



MACRO FIBERS FOR CONCRETE REINFORCING


ENVIRONMENTAL PRODUCT DECLARATION CRADLE-TO-GATE SIKAFIBER



BUILDING TRUST



General information

Manufacturer Name:	SIKA Corporation 4019 Industry Drive Chattanooga, TN 37416
Program Operator:	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959, USA
Declaration Number:	EPD 719
Reference PCR:	ISO 21930: 2017
Date of Issuance:	June 4, 2024
End of Validity:	June 4, 2029
Product Name:	SIKAFIBER® - Macro Synthetic Fibers
EPD Owner:	SIKA Corporation
Declared Unit:	1 kg of SikaFiber®
EPD Scope:	Cradle-to-gate (A1, A2, and A3)
Prepared By:	WAP Sustainability Consulting
Verification:	ISO 21930 serves as the core PCR. Independent verification of the declaration according to ISO 14025 and ISO 21930. <input type="checkbox"/> internal <input checked="" type="checkbox"/> external
LCA Reviewer and EPD Verifier:	Timothy S. Brooke ASTM International 

Company information

Sika is a specialty chemicals company with a globally leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing, and protecting in the building sector and motor vehicle industry. Sika has subsidiaries in 102 countries, manufactures in over 400 factories, and develops innovative technologies for customers around the world that facilitate the sustainable transformation of the construction and transportation industries.

Product information

Our high-performing polymer macro fibers offer the performance of steel fibers at lower dosage rates. The unique anchorage system of each macro synthetic fiber and the higher aspect ratio (length/diameter) allows for higher performance in the concrete matrix. SikaFibers are UL certified for composite steel deck construction and is used for replacement of limited structural steel in pre-cast, slabs on ground, pavements and shotcrete applications. SikaFibers have been successfully used to replace steel fibers, welded wire mesh and conventional reinforcing bars in a wide variety of applications. In addition, SikaFibers comply with ASTM C1116, Standard Specification for Fiber Reinforced Concrete and Shotcrete, and are specifically designed to provide equivalent tensile and bending resistance to conventional reinforcement requirements. The macro synthetic fibers infuse the concrete with added levels of flexural toughness, energy absorption, durability, and will decrease the formation of plastic shrinkage cracking in concrete. The three-dimensional SikaFibers will provide an added measure of crack control, without the risk of corrosion associated with steel.

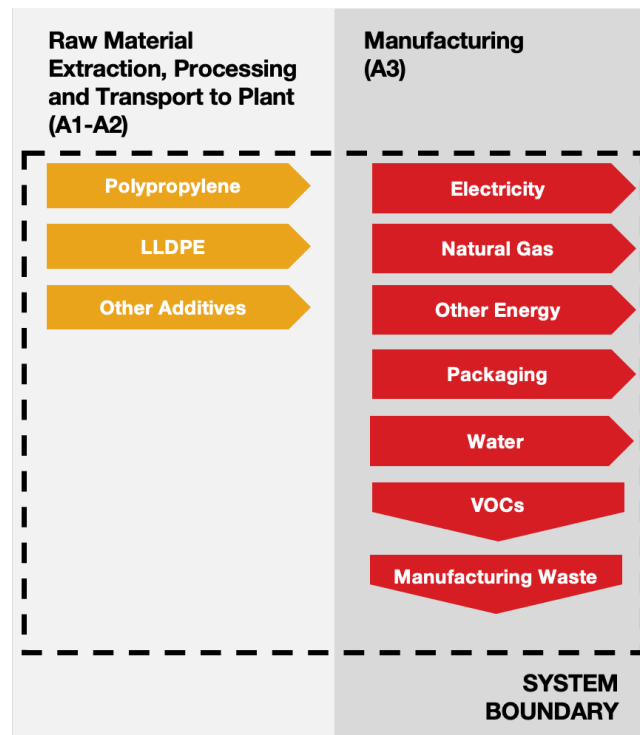
	Sika Fibermesh 650	Sika Fibermesh 650s	SikaFiber 800 Stealth	SikaFiber Enduro 600	SikaFiber Enduro Prime	SikaFiber Force 48	SikaFiber 54 Force	SikaFiber Force 60	SikaFiber Novomesh 950	SikaFiber CAL 51
	Macro Fiber								Blend (Macro & Micro)*	
Water Absorption	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Specific Gravity	0.91	0.91	0.91	0.91	0.91	1.91	1.91	1.91	0.91	0.91
Fiber Length, in (mm)	Graded 1.5, 1.7 (38, 44)	Graded 1.9, 2.4 (48, 57)	1.5 (38)	2.0 or 2.36 (52 or 60)	2.1 or 2.4 (55 or 60)	1.9 (48)	2.1 (54)	2.36 (60)	1.8 (47)	1.8 (47)
Electric Conductivity	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Acid and Alkali Resistance	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Melt Point, °F (°C)	324° F (162° C)	324° F (162° C)	324 (162)	328 (164)	328 (164)	328 (164)	328 (164)	328 (164)	328 (164)	328 (164)
Modulus of Elasticity, ksi (GPa)	1000 to 1145 (6.9 to 7.9)	885 to 1088 (6.1 to 7.5)	1160 to 1305 (8 to 9)	1015 (7)	1233 (8.5)	1233 (8.5)	1233 (8.5)	1233 (8.5)	1015 (7)	1015 (7)
Aspect Ratio	76 to 105	100 to 124	86 (Average)	64 or 74	98 or 107	57.4	64.6	71.7	58	58
Tensile Strength, ksi (MPa)	89 (613)	89 (613)	90 (613)	75 (516)	87 (600)	80 (550)	80 (550)	80 (550)	75 (516)	75 (516)
Minimum Dosage Rate, lb/yd ³ (kg/m ³)	3 (1.8)	5 (3)	3 (1.8)	4 (2.4)	3 (1.8)	5 (3)	5 (3)	5 (3)	5 (3)	5 (3)
Color	white	white	Gray	Gray	Gray	white	white	white	Gray	Gray
Anchorage	bond	bond	crimped	crimped	crimped	embossed	embossed	embossed	crimped	crimped

* Data shown is for Macro fiber

LCA information

Declared unit	1 kg of SikaFiber®
Reference service life	Not declared as use phase is not included in the study
Description of the system boundaries	Cradle to Gate
Geographical representativeness	A1-A3: United States
Time representativeness	Primary data collected for calendar year 2022
Cut-off rules	All flows for which data were provided are included in the assessment, accounting for at least 99% of the energy or mass flows and at least 99% of the environmental impacts from the product system. Production of capital equipment is excluded from this assessment.
Database and LCA software used	SimaPro 9.0.1 Ecoinvent V3.9.1
LCA Report	LCA of Macro and Micro Synthetic Fibers, WAP Sustainability, February 2023
Scenario Description: A2	Primary data of transportation from suppliers: 1300 km by rail, 32-870 km by truck
Scenario Description: A3	Electricity Source: country-specific residual mix

System diagram:



Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	US			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Content information

Product components	Weight, kg (per 1 kg)	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Polypropylene	0.77-0.925	0%	0%
Other Additives	0.33-0.075	0%	0%
TOTAL	1	0%	0%

No substances in the product are on the Candidate List of Substances of Very High Concern (SVHC) which exceed the limits for registration with the European Chemicals Agency



Results of the environmental performance indicators

The results presented here are for 1 declared unit, which is 1 kg of SikaFiber®

Environmental Indicator	Abbreviation	Units	Total	A1	A2	A3
Core Mandatory Impact Indicator						
Global warming potential	GWP	kg CO ₂ -eq	3.23E+00	1.95E+00	2.63E-02	1.25E+00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11-eq	1.18E-07	1.14E-08	9.45E-12	1.06E-07
Acidification potential of land and water	AP	kg SO ₂ -eq	1.21E-02	7.62E-03	4.61E-04	4.02E-03
Eutrophication potential	EP	kg PO ₄ -eq	9.92E-03	1.74E-04	2.80E-05	9.72E-03
Formation of tropospheric ozone	SFP	kg O ₃ -eq	1.32E-01	7.80E-02	1.50E-02	3.89E-02
Abiotic depletion potential for fossil resources	ADP_f	MJ Surplus	9.08E+01	7.69E+01	3.39E-01	1.35E+01
Use of Primary Resources						
Renewable primary energy carrier used as energy	RPRE	MJ	1.05E+00	1.49E-01	8.18E-06	9.00E-01
Renewable primary energy carrier used as material	RPRM	MJ	1.73E+00	0.00E+00	0.00E+00	1.73E+00
Non-renewable primary energy used as energy	NRPRE	MJ	9.80E+01	7.70E+01	3.39E-01	2.07E+01
Non-renewable primary energy used as material	NRPRM	MJ	1.59E-03	0.00E+00	0.00E+00	1.59E-03
Secondary Material, Secondary Fuel and Recovered Energy						
Use of secondary materials	SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy	RE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mandatory Inventory Parameters						
Use of freshwater resources	FW	m ³	3.75E-01	8.33E-03	1.02E-08	3.67E-01
Indicators Describing Waste						
Disposed of hazardous waste	HWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Disposed of non-hazardous waste	NHWD	kg	7.79E-02	0.00E+00	0.00E+00	7.79E-02
Disposed of high-level radioactive waste	HLRW	m ³	3.81E-09	9.21E-12	6.79E-10	3.13E-09
Disposed of low-level radioactive waste	LLRW	m ³	3.50E-08	4.25E-11	6.49E-09	2.84E-08
Components for reuse	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (waste to energy)	EEE	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (waste to energy)	ETE	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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. The results of modules A1-A3 shouldn't be used without considering the results of module C. A1-A3 results include the "balancing-out reporting" of biogenic CO₂ of packaging, traditionally released in A5. Additional optional indicators per EN 15804+A2 are not declared, including: particulate matter emissions; ionizing radiation, human health; eco-toxicity (freshwater); human toxicity, cancer effects; human toxicity, non-cancer effects; land use related impacts/soil quality.

Additional environmental information

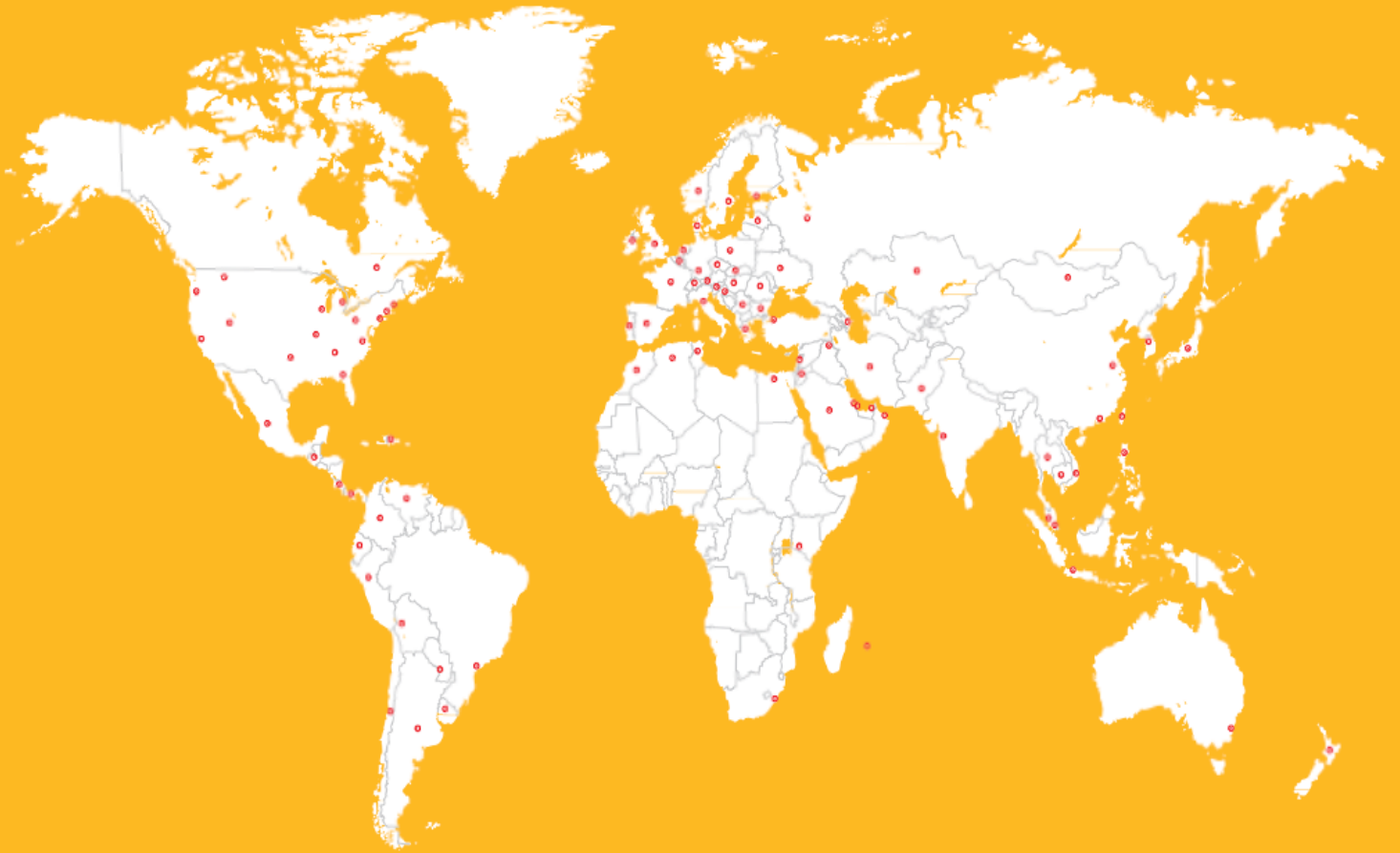
No additional environmental, social, or economic information is declared in this EPD.

References

- ASTM 2020 - ASTM Program Operator for Product Category Rules (PCR) and Environmental Product Declarations (EPDs) General Program Instructions v8, April 29th.
- WAP Sustainability Consulting: 2023 – A Cradle-to-Gate Life Cycle Assessment of SIKAFIBER®[®] Manufactured by SIKA.
- ISO 21930: 2017 Building construction – Sustainability in building construction – Environmental declaration of building products.
- ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.
- ISO 14044:2006/AMD 1:2017/ AMD 2:2020 - Environmental management - Life cycle assessment - Requirements and guidelines.
- 14040:2006/AMD 1:2020 - Environmental management - Life cycle assessment - Principles and framework.



GLOBAL BUT LOCAL PARTNERSHIP



WHO WE ARE

Sika AG, located in Baar, Switzerland, is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing, and protecting in the building sector and the motor vehicle industry.

The corporation has subsidiaries in 98 countries, employs more than 17,000 people worldwide, and has more than 190 manufacturing facilities around the globe.

Our most current General Sales Conditions shall apply.
Please consult the Product Data Sheet prior to any use and processing.

SIKA CORPORATION—SIKAFIBER

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