

# ENVIRONMENTAL PRODUCT DECLARATION

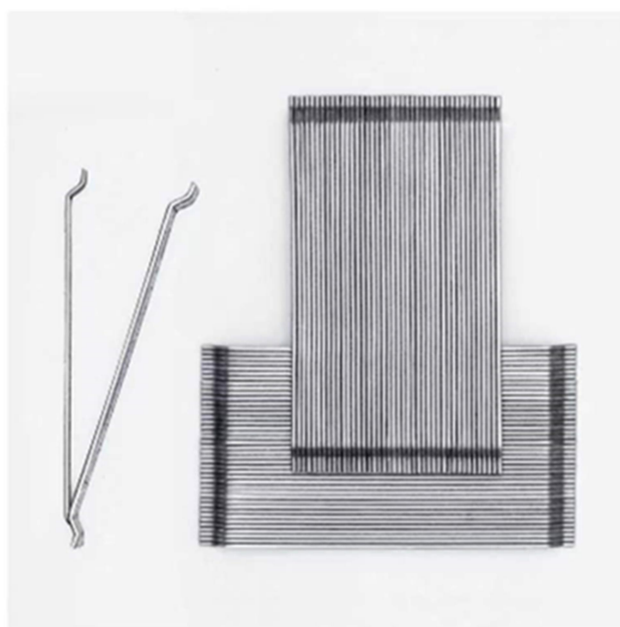
In accordance with ISO 14025 and EN 15804 for:

**Steel fiber**

From



**Yutian Zhitai Steel Fiber Manufacturing Co. Ltd**



Programme operator:	EPD China
Registration number:	EPD-CN-00003
Issued date:	2024-04-16
Valid until:	2029-04-15

## Programme Information

EPD Owner	Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd Contact: daixue@ztgxw.cn
Product Name	Steel Fibre
Production Site	Yutian Zhitai Steel Fiber Manufacturing Co.Ltd. Hejiazhuang Village, Yahongqiao Town, Yutian County, Tangshan City, Hebei Prov., China. Zip Code: 064102
Identification of product	Group I: cold-drawn wire according to EN 14889-1:2016
Field of Application	Improve the tensile strength, compressive strength, shear strength and increase the impact resistance of concrete to improve fatigue strength and other important performance indicators.
Programme Operator	EPD China Address of Headquarter: Tianping Road, Xuhui District, Shanghai Website: www.epdchina.cn Email: info@epdchina.cn   secretary@epdchina.cn
LCA Practitioner	Yufei Jiang Ecovane Environmental Co.,ltd
Responsibility	The EPD owner has the sole ownership, liability, and responsibility for the EPD
Comparability	EPDs within same category of product in different programme operator are not suggested to be compared. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible even applying the same PCR.
Liability	The EPD owner has the sole ownership, liability, and responsibility for the EPD.
Validity	The EPD is published on 2024-04-16 and valid to 2029-04-15
LCA Software (version)	Simapro, Version 9.5
LCI Dataset (version)	Ecoinvent Datenbank, Version 3.9.1.
Year(s) of Primary Data	01/2022-12/2022
PCR	EPDEN-PCR-202204: PCR for construction Products and construction services to EN 15804
Other Reference Document	/
Verification statement according EN15804	
Independent verification of the declaration and data according to EN ISO 14025:2010 <input type="checkbox"/> internal <input checked="" type="checkbox"/> external Third-party institution verification: < Lillian Li, SGS-CSTC Standards Technical Services Co., Ltd.> is an approved certification body accountable for third-party verification Approved by: EPD China	
Procedure for follow-up of data during EPD validity involves a third-party certification body: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

# General Information

## 1.1 Company information

Owner of the EPD: Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd

Contact: [daixue@ztgxw.cn](mailto:daixue@ztgxw.cn)

Description of the organisation:

Yutian Zhitai Steel Fiber Manufacturing Co.Ltd.was founded in 1996, and was formally established in 2011 through continuous development in Tangshan Yutian, China.

The company have excellent management and scientific research personnel, advanced leadership team, advanced steel fibre production equipment caused by Zhitai brand steel fibre in strict accordance with the ISO 13270:2013 “ steel fibre concrete” standard implementation of products by the national authoritative inspection agency (National building materials testing centre) tests all qualified. And has passed the China Quality Certification Centre of the ISO9001 quality management system certification.

The company are mainly divided into three series: glued steel fibre, RPC copper-plated steel fibre, hooked end steel fibre and has an annual output of 24913 tons of production capacity. The raw steel wire materials are mainly used from Tangshan Steel company.

Product-related or management system-related certifications:

Certificate of quality management system conforms to the Standard GB/T19001-2016/ISO9001:2015.

Certificate of constancy of performance applies to the construction product: Steel fibres Group I conforms to EN 14889-1:2006.

Name and location of production site(s):

Yutian Zhitai Steel Fiber Manufacturing Co.Ltd.

Hejiazhuang Village, Yahongqiao Town, Yutian County, Tangshan City, Hebei Prov., China.

Zip Code: 064102

## 1.2 Scope and type of EPD

Declared unit: Production of 1kg steel fibres (mass excluding packaging)

Reference service life: n/a

Time representativeness: 2022 as reference year

Description of system boundaries:

Cradle-to-gate (A1-A3) with options: A4(Transport to customers), A5 (Installation), C1 (De-construction), C2 (Transport to End of life), C3 (Waste processing), C4 (Disposal) and D (Reuse-Recycling-recovery-potential).

Excluded life cycle stages:

All phases of the use stage B (as there are no emissions during the use of the product).

Table: Process stages and and EPD modules.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Production	Transport from the gate to the	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ 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	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x

Further information:

All inputs and outputs of the production by Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd were considered in the calculation. Generic data was used for the considered raw materials from the supplier due to the fact that these materials are not produced by Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd.

Supplier-specific distances of raw materials to the manufacturing site (A2) were provided by Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd via lorry > 32 metric ton, EURO5. For A5 and C2, distance of 20 km to waste treatment plant by lorry (EURO5, more than 32 metric ton) were assumed.

According to the information from Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd, after the use of steel fibres, 100% is assumed to be landfilled. The low impact from deconstruction in C1 and shredding in C3 is neglected.

Needed machines, plants and further infrastructure for the production at Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd are not considered in the calculation.

No allocations are applied in the product stage because there is no co-products.

## 2 Detailed Product Description

### 2.1 2.1. Description of the product

Product name: Steel Fibre

Product identification: Group I: cold-drawn wire according to EN 14889-1:2016

Steel Fibers covered by this EPD:

Type of fibre	Length [mm]	Diameter [mm]	Aspect ratio (l/d)	Tensile Strength [N/mm <sup>2</sup> ]
Cold-drawn wire steel fibre	13-60	0.2-1.0	45-100	1100-2850

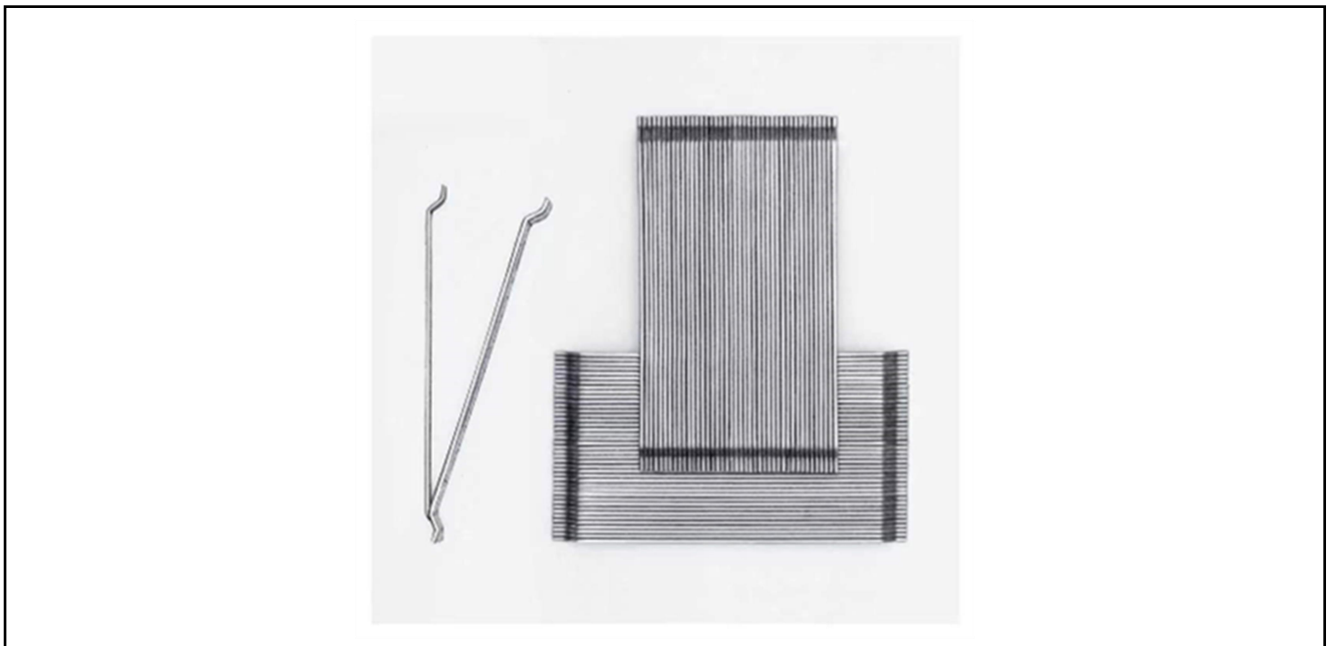


Figure: Picture of the declared product.

Product description: Zhitai steel fibre is cold-drawn from steel wire with hooks on both ends, enhancing the grip with concrete. The glue of the steel fibre can guarantee rapid and convenient adding and mixing, as well as uniform distribution. The steel fibre can greatly improve the tensile strength, compressive strength, shear strength and increase the impact resistance of concrete to improve fatigue strength and other important performance indicators.

Zhitai steel fibres with hooked ends for concrete reinforcement covered by this EPD are manufactured in their own manufacturing plant in Tangshan, China. Steel fibres are produced in different diameters and lengths, depending on the application field and customer requirements. The fibres are usually packed either in big bags or paper sack of different dimensions. Zhitai steel fibre has been widely used all over world for different applications like high-speed railway, tunnel, building floor, highway pavement, airport runway, concrete sleeper etc.

## 2.2 Description of production process

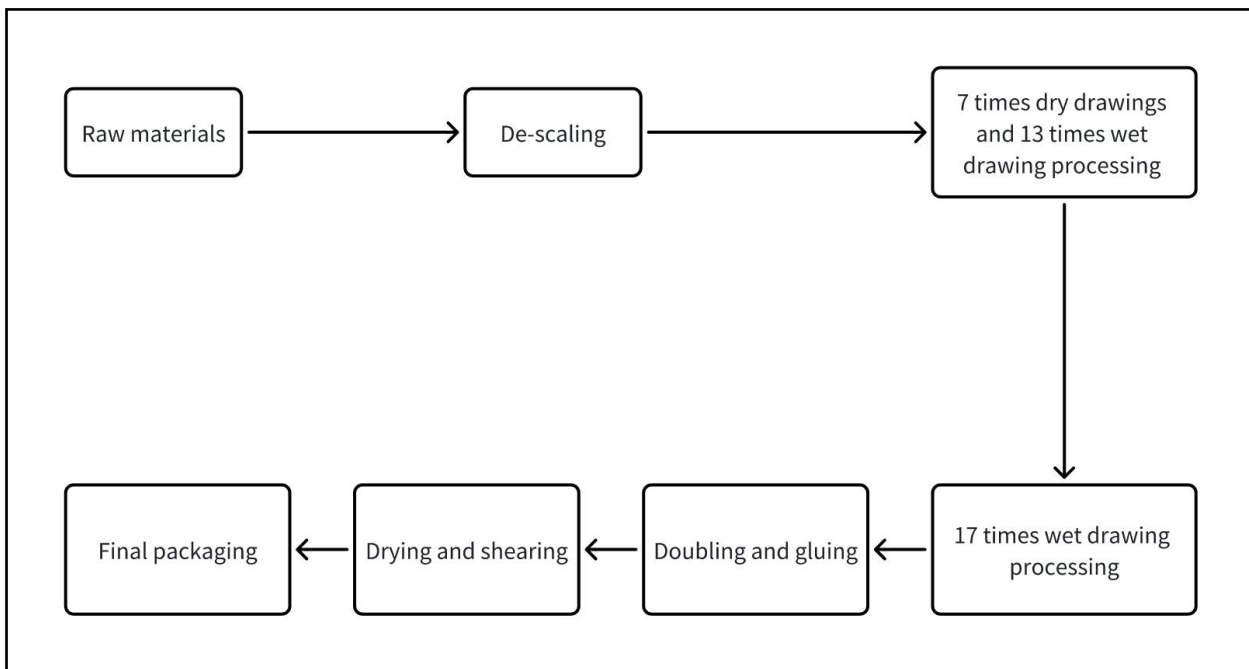


Figure: The production process in selected stages.

The steel fiber product process mainly includes seven steps. The raw material is mechanically deoxidized under normal temperature. After 7 dry drawing and 30 wet drawing procedures, it becomes a semi-finished product with a specific diameter. Then, it is doubled, glued, dried and cut to final packaging product. The electricity used in the manufacturing process is sourced from “Electricity, medium voltage {CN-NCGC} | market for electricity, medium voltage | Cut-off, U” from the Ecoinvent database.

## 2.3 Product components

Table: Main product components and packaging materials per unit.

Product components	Weight, kg	Weight-% (versus the product)
Hot low carbon steel wire rods	1.0016	100.16%
Auxiliary materials	Weight, kg	Weight-% (versus the product)
Glue	0.0019	0.19%
Packaging materials	Weight, kg	Weight-% (versus the product)
Polypropylene (big bag)	0.0072	0.72%
Kraft paper	0.0019	0.19%
Paper sack	0.0015	0.15%
Packaging film	0.0004	0.04%
Pallet	0.0078	0.78%
TOTAL	0.0189	1.89%

Included products do not contain the substances included in the "Candidate List of SVHC" document issued by the European Chemicals Agency (<http://echa.europa.eu/candidate-list-table>).

## 3 LCA results according to EN 15804

### 3.1 Environmental Impacts

The results of the underlying LCA is provided in this section as environmental impacts, resource use, output flows and additional information on biogenic carbon. All pre-set parameters of EN 15804 are required.

Table: Environmental impacts according to EN 15804.

Core indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	[kg CO <sub>2</sub> eq.]	1.94E+00	1.13E+00	1.02E-02	0.00E+00	2.11E-06	0.00E+00	6.08E-06	-4.70E-03
Global Warming Potential fossil fuels (GWP-fossil)	[kg CO <sub>2</sub> eq.]	1.93E+00	1.13E+00	5.13E-03	0.00E+00	2.11E-06	0.00E+00	6.08E-06	-4.69E-03
Global Warming Potential biogenic (GWP-biogenic)	[kg CO <sub>2</sub> eq.]	-5.03E-03	2.04E-04	5.03E-03	0.00E+00	5.74E-10	0.00E+00	2.40E-09	-6.42E-06
Global Warming Potential land use and land use change (GWP-luluc)	[kg CO <sub>2</sub> eq.]	9.09E-03	8.67E-04	1.10E-07	0.00E+00	1.04E-09	0.00E+00	3.67E-09	-3.69E-06
Depletion potential of the stratospheric ozone layer (ODP)	[kg CFC 11 eq.]	4.12E-08	1.71E-08	7.07E-12	0.00E+00	3.30E-14	0.00E+00	1.76E-13	-2.28E-11
Acidification potential, Accumulated Exceedance (AP)	[mol H <sup>+</sup> eq.]	7.79E-03	3.32E-02	1.77E-06	0.00E+00	7.63E-09	0.00E+00	4.58E-08	-1.98E-05
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)	[kg P eq.]	7.61E-04	3.83E-05	2.84E-08	0.00E+00	1.72E-10	0.00E+00	5.06E-10	-8.09E-07
Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine)	[kg N eq.]	1.81E-03	8.31E-03	9.19E-06	0.00E+00	2.54E-09	0.00E+00	1.76E-08	-3.95E-06
Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	[mol N eq.]	1.86E-02	9.19E-02	7.67E-06	0.00E+00	2.69E-08	0.00E+00	1.88E-07	-4.20E-05
Formation potential of tropospheric ozone (POCP)	[kg NMVOC eq.]	9.00E-03	2.48E-02	2.55E-06	0.00E+00	1.08E-08	0.00E+00	6.56E-08	-1.74E-05
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	[kg Sb eq.]	3.94E-06	1.12E-06	4.92E-10	0.00E+00	5.70E-12	0.00E+00	8.44E-12	-1.81E-08
Abiotic depletion potential for fossil resources (ADP-fossil)	MJ, net calorific value	1.95E+01	1.39E+01	2.65E-03	0.00E+00	3.07E-05	0.00E+00	1.51E-04	-1.52E-01
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m <sup>3</sup> world eq. Deprived]	6.95E-01	3.18E-02	2.73E-04	0.00E+00	1.57E-07	0.00E+00	6.69E-06	-7.17E-04

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

For all environmental impact indicators, 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.

### 3.2 Resource use and waste categories

Table: Resource use and waste categories according to EN 15804.

Core indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ	1.19E+00	1.00E-01	7.40E-02	0.00E+00	3.89E-07	0.00E+00	1.30E-06	-5.91E-02
Use of renewable primary energy resources used as raw materials (PERM)	MJ	7.39E-02	0.00E+00	-7.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT) (primary energy and primary energy resources used as raw materials)	MJ	1.26E+00	1.00E-01	7.79E-05	0.00E+00	3.89E-07	0.00E+00	1.30E-06	-5.91E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ	3.05E-01	6.90E-02	8.33E-02	0.00E+00	2.93E-07	0.00E+00	9.17E-07	-1.24E-03
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ	8.33E-02	0.00E+00	-8.33E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT) (primary energy and primary energy resources used as raw materials)	MJ	3.88E-01	6.90E-02	5.66E-05	0.00E+00	2.93E-07	0.00E+00	9.17E-07	-1.24E-03
Use of secondary material (SM)	kg	2.20E-01	0.00E+00	0.00E+00	0.00E+00	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	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water (FW)	m <sup>3</sup>	1.78E-02	1.13E-03	8.35E-06	0.00E+00	4.81E-09	0.00E+00	1.61E-07	-1.33E-05
Hazardous waste disposed (HWD)	kg	4.52E-04	1.81E-04	4.47E-05	0.00E+00	8.63E-10	0.00E+00	1.86E-09	-9.67E-07
Non-hazardous waste disposed (NHWD)	kg	2.31E-01	5.34E-02	4.21E-03	0.00E+00	2.67E-06	0.00E+00	1.00E-03	-3.69E-04
Radioactive waste disposed (RWD)	kg	7.25E-06	1.54E-06	1.20E-09	0.00E+00	6.71E-12	0.00E+00	2.24E-11	-2.72E-08
Components for re-use (CRU)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling (MR)	kg	4.55E-03	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity (EEE)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal (EET)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

### 3.3 Information on biogenic carbon content

Information on biogenic carbon content which shall be included in the EPD as follows:

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg C
Biogenic carbon content in accompanying packaging	0.0118 kg C
NOTE: 1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub> .	



## 4 Supplementary information

### 4.1 Calculation rules

All inputs and outputs of the production by Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd were considered in the calculation. Generic data was used for the considered raw materials from the supplier due to the fact that these materials are not produced by Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd.

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Needed machines, plants and further infrastructure for the production at Yutian Zhitai Steel Fiber Manufacturing Co.,Ltd are not considered in the calculation.

All known and available primary data of the production processes were considered. Therefore, no cut off rules were applied.

## References

- General Programme Instructions of EPD China. Version 1.0.
- EPDEN-PCR-202204: PCR for construction Products and construction services to EN 15804
- ISO 14025:2006, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
- ISO 14040:2006/Amd 1:2020 Environmental management — Life cycle assessment — Principles and framework — Amendment 1
- ISO 14044:2006/Amd 2:2020 Environmental management — Life cycle assessment — Requirements and guidelines — Amendment 2
- EN 15804:2012+A2:2019, Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products
- Product Environmental Footprint Category Rules (PEFCRs) Annex II Part C
- Ecoinvent, 2023. Swiss Centre for Life Cycle Assessment, version 3.9.1 ([www.ecoinvent.ch](http://www.ecoinvent.ch)).
- PRé Consultants, 2021. Software SimaPro version 9.5.0.0 ([www.pre.nl](http://www.pre.nl)).
- Life Cycle Assessment (LCA) Report for Steel fiber from Yutian Zhitai Steel Fiber Manufacturing Co. Ltd, 2024/04/14



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