ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Sika Australia Pty Ltd
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SIK-20250048-CBC1-EN
Issue date	04/03/2025
Valid to	03/03/2030

Polypropylene-based macro and blended fibres

Sika Australia Pty Ltd

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

www.ibu-epd.com | https://epd-online.com

BUILDING TRUST

General Information

Sika Australia Pty Ltd

Programme holder

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

Declaration number

EPD-SIK-20250048-CBC1-EN

This declaration is based on the product category rules:

Reinforcing fibres , 04/07/2023
(PCR checked and approved by the SVR)

Issue date

04/03/2025

Valid to

03/03/2030

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

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Polypropylene-based macro and blended fibres

Owner of the declaration

Sika Australia Pty Ltd
Elizabeth Street 55
2164 Wetherill Park, NSW
Australia

Declared product / declared unit

1 kg of Polypropylene-based macro and blended fibres, commercialised by Sika Australia Pty Ltd in Australia.

Scope:

This EPD is valid for Sika's Polypropylene-based fibres in macro and blended forms, commercialised by Sika Australia Pty Ltd in Australia. These products are produced in different plants in Australia and in the USA. This EPD covers 100 % of the production volume of the declared products.

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*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Sr Lucas Berman,
(Independent verifier)

Product

Product description/Product definition

Sika's Polypropylene-based fibres are available in macro, micro, and blended forms. They are primarily used to improve the load-carrying capacity of concrete and to enhance its resistance to plastic shrinkage cracking, impacts, and shattering. They also help reduce rebound waste, allow for thicker layer builds, and minimize sag in shotcrete applications. This EPD is valid for the following Sika's Polypropylene-based fibres in macro and blended forms:

- SikaFiber® Force PP-48 / RAD-48s
- SikaFiber® Force PP-55 / RAD-55s
- SikaFiber® Force PP-65/RAD65s
- SikaFiber® PPM 48/19
- SikaFiber® Novomesh®-950

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 14889-2:2006, Fibres for concrete - Part 2: Polymer fibres - Definitions, specifications and conformity* and the CE-marking.

For the application and use the respective national provisions apply.

Application

For most types of concrete to increase load-bearing capacity, improve resistance to plastic shrinkage cracking, and reduce brittle damage caused by impact and fire:

- Floor slabs,
- Precast concrete elements,
- Foundations, footings,
- Tunnelling, mining, pools shotcrete,
- Load-bearing components in building construction and traffic route engineering.

Polypropylene-based macro and blended fibres shall be mixed with a high-efficiency mixer, at the recommended dosage, and for an adequate duration (typically a minimum of 5 minutes) to ensure uniform distribution of the fibres throughout the concrete mix. The entire package can be thrown into the mix allowing for easy handling whilst leaving no waste on site. Fibres can be added to the mix at any stage during batching.

The addition of polypropylene-based macro and blended fibres can cause a reduction of the concrete consistency. It is recommended to correct this loss not by adding water, but by adjusting the mix to the required workability, with a suitable dosage of Sika® water reducing admixture (SikaPlast® or ViscoCrete® range).

Polypropylene-based macro and blended fibres are also compatible with all other concrete admixtures and performance-enhancing chemicals.

Technical Data

All technical data stated in this document are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

Name	Value	Unit
SikaFiber® Force PP-48 / RAD-48s		
- Density	0.92	kg/l
- Cross section	1.37 x 0.34	mm
- Length	48	mm
- Classification acc. to EN 14889-2	II	-
- Melting point	170	°C
- Tensile strength acc. to EN 14889-2	>450	MPa
- Modulus of elasticity in tension acc. to EN 14889-2	7–9	GPa
- Recommended dosage	4–8	kg/m^3
SikaFiber® Force PP-55 / RAD-55s		
- Density	0.92	kg/l
- Cross section	1.37 x 0.34	mm
- Length	55	mm
- Classification acc. to EN 14889-2	II	-
- Melting point	170	°C
- Tensile strength acc. to EN 14889-2	>450	MPa
- Modulus of elasticity in tension acc. to EN 14889-2	7–9	GPa
- Recommended dosage	4–8	kg/m^3
SikaFiber® Force PP-65/RAD65s		
- Density	0.92	kg/l
- Cross section	1.37 x 0.34	mm
- Length	65	
- Classification acc. to EN 14889-2	II	
- Melting point	170	°C
- Tensile strength acc. to EN 14889-2	>450	MPa
- Modulus of elasticity in tension acc. to EN 14889-2	7–9	GPa
- Recommended dosage	4–8	kg/m^3
SikaFiber® PPM 48/19		
- Density	0.92	kg/l
- Cross section / diameter	1.37 x 0.34 / 0.035	mm
- Length	48 / 18	mm
- Classification acc. to EN 14889-2	Ia & II (blended)	
- Melting point	170	°C
- Tensile strength acc. to EN 14889-2	>450	MPa
- Modulus of elasticity in tension acc. to EN 14889-2	7–9	GPa
- Recommended dosage	2.3–6.9	kg/m^3
SikaFiber® Novomesh®-950		
- Density	0.91	kg/l
- Cross section / diameter	0.81 / 0.05 / 0.03	mm
- Length	50 / 19 / 12.7	mm
- Classification acc. to EN 14889-2	Ia & II (blended)	
- Melting point	164	°C
- Tensile strength acc. to EN 14889-2	>450	MPa
- Modulus of elasticity in tension acc. to EN 14889-2	>3.5	GPa
- Recommended dosage	2.3–6.8	kg/m^3

Performance data of the product in accordance with the declaration of performance with respect to its essential

characteristics according to *EN 14889-2:2006, Fibres for concrete - Part 2: Polymer fibres - Definitions, specifications and conformity.*

Base materials/Ancillary materials

Polypropylene-based macro and blended fibres consist of the following:

Name	Value	Unit
Polypropylene	> 90	%
Polyethylene	< 10	%
Additive(s)	< 1	%

1) This product/article/at least one partial article contains substances listed in the *ECHA candidate list* (date: 26.09.2024) exceeding 0.1 percentage by mass:

- No

2) This product/article/at least one partial article contains other cancerogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *ECHA 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 *Regulation (EU) on biocidal products*):

- No

Reference service life

A reference service life according to the *ISO 15686:1, -2, -7 and -8* standards cannot be declared as the fibres are fully integrated into concrete. Their service life thus depends on the service life of the concrete structure they are used in.

LCA: Calculation rules

Declared Unit

The declared values are valid for 1 kg of Polypropylene-based macro and blended fibres, commercialised in Australia by Sika Australia Pty Ltd.

Declared unit

Name	Value	Unit
Declared unit	1	kg

The declared values represent an average weighted by production volume across all products covered in this EPD. For the production process alone (without transport to Australia), the values across all indicators vary between 73 % and 114 % for all products covered in this EPD, whereas specifically the GWP_{fossil} varies between 95 % and 111 %.

The production process itself is not related to significant emissions; hence, the environmental impact is caused in upstream and downstream processes.

System boundary

Type of the EPD: from the cradle to gate, i.e. A1-A3. In addition, the current average transport from the Sika warehouses to the concrete production plants (module A4) as well as the disposal of packaging (module A5) are declared for informative purposes.

The system boundaries related to non-elementary flows entering or leaving the product system are outlined below:

- Plastic materials (production waste and packaging) that are recycled, reach the end-of-waste state once they are sorted into homogeneous fractions.
- Cardboard and paper packaging that is recycled, reach the end-of-waste state once they are sorted into homogeneous fractions.
- For wooden packaging materials that are recycled, the end-of-waste state is reached after sorting and chipping/crushing.

For all recycled materials, transport to further processing is included as a conservative choice.
The content of the modules declared in this EPD are outlined in the next section below.

Modules A1-A3 include the production of the Sika's Polypropylene-based fibres. The raw materials are transported to the production site, where they are extruded, wound and cut to size; off-cuts are shredded and recycled closed-loop into the extrusion process. The fibres are then packed for transport and transported from the production site to warehouses in Australia. Hence, modules A1-A3 include all upstream and downstream processes related to the provision of raw materials, packaging and ancillary materials, their transport to the production sites, electricity, generation, waste treatment, etc.

Module A4 covers for informative purposes, the average transport for the year 2023:

- between different warehouses in Australia,
- the final transport to the concrete producer.

Module A5* contains the modelling of the disposal of the packaging from the production site of the concrete, where the fibres are used as reinforcement.
The following disposal routes are common for the different packaging materials of polypropylene fibres in Australia:

- all polyvinyl acetate water-soluble wrappings, paper bags and paper boxes are mixed within concrete during application (not to generate any waste)
- stretch wrap/plastic packaging around the pallet: landfill
- other cardboard/paper (e.g. corner post): recycling
- pallets in Australia: they are all reused
- other wood: landfill

Geographic Representativeness

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

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.
Ecoinvent v3.10 has been used as the background database.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on biogenic carbon

Characteristic product properties

Name	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging	0.0143	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

Module A4 "Transport to the user of the polypropylene fibres"
For the internal logistics between different Sika's warehouses in Australia and the transport from the Sika's warehouses to the user of the polypropylene fibres for concrete production, an average distance of 1752 km by truck, 1329 km by train and 11 km by ship have been inventoried as being representative for the year 2023.

Module A5* "Disposal of packaging after usage of the product"
This module contains the disposal of the packaging only. For material to be recycled, an average transport distance of 500 km is assumed; for material to be landfilled, an average transport distance of 100 km is assumed.

Given that the end-of-life scenario could be a permanent storage of the fibres in tunnel applications and in order to ensure a net 0 carbon balance for the biogenic carbon stored in the product, the (permanent) biogenic carbon storage in packaging material is neglected in line with *EN 15804+A2* (in analogy to biogenic carbon in landfills).

No bonding agent is needed during concrete production.

LCA: Results

Characterisation factors version EF3.1 have been used.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = 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	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg of polypropylene-based macro and blended fibres

Parameter	Unit	A1-A3	A4	A5
Global Warming Potential total (GWP-total)	kg CO_2 eq	2.93E+00	2.7E-01	5.25E-02
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	3.01E+00	2.69E-01	5.09E-05
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	-7.49E-02	9.24E-05	5.24E-02
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	1.22E-03	1.06E-04	1.85E-08
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.2E-07	5.12E-09	7.27E-13
Acidification potential of land and water (AP)	mol H^+ eq	1.01E-02	1.51E-03	2.13E-07
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1.07E-03	2.18E-05	1.44E-08
Eutrophication potential aquatic marine (EP-marine)	kg N eq	2.2E-03	6.2E-04	7.55E-08
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	2.16E-02	6.77E-03	7.78E-07
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	1.65E-02	2.26E-03	2.79E-07
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	2.3E-05	6.81E-07	1.25E-10
Abiotic depletion potential for fossil resources (ADPF)	MJ	8.51E+01	3.75E+00	7.09E-04
Water use (WDP)	m^3 world eq deprived	1.22E+00	1.91E-02	3.8E-06

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg of polypropylene-based macro and blended fibres

Parameter	Unit	A1-A3	A4	A5
Renewable primary energy as energy carrier (PERE)	MJ	1.77E+00	7.13E-02	1.37E-05
Renewable primary energy resources as material utilization (PERM)	MJ	5.28E-01	0	-1.26E-02
Total use of renewable primary energy resources (PERT)	MJ	2.3E+00	7.13E-02	-1.25E-02
Non renewable primary energy as energy carrier (PENRE)	MJ	4.24E+01	3.75E+00	7.09E-04
Non renewable primary energy as material utilization (PENRM)	MJ	4.27E+01	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	8.51E+01	3.75E+00	7.09E-04
Use of secondary material (SM)	kg	0	0	0
Use of renewable secondary fuels (RSF)	MJ	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0
Use of net fresh water (FW)	m^3	9.17E-06	6.85E-07	1.19E-10

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 kg of polypropylene-based macro and blended fibres

Parameter	Unit	A1-A3	A4	A5
Hazardous waste disposed (HWD)	kg	1.57E-03	2.44E-05	4.37E-09
Non hazardous waste disposed (NHWD)	kg	2.22E-01	2.42E-01	5.88E-05
Radioactive waste disposed (RWD)	kg	4.84E-05	2.16E-06	2.34E-10
Components for re-use (CRU)	kg	0	0	0
Materials for recycling (MFR)	kg	1.69E-02	0	8.12E-04
Materials for energy recovery (MER)	kg	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0
Exported thermal energy (EET)	MJ	0	0	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 kg of polypropylene-based macro and blended fibres

Parameter	Unit	A1-A3	A4	A5
Incidence of disease due to PM emissions (PM)	Disease incidence	7.94E-08	2.75E-08	4.52E-12
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	1.17E-01	5.1E-03	5.78E-07
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	1.05E+01	1.09E+00	1.74E-04

Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	1.04E-08	2E-09	2.32E-13
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	2.56E-08	2.18E-09	4.59E-13
Soil quality index (SQP)	SQP	1.2E+01	3.29E+00	6.47E-04

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'.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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.
Disclaimer 2 – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

References

Product category rules of IBU

IBU (2021)
IBU (2021): General Instructions for the EPD Programme of the Institut Bauen und Umwelt e.V. (General Instructions for the IBU EPD Programme). Version 2.0, Institut Bauen und Umwelt, Berlin.

IBU (2023)
IBU (2023): PCR Part B: Requirements on the for reinforcing fibres. Version 2023/07, Institut Bauen und Umwelt, Berlin.

IBU (2024)
IBU (2024): PCR Part A: Calculation rules for the life cycle assessment and requirements on the project report according to EN 15804 +A2. Version 1.4., Institut Bauen und Umwelt, Berlin.

Standards and legal documents

ISO 14025
ISO 14025:2006-07, Environmental labels and declarations - Type III Environmental declarations - Principles and procedures.

ISO 14040
ISO 14040:2006-07, Environmental management - Life cycle assessment - Principles and framework.

ISO 14044
EN ISO 14044:2006-07, Environmental management - Life cycle assessment - Requirements and guidance (ISO 14044:2006).

EN 14889-2
EN 14889-2:2006, Fibres for concrete - Part 2: Polymer fibres - Definitions, specifications and conformity.

EN 15804
DIN EN 15804 +A2:2022-03, sustainability of construction works - Environmental product declarations - Core rules for the product category construction products.

ECHA-List
The Candidate List of substances of very high concern, available via https://echa.europa.eu/nl/-/four-newsubstances-added-to-the-candidate-list.

Regulation (EU) on biocidal products
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.

Regulation (EU) Nr. 305/2011(CPR)
Regulation (Eu) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

Regulation on the European Waste List
https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32000D0532

ecoinvent v3.10
ecoinvent v3.10, life cycle database, 12/2023. ecoinvent, Zurich.

Additional references

Weidema et al. (2013)
Weidema, B., C. Bauer, R. Hischier, C. Mutel, T. Nemecek, J. Reinhard, C.O. Vadenbo, G. Wernet (2013): Overview and methodology, Data quality guideline for the ecoinvent database version 3. ecoinvent report no. 1 (v3), St. Gallen (CH).

Publisher

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

Dr. Frank Werner - Umwelt & Entwicklung
Kammelenbergstrasse 30
9011 St. Gallen
Switzerland

+ 41 (0)44 241 39 06
frank@frankwerner.ch
http://www.frankwerner.ch/

Owner of the Declaration

Sika Australia Pty Ltd
Elizabeth Street 55
2164 Wetherill Park, NSW
Australia

+61 2 9725 1145
sustainability@au.sika.com
aus.sika.com