

ENVIRONMENTAL-PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Simpson Strong Tie Europe / S&P Clever Reinforcement
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SST-20210032-CBA1-EN
Issue date	23.03.2021
Valid to	22.03.2026

S&P Carbophalt® G

Simpson Strong Tie Europe / S&P Clever Reinforcement

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ECO PLATFORM

EPD
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General Information

Simpson Strong Tie Europe / S&P Clever Reinforcement

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-SST-20210032-CBA1-EN

This declaration is based on the product category rules:

Reinforcing and securing systems made from glass fibre composite materials, 08.03.2023
(PCR checked and approved by the SVR)

Issue date

23.03.2021

Valid to

22.03.2026



Dipl.-Ing Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)



Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.)

S&P Carbophalt® G

Owner of the declaration

Simpson Strong-Tie Europe
Le Moulin des Ardillers -
85400 Sainte Gemme La Plaine
France

Declared product / declared unit

1 m²
of S&P Carbophalt® G with the grammage of 0.56 kg/m².

Scope:

This document refers to the manufacture, transport and end-of-life stages of S&P Carbophalt® G for asphalt reinforcement by Simpson Strong-Tie Europe / S&P Clever Reinforcement. This product is produced at the manufacturing plant S&P Polska Sp. z. o.o. in Malbork for the S&P Group. The production data were recorded for the year 2019. This EPD declares the life cycle analysis (LCA) for a specific product from the manufacturer's plant. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804 bezeichnet*.

Verification

The standard EN 15804 serves as the core PCR	
Independent verification of the declaration and data according to ISO 14025:2011	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



Angela Schindler,
(Independent verifier)

Product

Product description/Product definition

S&P Carbophalt® G is a pre-bituminised asphalt reinforcement grid made of glass and carbon fibres for local and/or complete surface reinforcement of bituminous surfaces.

WHERE TO USE

- Used against cracking
- Prevents crack reflection
- Increases the durability of asphalt surfaces
- Increases the load-bearing capacity of asphalt surfaces
- The pre-bituminisation guarantees the required layer bonding between old and new road surfaces

PERFORMANCE FEATURES

- Increases the load-bearing capacity
- Measurable improvement of the structural value due to high tensile strength at small elongation
- Minimises crack formation and prevents crack reflection
- Reduces fatigue and thermal cracks
- Grid structure freely moveable through heat application (no fixed knots)
- Local application on existing cracks/joints or complete surface application
- No waiting time – immediate road construction possible
- Lower consumption of tack coat thanks to the pre-bituminised grid
- Easy and efficient application with unrolling equipment (also in curves)
- Effectiveness at a cover layer of min. 2 cm
- Can be milled and recycled without problems

Products

according to the CPR based on an ETA

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration *EN 15381:2008*, Geotextiles and geotextile-related products – Characteristics required for use in pavements and asphalt overlays and the CE-marking.

For the application and use the respective national provisions apply.

Application

- Apply S&P Carbophalt® G on dry surface, either by machine or manually, and if possible immediately before the installation of the road surface.
- Apply at temperatures > 3 °C. Observe relevant norms for application of layers.
- Ensure overlapping lengths of 10–20 cm are observed.
- Overlapping of the reinforcement mesh should be optimised, according to the nature and location of joints/cracks, as well as wheel loading.
- If the mesh is applied only on local areas, it shall be covered manually with an asphalt layer. This prevents debonding caused by passing vehicles.
- Minimum covering of 2 cm above S&P Carbophalt® G.

Technical Data

S&P Carbophalt® G meets the requirements of *EN 15381* and is a glass fibre/carbon fibre open grid which is fully penetrated and impregnated with bitumen to ensure an optimal bond between asphalt layers.

Constructional Data

Name	Value	Unit
E-Modulus (Longitudinal Glass Fibres)	≥73000	N/mm ²
Elongation (Longitudinal Glass Fibres)	3 (±0.3)	%
Tensile Force (Longitudinal Glass Fibres)	120	kN/m
Fibre Cross Section (Longitudinal Glass Fibres)	46 (51 Fibre Strands)	mm ² /m
E-Modulus (Transversal Carbon Fibres)	≥265000	N/mm ²
Elongation (Transversal Carbon Fibres)	1.5 (+0.2)	%
Tensile Force (Transversal Carbon Fibres)	200	kN/m
Fibre Cross Section (Transversal Carbon Fibres)	46 (52 Fibre Strands)	mm ² /m

(CE-marking according to *EN 15381:2008*)

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 15381:2008*, Geotextiles and geotextile-related products – Characteristics required for use in pavements and asphalt overlays

Base materials/Ancillary materials

- Glass fibres ~25 %
- Carbon fibres ~17.5 %
- Bitumen ~38 %
- Quartz sand ~17.5 %
- Other ~2 %

(percentages by weight)

S&P Carbophalt® G is manufactured with glass fibres in the longitudinal direction (0.14 kg/m²) and carbon fibres in the transverse direction (0.1 kg/m²). The grids are manufactured with no fixed-knots, therefore making them freely moveable when heated up.

Following the manufacture of the grids, they are fully penetrated and impregnated with bitumen at a rate of approximately 0.215 kg/m².

A sprinkling of quartz sand at a rate of 0.1 kg/m² is applied onto the wet bitumen to reduce the risk of

vehicle tyres bonding to the grid during the application process.

1) "This product contains substances listed in the *candidate list* (25.06.2020) exceeding 0.1 percentage by mass: **"No"**

2) "This product contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list*, exceeding 0.1 percentage by mass: **"No"**

3) "Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): **"No"**

Environment and health during use

Reference service life

The reference service life (RSL) is not declared. A calculation according to *ISO 15686* is not applied.

LCA: Calculation rules

Declared Unit

This declaration refers to the production of 1 m² of S&P Carbophalt® G reinforcement grid with a grammage of 0.56 kg/m².

Declared unit

Name	Value	Unit
Declared unit	1	m ²
Grammage	0.56	kg/m ²
Conversion factor to 1 kg	0.56	-

It is a specific EPD.

System boundary

It is a cradle to gate EPD with options wherein module A1-A5, C1-C4 and D life cycle stages are considered.

Production

A1-A3: Extraction and manufacturing of all raw materials (basic and auxiliary) including packaging material followed by the transportation of raw materials and energy consumption from grid electricity and natural gas within manufacturing plant and landfill of wastes generated during manufacturing are considered in the scope of this module.

Transport to manufacturing site

A4: Average distance considered for the transport from the manufacturing plant to various construction sites

Installation

A5: It is estimated that there are no wastes disposed of during implementation as the waste generated are used as overlaps. Therefore, no losses are declared. The use of packaging material for the product is declared in EPDs in Module A1-A3 which is sent to waste incineration plant during installation stage (Module A5). Subsequent energy recovery credits are declared in module D.

End-of-life Scenario: Recycling

C1: Dismantling / Demolition - As the products are used under pavements, they are collected as mixed construction waste for recycling after the end-of -life of the surface structures.

C2: Transport to treatment/disposal site - Average transport distance from demolition site to waste treatment (recycling) site.

C3: Waste processing for reuse, recovery or recycling - Processing of construction waste to recycled material. The wastes are 100% recyclable according to an investigation commissioned by S&P (*Report No.: 14-7974-01*).

C4: Disposal - Since the products are recycled and reused in asphalt layers, there are no disposals.

Benefits and loads beyond the product system boundary

D: The potential benefits from packaging material in module A5 are declared. For waste incineration, combustion in a waste incineration plant ($R1 > 0.6$) with energy recuperation is considered. Recycling credits after the end-of-life of the product are considered.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

Characteristic product properties Information on biogenic carbon

The mass of packaging is declared in module A5 and associated biogenic carbon content is listed in the table below. There is no biogenic carbon content in the product.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging (Wooden Pallet)	0.0049	kg C

The following technical information is the basis for the declared modules:

Transport from the gate to the site (A4)

Name	Value	Unit
Amount of fuel	0.000954	kg/100km
Transport distance	500	km
Capacity utilisation (including empty runs)	61	%

Installation (A5)

The following packaging materials are considered on construction

site:

Name	Value	Unit
Wooden pallet for packaging	0.01	Kg/m ²

Installation of the product is done manually. Hence, no additional energy or material is required. Waste generated from offcuts during installation, is used again as overlaps. The packaging wooden pallet goes into incineration after installation of the product. The impacts of incineration are considered in A5 module and subsequent credits of energy recovery from packaging wooden pallet are considered in module D.

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies for the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list on service life by BNB is declared.

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	0.56	kg
Recycling (100% Scenario)	0.56	kg
Transport (To Waste processing Site)	100	km
Amount of fuel (For transport to Waste processing Site)	0.00108	kg/100km
Capacity utilisation of Trucks (including empty runs)	50	%

According to an investigation commissioned by S&P (*Report No.: 14-7974-01*), milled material with reinforcement residues of S&P Carbophalt® G can be easily recycled and

reused in asphalt layers according to the *German Recycling Management Act*.

Reuse, recovery and/or recycling potentials (D), relevant scenario information

The potential benefits from packaging material in module A5 are declared. For waste incineration, combustion in a waste incineration plant (R1 > 0.6) with energy recuperation is considered. Recycling credits after the end-of-life of the product are considered.

LCA: Results

The following table depicts the results of the indicators with the associated magnitude of impact, use of resources as well as waste and other output flows in relation to 1 m² of S&P Carbophalt® G with the grammage of 0.56 kg/m².

As End-of-life scenario (EoL) of 100% recycling is considered and subsequent credits are considered in stage D. Since, after the end of life of the product, it is sent to recycling, the impacts in stage C4 (Disposal) is "zero".

In Table 1 "Description of the system boundary", all declared modules shall be indicated with an "X"; all modules that are not declared shall be indicated with "MND" (As default the modules B3, B4, B5 are marked as MNR – module not relevant)

Note: The results declared for EP-freshwater are declared in the unit "P eq." according to the European Platform on Life Cycle Assessment (<http://eplca.jrc.ec.europa.eu/LCDN/developEF.html>). This web-link is provided in EN 15804+A2, clause 6.3.8.2.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² S&P Carbophalt® G

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ -Äq.	3.3E+00	1.72E-02	1.82E-02	1.56E-04	3.91E-03	1.5E-03	0	-1.39E-02
GWP-fossil	kg CO ₂ -Äq.	3.29E+00	1.71E-02	2.7E-04	1.49E-04	3.88E-03	1.49E-03	0	-1.38E-02
GWP-biogenic	kg CO ₂ -Äq.	-1.79E-02	0	1.79E-02	6.92E-06	0	2.85E-06	0	-5.4E-05
GWP-luluc	kg CO ₂ -Äq.	1.96E-03	1.39E-04	1.75E-07	3.58E-09	3.15E-05	5.49E-06	0	-2.59E-05
ODP	kg CFC11-Äq.	2.67E-14	2.06E-18	2.21E-18	1.59E-20	4.67E-19	6.34E-18	0	-2.53E-16
AP	mol H ⁺ -Äq.	9.67E-03	1.75E-05	2.6E-06	2.02E-06	4.11E-06	1.4E-05	0	-2.31E-05

EP-freshwater	kg PO ₄ -Äq.	5.55E-06	5.2E-08	3.29E-10	3.22E-11	1.18E-08	3.57E-09	0	-3.65E-08
EP-marine	kg N-Äq.	2.52E-03	5.11E-06	8.47E-07	9.15E-07	1.23E-06	6.9E-06	0	-7.23E-06
EP-terrestrial	mol N-Äq.	2.65E-02	6.16E-05	1.23E-05	1E-05	1.47E-05	7.58E-05	0	-7.96E-05
POCP	kg NMVOC-Äq.	7.33E-03	1.42E-05	2.3E-06	2.75E-06	3.35E-06	2E-05	0	-1.88E-05
ADPE	kg Sb-Äq.	5.52E-07	1.23E-09	3.52E-11	4.51E-12	2.79E-10	1.64E-09	0	-3.44E-09
ADPF	MJ	6.68E+01	2.28E-01	3.9E-03	2.13E-03	5.18E-02	2.81E-02	0	-2.02E-01
WDP	m ³ world-Äq. deprived	1.52E-01	1.53E-04	1.88E-03	2.95E-07	3.48E-05	2.52E-04	0	-1.96E-03

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² S&P Carbophalt® G

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	8.59E+00	1.28E-02	1.51E-01	6.73E-06	2.91E-03	2.37E-03	0	-6.8E-02
PERM	MJ	1.5E-01	0	-1.5E-01	0	0	0	0	0
PERT	MJ	8.74E+00	1.28E-02	7.27E-04	6.73E-06	2.91E-03	2.37E-03	0	-6.8E-02
PENRE	MJ	5.56E+01	2.28E-01	3.91E-03	2.14E-03	5.18E-02	1.12E+01	0	-2.02E-01
PENRM	MJ	1.12E+01	0	0	0	0	-1.12E+01	0	0
PENRT	MJ	6.68E+01	2.28E-01	3.91E-03	2.14E-03	5.18E-02	2.81E-02	0	-2.02E-01
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m ³	1.3E-02	1.48E-05	4.41E-05	1.21E-08	3.37E-06	7.36E-06	0	-7.89E-05

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; 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; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² S&P Carbophalt® G

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	8.61E-07	1.06E-08	2.72E-12	2.07E-13	2.41E-09	5.92E-10	0	-8.03E-10
NHWD	kg	5.17E-02	3.49E-05	1.3E-04	2.18E-07	7.93E-06	8.46E-06	0	-1.12E-04
RWD	kg	2.9E-03	2.82E-07	2.23E-07	2.29E-09	6.41E-08	2.26E-07	0	-1.42E-05
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	5.6E-01	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	2.62E-02	0	0	0	0	0
EET	MJ	0	0	4.7E-02	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² S&P Carbophalt® G

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	6.97E-08	1.04E-10	1.31E-11	1.08E-10	2.41E-11	3.22E-10	0	-4.52E-10
IR	kBq U235-Äq.	4.64E-01	4.08E-05	3.53E-05	3.28E-07	9.27E-06	2.04E-05	0	-1.86E-03
ETP-fw	CTUe	2.41E+01	1.61E-01	1.7E-03	1.52E-03	3.66E-02	2.21E-02	0	-6.86E-02
HTP-c	CTUh	1.64E-09	3.37E-12	1.13E-13	2.84E-14	7.66E-13	5.28E-13	0	-2.56E-12
HTP-nc	CTUh	2.46E-08	1.73E-10	3.91E-12	1.98E-12	3.93E-11	2.84E-11	0	-1.13E-10
SQP	SQP	8.81E+00	7.99E-02	1.09E-03	5.48E-06	1.82E-02	6.22E-03	0	-6.13E-02

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator IRP

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.

Disclaimer 2 – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP

The results of this environmental impact indicator

shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

References

Standards

EN 15381

EN 15381:2008, Geotextiles and geotextile-related products – Characteristics required for use in pavements and asphalt overlays

ISO 14025

DIN EN ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 15686

ISO 15686:2011-05, Buildings and constructed assets - Service life planning

EN 15804+A2

EN 15804:2019+A2 (in press), Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

IBU

Institut Bauen und Umwelt e.V.:
General Programme Instructions for the Preparation of EPDs at the
Institut Bauen und Umwelt e.V. Version 1.1, Berlin: Institut
Bauen und
Umwelt e.V., 2016.

www.ibu-epd.com **Candidate list**

List of those eligible for approval substances of very high concern to the European Chemicals Agency, as of June 25, 2020.

CPR

Regulation (EU) No. 305/2011 Construction Product Regulation (CPR)

(EU) Ordinance on Biocide Products No. 528/2012

Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products Text with EEA relevance.

GaBi Software

Software & Documentation (Service Pack 40), 2019

Sphera solutions GmBH,

Documentation
of GaBi data sets

<http://www.gabi-software.com/international/databases/>

German Recycling Management Act

Kreislaufwirtschaftsgesetz (KrWG), German
Federal Ministry for the Environment, Nature Conservation and
Nuclear Safety
(BMU), 2012

PCR guideline texts for building-related

products and services (PCR)

PCR - Part A: Calculation Rules for the Life
Cycle Assessment and Requirements on the Project Report,
version 1.8, Institut

Bauen und Umwelt e.V., www.bau-umwelt.com,
2019

PCR – Part B: Requirements of the EPD
Reinforcing and securing systems made from glass fibre
composite materials,
version 1.6, Institut Bauen und Umwelt e.V., www.bau-umwelt.com,
2017

REACH Regulation

(EC) No.
1907/2006 of the European Parliament and Council of
December 18, 2006 for
Registration, evaluation, admission and Restriction of chemical
substances.
List of those eligible for approval substances of very high
concern to the
European Chemicals Agency, as of June 25, 2020.

Report No.: 14-7974-01

Gogolin, D., Wirkung und Nachhaltigkeit von
Asphaltarmierungen, An investigation report commissioned by
S&P
Clever Reinforcement GmbH, 2015



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