

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2:2019 for

Sol + Guard™ Swimming Pool Cover Material

Manufactured by Plastipack Limited

Programme: The International EPD® System

Programme Operator: EPD International AB

EPD Registration Number: S-P-0016770

Version Date: 2024-10-08

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Geographical Scope: Global

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com.



THE INTERNATIONAL EPD® SYSTEM



About Sol + Guard[™] Swimming Pool Cover Material

Sol + Guard[™] is one of several GeoBubble[™] materials manufactured by Plastipack used for the fabrication of pool covers and designed to reduce the energy and resources used to maintain a pool.

Sol + Guard[™] (S+G) material is comprised of two layers of low-density polyethylene (LDPE) that has pigments, UV and heat stabilizers added to its formulation. The bottom layer goes through a vacuum forming process before the two layers are laminated to produce a single material with air cells (similar to bubble wrap packaging).

S+G is manufactured at Plastipack's production site in the UK. From there the final packaged product is distributed to customers around the world for further processing. The packaging is composed mostly of 100% recycled content cardboard and LDPE.

This EPD presents detailed results for the 1 m² of S+G pool cover material and its packaging.

The UN CPC code for this product is 369 Other Plastics Products.




General Information

The EPD is owned by Plastipack Limited which has the sole ownership, liability, and responsibility for the EPD. The EPD provides current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

The programme operator is the International EPD[®] System EPD International AB, Box 210 60, SE-100 31 Stockholm.

Product category rules

CEN standard EN 15804 serves as the Core Product Category Rules (PCR). Product Category Rules (PCR): 2019:14 Version 1.3.4, Construction Products, EN 15804:2012 + A2:2019 Sustainability of Construction Works. PCR review was conducted by: The Technical Committee of the International EPD[®] System. Review chair: Claudia A. Peña, University of Concepción, Chile.

LCA Accountability: Valpak Sustainability Consulting 

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification EPD process verification

Third-party verifier: Hudai Kara PhD, Metsims Sustainability Consulting, www.metsims.com

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Life Cycle Assessment Methodology

Declared unit1 m² of Sol + Guard[™] pool cover material**Weight of declared unit**

0.46 kg

Reference service life

8 years

Time representativeness

2022

Database and LCA software

GreenDelta's EN15804 Add-on version 2 and OpenLCA Version 2.03

Method used

EF 3.1

System boundaries

Cradle-to-gate with options, modules C1-C4 and module D. This consists of (A1) extraction and processing of raw materials for the product and its packaging, (A2) transport of materials to Plastipack's production site, (A3) manufacturing of S+G, distribution of the packaged product to customers (A4), End-of-life waste management (C1-C4), and D. Excluded modules are A5 and B1-B7.

LCA modelling

There is no allocation of co-products in the LCA modelling underpinning this EPD. No cut-offs are applied to either the inventory data or the calculated environmental impacts. As per the requirements of the International EPD[®] system, the LCA results are shown in the results tables below.

Audience

The intended application for this study is to provide comprehensive information on the environmental impacts of the S+G pool cover manufactured by Plastipack. The intended audience is B2B i.e. Plastipack's customers and end-users of S+G pool cover material.

Content Declaration

Materials and packaging per 1 m² of S+G pool cover material.

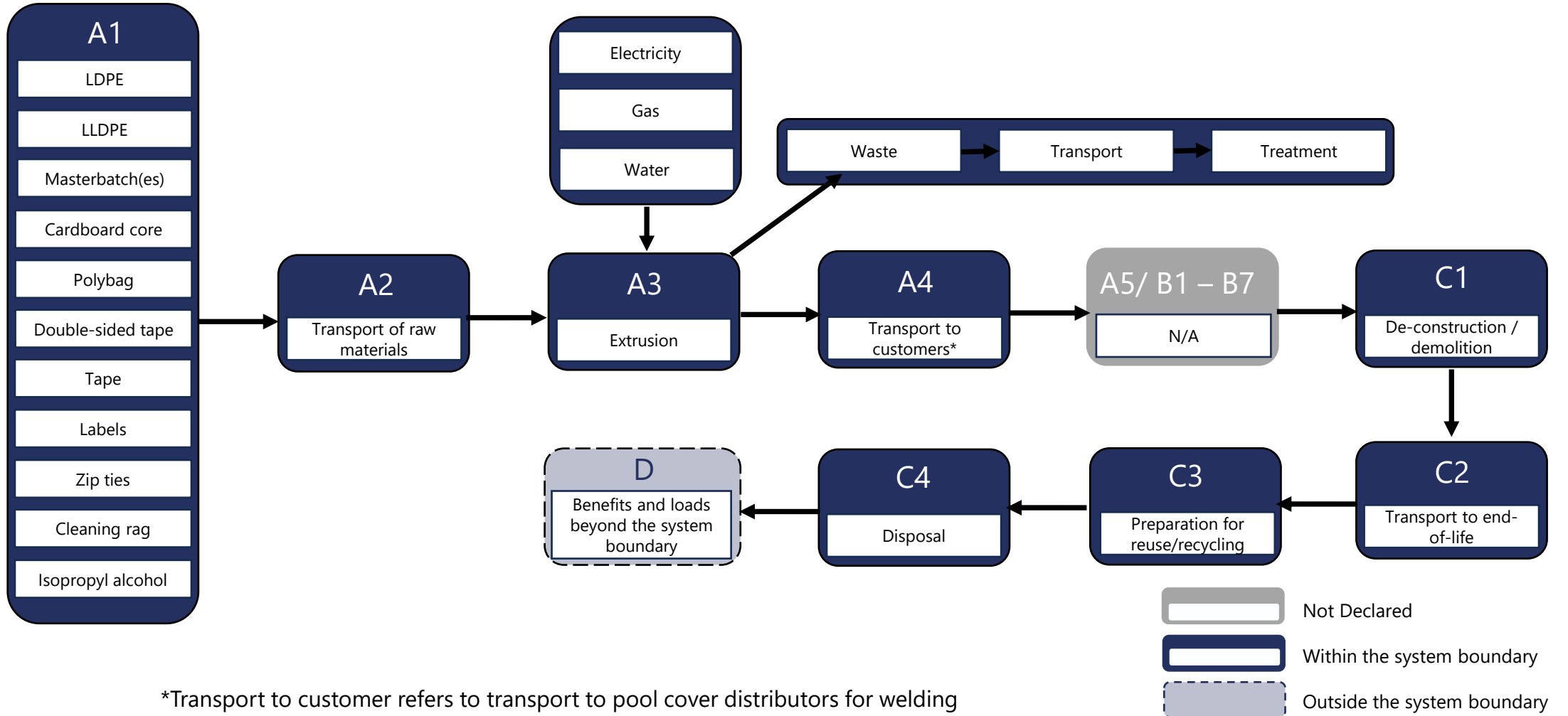
Material	Weight (kg)	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic carbon kg C/product
LDPE	0.381	0%	0%	0.00
LLDPE	0.0460	0%	0%	0.00
Masterbatch MB028	0.00616	0%	0%	0.00
Masterbatch MB014	0.0176	0%	0%	0.00
Masterbatch MB030	0.0092	0%	0%	0.00
Total	0.46	0%	0%	0.00

Packaging	Weight (kg)	Post-consumer recycled material, % of packaging weight	Biogenic material, kg C/product
Polypropylene	0.000123	0%	0.00
Cardboard	0.00343	100%	0.000413
LDPE	0.00392	30%	0.00
Nylon 6-6	0.00000980	0%	0.00
Total	0.000413	-	0.000413

Dangerous substances

No substances included in the Candidate List of Substances of Very High Concern for authorisation under the REACH regulations are present in the product either above the threshold for registration with the European Chemicals Agency or above 0.1%.

Product Life Cycle Overview



Product Life Cycle Overview

A1 Raw materials supply - Extraction, processing and supply of raw materials used to manufacture 1m² of S+G pool cover material and its packaging. By weight, the main material input is LDPE.

A2 Transport - Transport to Plastipack’s production site. Supplier locations are provided by Plastipack.

A3 Manufacturing - Energy, fuels, water and wastes per 1 m² of S+G pool cover material. Amounts per 1 m² of S+G are allocated according to 2022 production data supplied by Plastipack. The electricity mix used is representative of Great Britain (0.36 kgCO₂ eq/kWh).

A4 Transport to customer – Transport to customers who weld and cut the material into pool cover. Transport modes and distances to destination countries are provided by Plastipack. Of the four main routes taken, the longest one consists of 70 km by lorry, 14936 km by sea container and a 362 km by lorry.

C1 De-construction/demolition - It is assumed there are no environmental impacts associated with the removal of the pool cover material at EoL.

C2 Transport to waste site - Transport to a local household waste recycling centre is assumed to be 8.35 km by passenger car.

C3 Waste treatment - It is assumed that the pool cover is recycled due to its LDPE content. It is assumed that cardboard and LDPE packaging components are recycled by the customer.

C4 Waste disposal – It is assumed that polypropylene packaging components are sent to general waste (combination of landfill/ incineration) by the customer.

D Benefits beyond the system boundary - The main benefit is from the assumed avoided production of virgin LDPE by recycling the 1 m² of S+G pool cover material.

Mode	Vehicle type	Fuel type
Road	Lorry, 3.5 – 7.5 tonnes, EURO6	Diesel
	Lorry, 16 – 32 tonnes, EURO6	
	Lorry, < 32 tonnes, EURO6	
Sea	Freight, ferry	Heavy fuel oil
	Freight, container ship	

Modules Declared

Module	Product stage			Construction		Use stage							End of Life stage				Benefits / loads beyond the system boundary
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	D
Geography	UK	UK	UK	GLO									GLO	GLO	GLO	GLO	GLO
Specific data used	>90%			>90%	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0%			0%	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			0%	-	-	-	-	-	-	-	-	-	-	-	-	-

A1 = Raw materials supply, **A2** = Transport, **A3** = Manufacturing, **A4** = Transport, **A5** = Construction/installation,

B1 = Use, **B2** = Maintenance, **B3** = Repair, **B4** = Replacement, **B5** = Refurbishment, **B6** = Operational energy use, **B7** = Operational water use,

C1 = De-construction/demolition, **C2** = Transport, **C3** = Waste treatment, **C4** = Waste disposal

D = Benefits/loads beyond the system boundary.

X = Module declared, **ND** = Module not declared

Mandatory Impact Category Indicators According to EN 15804 + A2

Environmental Indicators (per 1 m² of S+G pool cover material)

Indicator	Units	Product Stage	Construction/ assembly	End of life				Benefits/loads beyond the system boundary
		A1 – A3	A4	C1	C2	C3	C4	D
		Raw materials supply, transport and production	Transport	De-construction/ demolition	Transport	Waste treatment	Disposal	Benefits of recycling the material at End- of-life
GWP-fossil	kg CO2 eq.	1.06E+00	5.37E-02	0.00E+00	8.79E-02	8.58E-02	2.16E-04	-9.34E-01
GWP biogenic	kg CO2 eq.	-1.52E-03	0.00E+00	0.00E+00	0.00E+00	1.52E-03	0.00E+00	0.00E+00
GWP-LULUC	kg CO2 eq.	6.07E-04	2.34E-05	0.00E+00	4.27E-05	5.22E-05	1.90E-09	-4.62E-04
GWP-Total	kg CO2 eq.	1.06E+00	5.37E-02	0.00E+00	8.80E-02	8.73E-02	2.16E-04	-9.34E-01
ODP	kg CFC11 eq.	2.74E-08	1.24E-08	0.00E+00	1.63E-08	1.74E-09	6.59E-13	-1.46E-08
AP	molc H+ eq.	3.95E-03	3.67E-04	0.00E+00	3.60E-04	1.40E-04	4.19E-08	-3.49E-03
EP - freshwater	kg P eq.	2.31E-04	3.48E-06	0.00E+00	1.23E-05	9.79E-06	4.63E-10	-2.11E-04
EP - marine	kg N eq.	7.47E-04	8.62E-05	0.00E+00	8.29E-05	8.72E-05	4.48E-08	-6.49E-04
EP - terrestrial	molc N eq.	7.60E-03	9.51E-04	0.00E+00	8.96E-04	4.26E-04	1.97E-07	-6.52E-03
POCP	kg NMVOC eq.	4.15E-03	2.86E-04	0.00E+00	3.00E-04	1.23E-04	5.19E-08	-3.96E-03
ADP - minerals and metals*	kg Sb eq.	7.17E-06	1.37E-07	0.00E+00	1.09E-06	4.70E-07	1.35E-11	-6.06E-06
ADP - fossil*	MJ	3.15E+00	7.10E-02	0.00E+00	2.26E-01	1.47E-01	9.48E-06	-2.59E+00
WDP*	m3	7.28E-01	3.92E-03	0.00E+00	1.13E-02	1.35E-02	2.13E-06	-6.63E-01

GWP-biogenic = Global warming potential biogenic, GWP-fossil = Global warming potential fossil fuels, GWP-LULUC= Global warming potential land use and land use change, GWP - Total = Total global warming potential, ODP = Ozone layer depletion potential, AP = Acidification potential, EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment, EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment, EP-terrestrial = Eutrophication potential terrestrial, POCP = Formation potential of tropospheric ozone, ADP - minerals and metals = Abiotic depletion potential for non-fossil resources, ADP - fossil = Abiotic depletion for fossil resources potential, WDP = Water use deprivation potential.

Disclaimer – 1: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

*Disclaimer – 2: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Additional Mandatory Indicators Results

GWP-GHG (per 1 m² of S+G pool cover material)

Indicator	Units	Product Stage	Construction/ assembly	End of life				Benefits/loads beyond the system boundary
		A1- A3	A4	C1	C2	C3	C4	D
		Raw materials supply, transport and production	Transport	De-construction/ demolition	Transport	Waste treatment	Disposal	Benefits of recycling the material at End- of-life
GWP – GHG ¹	kg CO2 eq.	9.87E-01	5.32E-02	0.00E+00	8.67E-02	8.43E-02	2.14E-04	-8.63E-01

¹This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.

Additional Voluntary Indicator Results

Resource Use Indicators (per 1 m² of S+G pool cover material)

Indicator	Units	Product Stage	Construction/ assembly	End of life				Benefits/loads beyond the system boundary
		A1-A3	A4	C1	C2	C3	C4	D
		Raw materials supply, transport and production	Transport	De-construction/ demolition	Transport	Waste treatment	Disposal	Benefits of recycling the material at End- of-life
PENRT	MJ	3.80E+01	8.29E-01	0.00E+00	1.27E+00	3.11E-01	5.82E-05	-3.49E+01
PENRE	MJ	6.65E+00	8.36E-02	0.00E+00	2.57E-01	1.89E-01	1.07E-05	-5.16E+00
PENRM	MJ	3.14E+01	7.45E-01	0.00E+00	1.01E+00	1.22E-01	4.75E-05	-2.98E+01
PERE	MJ	9.31E-01	7.24E-03	0.00E+00	2.14E-02	2.13E-02	7.45E-07	-6.45E-01
PERM	MJ	3.78E-01	2.42E-03	0.00E+00	8.00E-03	9.18E-03	3.05E-07	-1.91E-01
PERT	MJ	1.31E+00	9.66E-03	0.00E+00	2.94E-02	3.04E-02	1.05E-06	-8.36E-01
FW	m ³	1.70E-02	9.42E-05	0.00E+00	2.76E-04	3.20E-04	5.07E-08	-1.55E-02
SM	kg	5.89E-02	6.61E-04	0.00E+00	9.76E-03	5.19E-01	1.55E-07	-5.55E-02
NRSF	MJ	2.33E-02	4.22E-04	0.00E+00	5.11E-04	6.63E-04	3.72E-08	-2.05E-02
RSF	MJ	2.79E-02	1.49E-04	0.00E+00	2.69E-04	5.83E-04	1.25E-08	-2.85E-02

PENRT = Total use of non-renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials;; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources FW = Use of net fresh water, SM = Use of secondary materials, NRSF = Use of non-renewable secondary fuels, RSF = Use of renewable secondary fuels.

Additional Voluntary Indicator Results

Waste Indicators (per 1 m² of S+G pool cover material)

Indicator	Units	Product Stage	Construction/ assembly	End of life				Benefits/loads beyond the system boundary
		A1- A3	A4	C1	C2	C3	C4	D
		Raw materials supply, transport and production	Transport	De- construction/ demolition	Transport	Waste treatment	Disposal	Benefits of recycling the material at End-of-life
HW	kg	1.17E+00	1.77E-02	0.00E+00	6.59E-02	5.03E-02	3.12E-06	-1.06E+00
NHW	kg	5.33E-02	5.62E-02	0.00E+00	3.15E-02	4.97E-02	1.34E-04	-2.65E-02
RW	kg	1.72E-03	1.36E-05	0.00E+00	2.57E-05	2.63E-05	9.58E-10	-1.14E-03

HW = Hazardous waste,
 NHW = Non-hazardous waste,
 RW = Radioactive waste.

Output Flow Indicators (per 1 m² of S+G pool cover material)

Indicator	Units	Product Stage	Construction/ assembly	End of life				Benefits/loads beyond the system boundary
		A1- A3	A4	C1	C2	C3	C4	D
		Raw materials supply, transport and production	Transport	De- construction/ demolition	Transport	Waste treatment	Disposal	Benefits of recycling the material at End-of-life
CFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EXE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFE	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	4.78E-02	5.17E-04	0.00E+00	4.20E-03	2.14E-03	5.71E-08	-4.84E-02

CFR = Components for reuse.
 EXE = Exported energy,
 MFE = Materials for energy recovery,
 MFR=Materials for recycling.

Additional Voluntary Indicator Results

Other Indicators (per 1 m² of S+G pool cover material)

Indicator	Units	Product Stage	Construction/ assembly	End of life				Benefits/loads beyond the system boundary
		A1 – A3	A4	C1	C2	C3	C4	D
		Raw materials supply, transport and production	Transport	De-construction/ demolition	Transport	Waste treatment	Disposal	Benefits of recycling the material at End- of-life
Ionising radiation, HH	kBq U-235 eq	1.81E-01	3.98E-03	0.00E+00	5.86E-03	2.74E-03	2.09E-07	-1.06E-01
Land use	Pt	7.12E-01	9.14E-01	0.00E+00	5.22E-01	6.28E-02	7.26E-05	-2.97E-01
Human toxicity, non-cancer effects	CTUh	2.59E-08	9.57E-10	0.00E+00	2.99E-09	2.54E-09	2.61E-12	-2.05E-08
Ecotoxicity, freshwater	CTUe	1.12E-01	2.92E-02	0.00E+00	5.87E-02	2.59E-02	9.08E-06	-7.44E-02
Particulate matter, HH	Disease inc.	3.13E-08	3.82E-09	0.00E+00	4.40E-09	3.51E-09	5.39E-13	-2.69E-08
Human toxicity, cancer effects	CTUh	2.93E-10	1.79E-11	0.00E+00	6.92E-11	9.14E-11	1.47E-14	-2.21E-10

HH = Human Health

Data quality

Comprehensive process specific input data of high quality, accuracy and granularity has been provided by Plastipack regarding the manufacturing and supply chain processes for the assessed pool cover material.

The production datasets are a combination of 2022 (for material processes) and three-year average data (for water, fuels, off-cuts, and the distribution distance to customer), and therefore recent and representative of processes used. Generic datasets are in general representative of the location of the production site, supplier locations and transport modes for delivery of materials and the final packaged product.

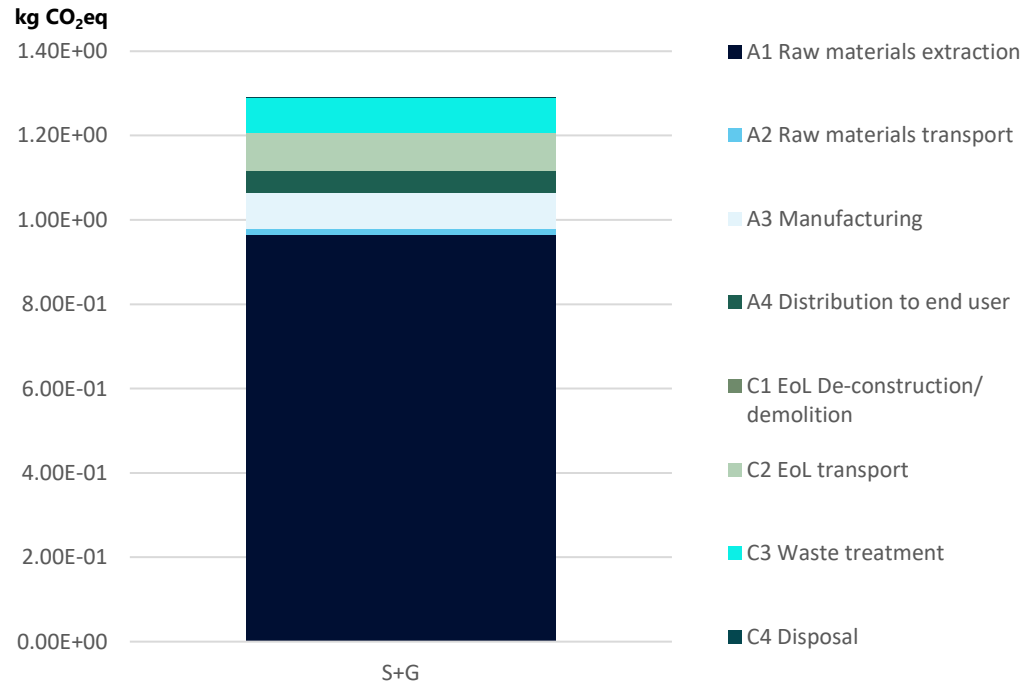
The environmental impacts for end-of-life are calculated based on assumptions and the quality of this data should be considered poor. As such, it is recognised that the impacts (though relatively small) are uncertain.

Module	Stage	Type of Data
A1	Materials acquisition	Supplier/site product specific, scenario, generic database
A2	Materials transport	Supplier/site product specific, scenario, generic database
A3	Manufacturing	Supplier/site product specific, scenario, generic database
A4	Distribution transport	Scenario, generic database
C1	EoL de-construction/ demolition	Scenario, generic database
C2	EoL waste transport	Scenario, site/product specific data, generic database
C3	EoL waste treatment	Scenario, site/product specific data, generic database
C4	EoL waste disposal	Scenario, site/product specific data, generic database
D	Benefits	Scenario, product specific data, generic database

Interpretation

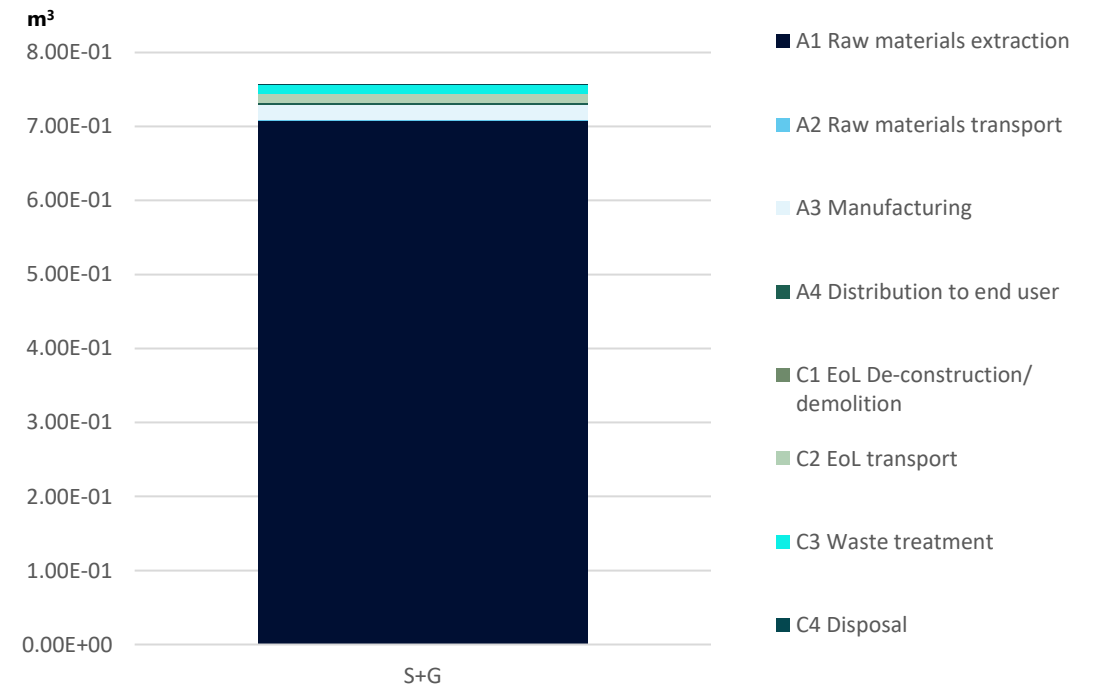
The carbon footprint per 1 m² of S+G pool cover material is 1.29 kg CO₂eq. The figure below shows the contribution of each lifecycle stage to the overall carbon footprint per 1 m² of S+G pool cover material.

The acquisition and supply of raw materials stage (A1) contributes the most (75%) to the carbon footprint of the life cycle per 1 m² of S+G pool cover material.



The water deprivation potential per 1 m² of S+G pool cover is 0.76 m³. The figure below shows the contribution of each lifecycle stage to the overall water deprivation potential per 1 m² of S+G pool cover material.

The majority (93%) of the overall water deprivation potential per 1 m² of S+G pool cover material comes from (A1) the acquisition and supply of raw materials.



Additional Information

The Benefits of Using Sol + Guard™ Pool Cover Material

A pool cover on an outdoor heated pool can lead to savings of electricity, water and chlorine (compared to an uncovered pool that is not heated). The estimated environmental impacts avoided by the reduced usage of electricity, water and chlorine from using a pool cover on a heated pool are shown below¹. These are based on the following assumptions; the pool cover is in place for 50% of the day during the pool season for the entirety of the material's 8-year lifespan; the chlorine concentration is maintained at 4 ppm.

For a standard size pool (32 m²) over its lifetime, the avoided carbon impact is 1256 kg CO₂eq and the avoided water deprivation potential is 836 m³.

Estimated savings from using a Sol + Guard™ pool cover compared to an uncovered heated pool	
Per standard size pool (32 m ²) per lifetime	
Kg CO ₂ eq.	Water deprivation potential (m ³)
1256	836

¹ More information on the modelling of this scenario can be found in the LCA report.

Additional Information

Sustainability at Plastipack

With 25 years of manufacturing experience, Plastipack Limited are specialist manufacturers of energy and resource saving bubble cover materials designed for the swimming pool and industrial water storage markets. Plastipack products are sold worldwide under its GeoBubble[™] brand. Plastipack Limited is committed to sustainable business practices and continue to promote environmentally conscious consumption to its customers and end-users alike.

Plastipack products have sustainability at the heart of their design – existing solely to promote water, energy and chemical savings through their use. Production off-cuts are kept to a minimum, and any production scrap is recycled and re-processed on site. This recycled material stream is then re-incorporated into a selection of our bubble cover materials or sold on as high-quality commodity material for other manufacturing processes, thus ensuring no plastic resources go to landfill.

All GeoBubble[™] products are designed and formulated to maximise their useful lifespan and longevity, significantly reducing the frequency at which they require replacement when compared to other lower-quality pool cover materials also available. Plastipack offer warranties for their GeoBubble[™] products, with extended product lifespans achievable through ensuring only the highest quality materials are used in their products and all goods that leave their site pass stringent quality assurance.

When GeoBubble[™] products finally reach the end of their useful life, they are designed to be easily recyclable such that the materials they contain remain in circulation and are not simply discarded and wasted.

Company information: www.plastipack.co.uk | Product information: www.geobubblepoolcovers.com

References

GPI International EPD[®] System (2021) General Programme Instructions for the International EPD[®] System. Version 4.0. www.environdec.com.

PCR 2019:14 Construction products (EN 15804:A2) (v1.3.4) prepared by IVL Swedish Environmental Research Institute, Secretariat of the International EPD[®] System, date 2024-04-30.

EN 15804:2012+A2:2019/ Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products.

ISO 14025 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 14040/44 Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006).

The International EPD[®] System - The International EPD[®] System is a programme for type III environmental declarations, maintaining a system to verify and register EPD[®]s as well as keeping a library of EPD[®]s and PCRs in accordance with ISO 14025. www.environdec.com

EN15804 Add-on version 2, <https://nexus.openlca.org/>, <https://nexus.openlca.org/ws/files/23889>

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