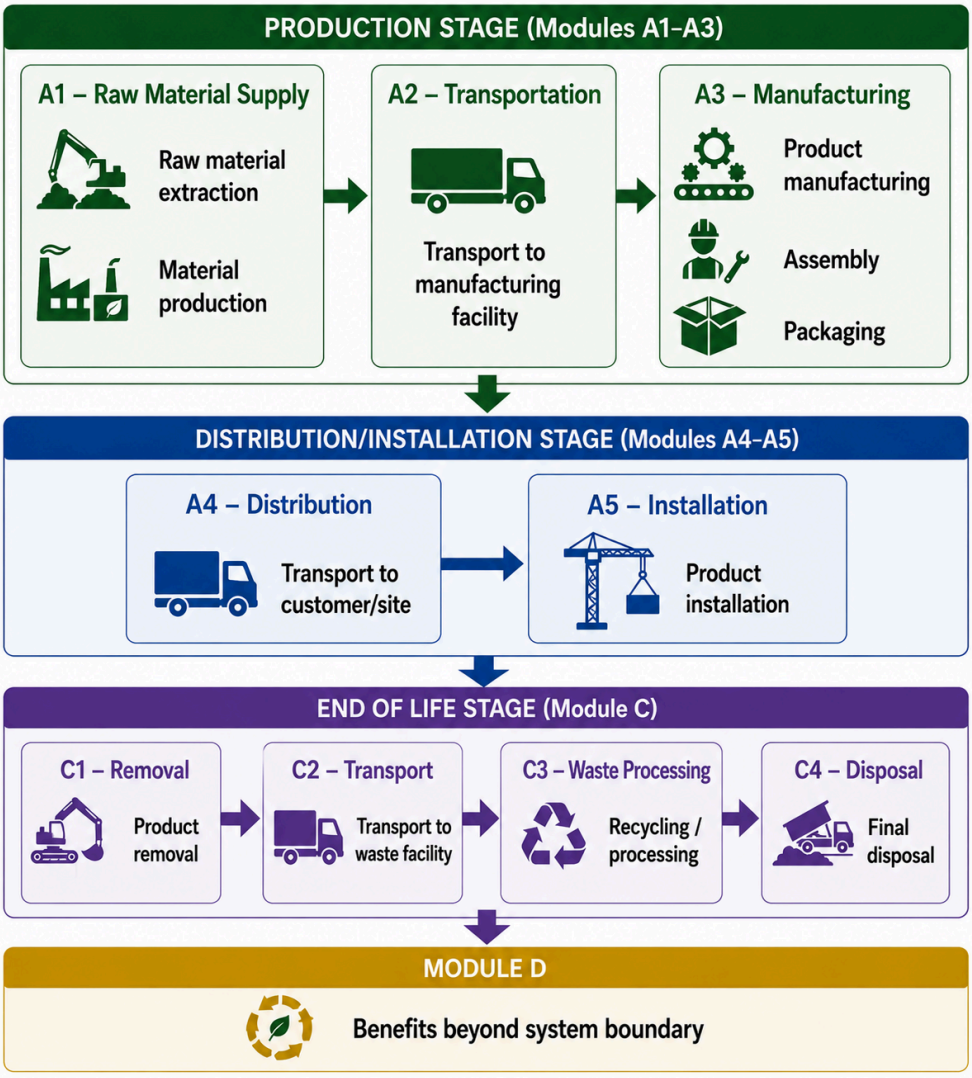
Note:

ND = Module not declared

Plants

Structural Science Composites Ltd James Freel Court, James Freel Close, Barrow-in-Furness LA14 2NG, United Kingdom

Product Flow Diagram



Software And Database

LCA Software:	SimaPro v. 10.2	
LCI Foreground Database(s):	Ecoinvent v. 3.11	Cut-off by Classification
LCI Background Database(s):	Ecoinvent v. 3.11	Cut-off by Classification

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

Precision & Completeness

- **Precision:** Inventory data were directly measured, calculated, or conservatively estimated from primary sources using consistent units and QA checks. Background processes from ecoinvent v3.11 were adopted with their documented uncertainty/precision metadata where available, preserving a transparent record of data quality.
- **Completeness:** The product system's mass and energy balance, as well as inventory completeness, were verified. Minor exclusions deemed immaterial under EN 15804+A2 were applied, including personnel impacts, R&D activities, business travel, and point-of-sale infrastructure. No data were intentionally omitted.

Consistency and Reproducibility

- **Consistency:** Primary data for all modules were consistently gathered aiming at the highest level of detail possible. Background processes were modeled mainly with the ecoinvent database. The same allocation rules, cut-off criteria, and impact assessment methods were applied throughout, ensuring methodological coherence and consistent data quality across the entire LCA model.
- **Reproducibility:** This study ensures reproducibility by providing comprehensive disclosure of input–output data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness

- **Temporal:**Primary data were collected over a 12-month period representing the 2025 calendar year. Secondary data from the ecoinvent v3.11 database are representative of recent reference years.
- **Geographical:**Primary data reflect the actual production facility of Structural Science Composites Ltd. in Barrow-in-Furness, United Kingdom. Where relevant, differences in electricity grid mixes were accounted for, using appropriate secondary datasets. Country-specific data were used whenever available to ensure high geographical representativeness, while proxy data were applied only when necessary.
- **Technological:** Primary and secondary data were selected to reflect the actual technologies used, ensuring high technological representativeness.

Table 3. Data Sources

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Polyester Resin	Bill of Materials, LCI Database	Thrubeam, ecoinvent	2010-2025	Primary (Bill of Materials), Secondary (Upstream emissions)	57%
Glass Fiber	Bill of Materials, LCI Database	Thrubeam, ecoinvent	2024-2025	Primary (Bill of Materials), Secondary (Upstream emissions)	18%

Life Cycle Module Description

Modules A1–A3: The LCA model covers the manufacture of raw materials and components for the products (A1), followed by transport to the Structural Science Composites Ltd. manufacturing facility primarily by truck, with ferry and ocean transport included where applicable (A2). The manufacturing stage (A3) begins with receipt of these materials and includes operations such as material preparation, molding, curing, finishing, assembly, and packaging of finished composite access covers.

Modules A4–A5: Once manufacture is completed, products are shipped to customers by truck, ferry, and ocean freight as applicable (A4). For installation (A5), no material installation loss was assumed, conservatively. This module includes disposal of product packaging.

Modules C1–C4 and D: At end of life (C1–C4), the product is assumed to be collected and managed according to the applicable UK end-of-life scenario for composite materials. Loads and benefits beyond the system boundary are considered in Module D (e.g., displacement of virgin materials from packaging waste recycling).

LCA Discussion

Allocation Procedure

Allocation of co-products was avoided, to the extent possible, based on the guidance given in ISO 14044:2006, 4.3, and EN 15804+A2. Utilities used at the facility level were allocated by mass. Manufacturing waste was treated as a co-product with no economic value and therefore remained within the product system in accordance with EN 15804 requirements. The manufacturing process does not generate wastewater or significant direct air emissions other than those associated with energy consumption and material processing. Solid waste was estimated using packaging masses and material losses and allocated following the polluter pays principle.

Cut-off Procedure

For the processes within the system boundary, all available energy and material flow data have been included in the model. Cut-off criteria, however, were applied to exclude capital goods and infrastructure, personnel impacts, R&D activities, business travel, and office operations, as these are assumed to not significantly affect LCA results nor conclusions. Manufacturing waste was treated in accordance with EN 15804+A2 requirements and was not excluded from the assessment.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Vehicle Type:	Truck and Trailer
Transport Distance:	1627 km
Capacity Utilization:	33 %
Packaging Mass:	0.01584 kg
Weight of products transported:	1.016 kg
Capacity utilization volume factor:	1
Assumptions for scenario development:	Transport distance includes finished product to distribution center and distribution center to point of sale.

Installation in to the building/construction site (A5)

A5 Module

Mass of Packaging Waste Specified by Type:	0.01584 kg

Biogenic Carbon Contained in Packaging (kg C):	0.007835 kg
Assumptions for scenario development:	Impacts limited to product packaging waste management

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	1 kg

Recovery

Recycling:	0.05 kg
Landfill:	0.342 kg
Incineration:	0.608 kg

Assumptions for scenario development:

UK-specific end-of-life scenario for composite products. Product assumed to be collected with mixed construction waste. Recovery pathways include 5.0% recycling, 60.8% incineration, and 34.2% landfill based on Defra waste statistics and Composites UK guidance on composite material recovery.

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	5 %
Net Energy Benefit from Energy Recovery from Waste Treatment Declared as Export Energy in C3:	11.6 MJ
Further assumptions for scenario development:	Net energy production: 3.93MJ/kg electric energy and 7.67MJ/kg thermal energy.

Results

Table 4. Environmental Impact Assessment Results

EF 3.1

per 1 kg of product of a composite manhole or trench cover.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Unit	Method	A1 - A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	EF 3.1	4.59e+0	1.01e-1	6.91e-3	0	1.37e-2	9.86e-1	3.35e-3	-5.93e-1
GWP-biogenic	kg CO2 eq	EF 3.1	7.01e-3	5.60e-5	6.11e-3	0	8.38e-6	1.12e-4	1.59e-5	-6.59e-3
GWP-fossil	kg CO2 eq	EF 3.1	4.58e+0	1.01e-1	7.97e-4	0	1.37e-2	9.86e-1	3.33e-3	-5.86e-1
GWP-luluc	kg CO2 eq	EF 3.1	3.65e-3	3.78e-5	1.25e-7	0	4.92e-6	8.61e-6	8.37e-7	-2.79e-4
ODP	kg CFC11 eq	EF 3.1	2.02e-6	2.16e-9	7.39e-12	0	3.00e-10	4.49e-10	1.12e-10	-2.81e-8
AP	mol H+ eq	EF 3.1	2.15e-2	5.40e-4	2.01e-6	0	4.54e-5	2.96e-4	3.75e-5	-1.50e-3
EP-freshwater	kg P eq	EF 3.1	1.13e-3	6.88e-6	6.94e-8	0	9.67e-7	3.39e-6	5.74e-6	-5.17e-5
EP-marine	kg N eq	EF 3.1	4.15e-3	1.62e-4	1.73e-6	0	1.54e-5	5.74e-4	9.36e-6	-4.59e-4
EP-terrestrial	mol N eq	EF 3.1	4.30e-2	1.78e-3	8.85e-6	0	1.68e-4	1.44e-3	1.01e-4	-5.06e-3
POCP	kg NMVOC eq	EF 3.1	1.94e-2	6.63e-4	3.08e-6	0	7.19e-5	4.05e-4	3.65e-5	-1.80e-3
ADP-minerals&metals	kg Sb eq	EF 3.1	1.65e-4	2.71e-7	9.56e-10	0	3.85e-8	6.30e-8	5.61e-9	-3.34e-6
ADP-fossil	MJ	EF 3.1	8.53e+1	1.46e+0	5.05e-3	0	2.01e-1	2.77e-1	7.88e-2	-1.28e+1
WDP	m3 depriv.	EF 3.1	1.51e+0	6.44e-3	-2.25e-4	0	9.12e-4	6.78e-4	-4.37e-2	-3.73e-2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product 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. 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 comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Table 5. Resource Use Indicator

per 1 kg of product of a composite manhole or trench cover.

Indicator	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	6.37e+0	2.12e-2	8.70e-5	0	3.00e-3	9.39e-3	1.47e-3	-1.21e+0
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	3.52e+0	9.46e-3	3.79e-5	0	1.34e-3	4.23e-3	5.39e-4	-1.08e+0
PENRE	MJ	8.53e+1	1.46e+0	5.05e-3	0	2.01e-1	2.77e-1	7.88e-2	-1.28e+1
PENRM	MJ	5.05e+0	0	0	0	0	0	0	0
PENRT	MJ	8.32e+1	1.44e+0	4.97e-3	0	1.97e-1	2.69e-1	7.73e-2	-1.09e+1
SM	kg	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Table 6. Waste and Output Flow Indicators

per 1 kg of product of a composite manhole or trench cover.

Indicator	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0
NHWD	kg	0	0	2.70e-5	0	0	0	0	0
RWD	kg	1.22e-4	3.87e-7	1.47e-9	0	5.52e-8	1.35e-7	2.39e-8	-3.43e-5
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	3.31e-2	0	9.09e-3	0	0	5.00e-2	0	0
MER	kg	4.47e-2	0	2.48e-3	0	0	6.08e-1	0	0
EE	MJ	1.38e+0	0	4.49e-2	0	0	1.87e+1	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Table 7. Carbon Emissions and Removals

per 1 kg of product of a composite manhole or trench cover.

Indicator	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
Bio Carbon Removal from Product	kg CO2	0	0	0	0	0	0	0	0
Bio Carbon Emission from Product	kg CO2	0	0	0	0	0	0	0	0
Bio Carbon Removal from Packaging	kg CO2	-2.87e-2	0	0	0	0	0	0	0
Bio Carbon Emission from Packaging	kg CO2	2.87e-2	0	ND	0	0	0	0	0
Bio Carbon Emission from Waste during Manufacturing (renewable source)	kg CO2	0	0	0	0	0	0	0	0
Calcination Carbon Removal	kg CO2	0	0	0	0	0	0	0	0
Carbonation Carbon Emission	kg CO2	0	0	0	0	0	0	0	0
Carbon Emission from Waste during Manufacturing (non-renewable source)	kg CO2	0	0	0	0	0	0	0	0

Note:

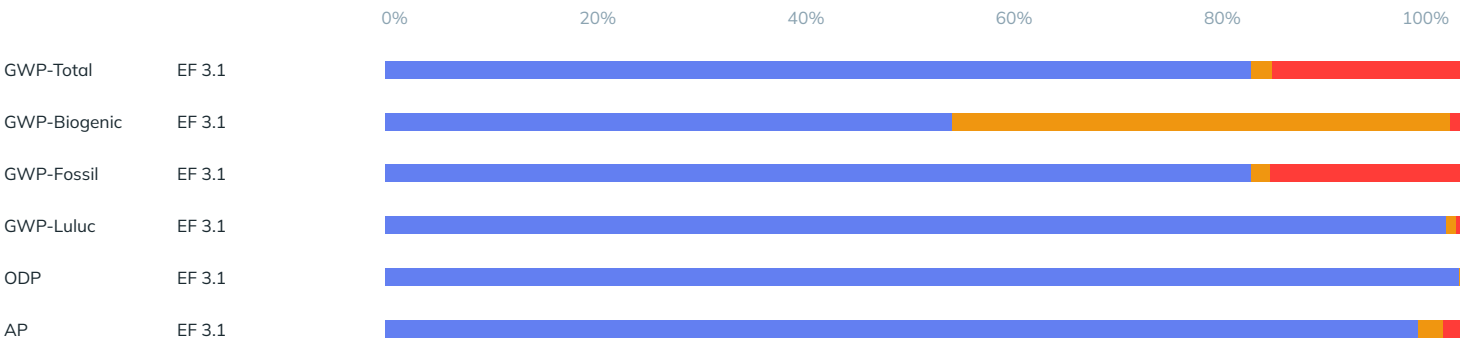
Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

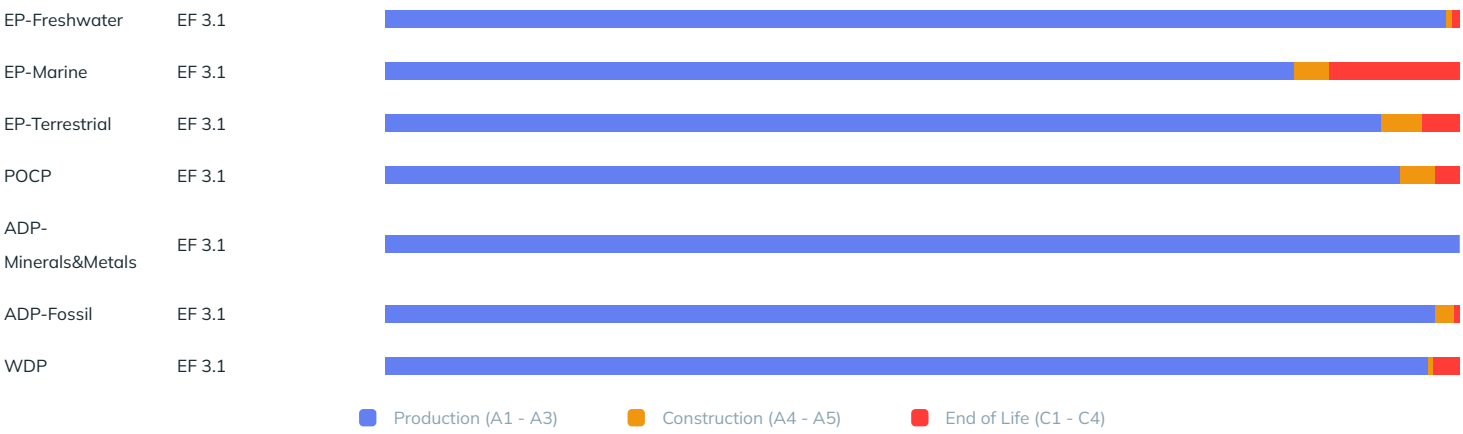
Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

- The manufacturing of the products in this analysis involves the procurement of raw materials from suppliers, followed by transportation to the Structural Science Composites Ltd. manufacturing facility where materials are stored, processed, molded, cured, assembled, and packaged into finished composite access covers. The product stage (A1–A3) represents the largest contribution to environmental impacts, primarily due to the production of resin systems, fiberglass reinforcement, calcined bauxite, and the energy consumed during manufacturing.
- For products with significant manufacturing energy impacts, continued efforts to improve energy efficiency and increase the use of renewable electricity sources are recommended.
- Given the significant contribution of raw materials to the overall environmental profile, opportunities should be explored to reduce material consumption, increase recycled content where technically feasible, and evaluate lower-impact material alternatives. Additionally, collaboration with suppliers to improve environmental performance, adopt sustainable manufacturing practices, and increase the use of renewable energy can further reduce the environmental impacts of the products assessed in this analysis.





Additional Environmental Information

None

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