

# Environmental Product Declaration

*according to ISO 14025 and EN 15804*



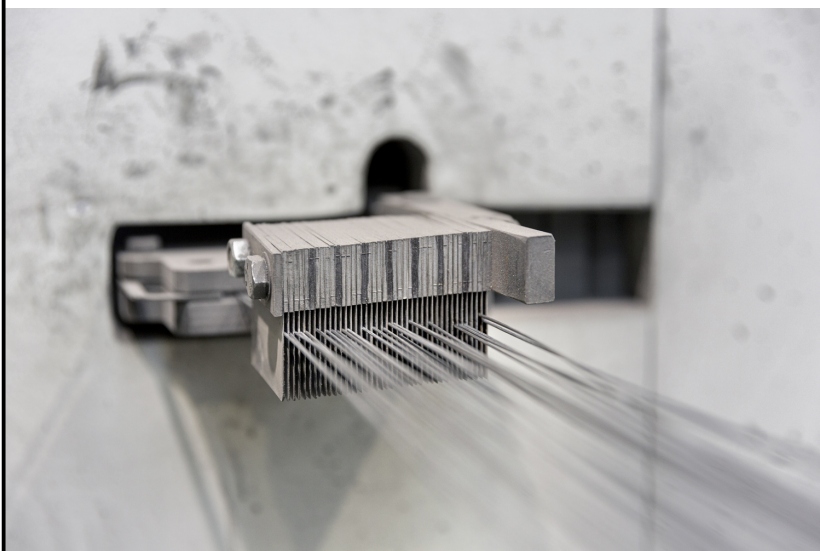
This declaration is for:

**Steel fibers for concrete, mortar and  
grout**

Provided by:

**Metalproducts BV**

**metal**  
**products**



program operator

**Stichting MRPI®**

publisher

**Stichting MRPI®**

**[www.mrpi.nl](http://www.mrpi.nl)**

MRPI® registration

**1.1.00457.2023**

date of first issue

**01-12-2023**

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**01-12-2023**

expiry date

**01-12-2028**





## COMPANY INFORMATION

# metal products

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## PRODUCT

Steel fibers for concrete, mortar and grout

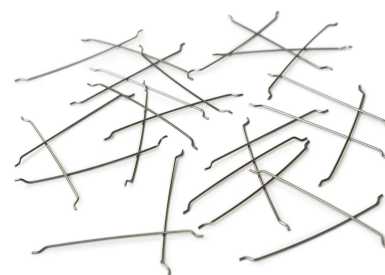
## DECLARED UNIT/FUNCTIONAL UNIT

All impacts are calculated using the declared unit of 1 kg of steel fiber.

## DESCRIPTION OF PRODUCT

Steel fibers, produced by Metalproducts BV, are used for the construction industry, mainly for application in reinforced concrete floors

## VISUAL PRODUCT



## MRPI® REGISTRATION

1.1.00457.2023

## DATE OF ISSUE

01-12-2023

## EXPIRY DATE

01-12-2028

## SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **Kamiel Jansen, Aveco de Bondt**.

The LCA study has been done by **Mieke de Jager, Ecomatters B.V.**

The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2. It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate List of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

## MORE INFORMATION

<https://www.metalproductshorst.com/producten-en-diensten/staalvezels/>

## PROGRAM OPERATOR

Stichting MRPI®  
Kingsfordweg 151  
1043GR  
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ir. J-P den Hollander, Managing director MRPI®

## DEMONSTRATION OF VERIFICATION

CEN standard EN15804 serves as the core PCR[a]

Independent verification of the declaration and data,  
according to EN ISO 14025:2010:  
internal: external: X

Third party verifier:

Kamiel Jansen, Aveco de Bondt

[a] PCR = Product Category Rules

## DETAILED PRODUCT DESCRIPTION

In Metalproduct's production location, drawn steel wire is cut and shaped into different grades of steel fibers that differ in length, strength and/or thickness. Subsequently the steel fibers are packed and shipped to customers. This EPD is based on data for two grades of steel fibers (Table 1), but representative for all current and future steel fiber variations (Table 2).

### Condition of delivery

Cut and shaped steel fibers packed in boxes

### Product components

Drawn steel wire

### Reference service life

> 50 years

Description	Thickness (mm)	Strength (N/mm <sup>2</sup> )	Dimensions (mm)	Recycled content (%)	Iron content (%)
Steel fiber 1	1.05	1400	40-65	75-80	98.96
Steel fiber 2	0.90	2000	40-65	78	98.36

Table 1: Characteristics steel fibers currently in production

Description	Thickness (mm)	Strength (N/mm <sup>2</sup> )	Dimensions (mm)
Microfibers	0.16 - 0.30	2200 - 2900	5 - 30
Steel Fibers	0.50 - 0.65	1100 - 2300	20 - 45
Steel Fibers	0.70 & 0.75	1100 - 2300	35 - 55
Steel Fibers	0.80 - 1.10	1100 - 2300	40 - 65

Table 2: Characteristics current and future steel fibers

COMPONENT > 1% of total mass	[%]
Minimum iron content steel fiber 1	98.96%
Minimum iron content steel fiber 2	98.36%

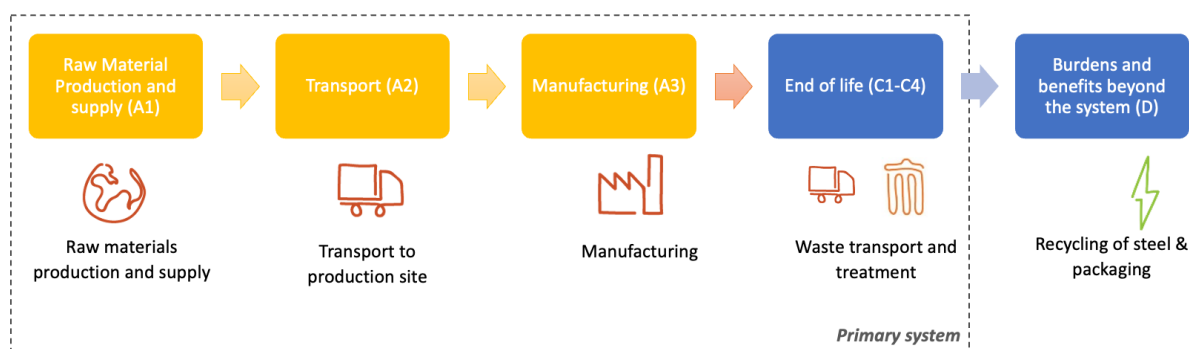
## SCOPE AND TYPE

This LCA is Cradle-to-Gate with Modules C1-C4 and Module D. All major steps from the extraction of natural resources to the final disposal of the product and its packaging are included in the scope of the study. This EPD is a representative EPD for steel fibers produced by Metalproducts BV (The Netherlands). The software 'LCA for Experts' version 10.7.0.183 (formerly Gabi) was used to perform the LCA. Background processes were sourced from Ecoinvent 3.9.1 (2022).

PRODUCT STAGE			CONSTRUCTION					USE STAGE							END OF LIFE			BENEFITS AND	
			PROCESS												STAGE			LOADS BEYOND THE	
			STAGE															SYSTEM BOUNDARIES	
Raw material supply	Transport	Manufacturing	Transport gate to 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	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X			

X = Modules Assessed

ND = Not Declared



LCA process diagram according to EN 15804 (7.2.1)

## REPRESENTATIVENESS

This EPD is based on data for the production of the steel fibers as indicated in Table 1. As the electricity required for production cannot be split between the different grades, the environmental performance was calculated per kg of steel fiber. In the future, other type of fiber grades will be produced, but the inputs, waste and emission outputs are not expected to differ from the current data. Therefore, the environmental performance per kg of steel fiber as calculated in this LCA study will be relevant for all steel fibers as indicated in Table 2.

**ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)**

	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1.26 E+0	2.76 E-1	-1.38 E-3	1.53 E+0	6.36 E-2	2.00 E-2	4.26 E-3	8.84 E-3	-3.34 E-1
GWP-fossil	kg CO2 eq.	1.25 E+0	2.75 E-1	2.84 E-2	1.55 E+0	6.36 E-2	2.00 E-2	3.94 E-3	1.32 E-3	-3.54 E-1
GWP-biogenic	kg CO2 eq.	-2.13 E-3	6.06 E-4	-3.00 E-2	-3.15 E-2	1.66 E-5	1.95 E-5	3.16 E-4	7.52 E-3	1.96 E-2
GWP-luluc	kg CO2 eq.	9.12 E-3	1.73 E-4	2.55 E-4	9.55 E-3	7.16 E-6	9.59 E-6	6.35 E-6	3.94 E-8	3.53 E-6
ODP	kg CFC11 eq.	2.77 E-8	5.61 E-9	1.03 E-9	3.43 E-8	9.88 E-10	4.23 E-10	3.39 E-11	4.07 E-12	-8.48 E-9
AP	mol H+ eq.	4.21 E-3	1.07 E-3	1.13 E-4	5.39 E-3	5.76 E-4	6.34 E-5	1.93 E-5	1.25 E-6	-1.13 E-3
EP-freshwater	kg PO4 eq.	7.50 E-4	3.08 E-5	1.02 E-5	7.91 E-4	1.91 E-6	1.36 E-6	1.43 E-6	3.40 E-8	-1.56 E-4
EP-marine	kg N eq.	1.02 E-3	3.79 E-4	5.25 E-5	1.45 E-3	2.67 E-4	2.19 E-5	4.90 E-6	7.89 E-7	-2.67 E-4
EP-terrestrial	mol N eq.	1.01 E-2	4.01 E-3	3.39 E-4	1.44 E-2	2.90 E-3	2.30 E-4	4.80 E-5	6.10 E-6	-2.99 E-3
POCP	kg NMVOC eq.	5.06 E-3	1.49 E-3	1.18 E-4	6.67 E-3	8.59 E-4	9.47 E-5	1.56 E-5	1.55 E-6	-1.90 E-3
ADP-minerals & metals	kg Sb eq.	4.53 E-6	8.47 E-7	1.71 E-7	5.55 E-6	2.17 E-8	6.24 E-8	1.97 E-8	2.39 E-10	3.75 E-7
ADP-fossil	MJ, net calorific value	1.53 E+1	3.91 E+0	4.92 E-1	1.97 E+1	8.11 E-1	2.78 E-1	5.57 E-2	1.13 E-3	-4.42 E+0
WDP	m3 world eq. deprived	1.39 E+0	3.35 E-2	1.40 E-2	1.44 E+0	2.74 E-3	1.69 E-3	9.65 E-4	1.11 E-4	-1.77 E-2

GWP-total = Global Warming Potential total

GWP-fossil = Global Warming Potential fossil fuels

GWP-biogenic = Global Warming Potential biogenic

GWP-luluc = Global Warming Potential land use and land use change

ODP = Depletion potential of the stratospheric ozone layer

AP = Acidification Potential, Accumulated Exceedence

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, Accumulated Exceedence

POCP = Formation potential of tropospheric ozone photochemical oxidants

ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]

ADP-fossil = Abiotic Depletion for fossil resources potential [2]

WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclaimer [2]

- 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.

## ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	Disease incidence	6.99 E-8	1.76 E-8	1.38 E-9	8.89 E-8	1.59 E-8	1.25 E-9	2.20 E-10	1.06 E-11	-1.85 E-8
IRP	kBq U235 eq.	1.17 E-1	1.18 E-2	2.15 E-3	1.31 E-1	3.86 E-4	3.69 E-4	4.26 E-4	1.71 E-6	1.68 E-2
ETP-fw	CTUe	2.92 E+1	3.97 E+0	5.75 E-1	3.37 E+1	6.93 E-1	2.79 E-1	8.23 E-2	6.40 E-3	-1.09 E+1
HTP-c	CTUh	7.54 E-9	1.57 E-10	4.99 E-11	7.75 E-9	1.99 E-11	9.30 E-12	2.41 E-12	4.01 E-13	3.36 E-9
HTP-nc	CTUh	2.81 E-8	3.36 E-9	4.03 E-10	3.19 E-8	4.23 E-10	2.35 E-10	5.23 E-11	1.69 E-11	-6.85 E-9
SQP	---	3.86 E+0	2.30 E+0	3.14 E+0	9.30 E+0	5.42 E-2	1.64 E-1	2.60 E-2	3.33 E-4	-1.58 E+0

PM = Potential incidence of disease due to PM emissions

IRP = Potential Human exposure efficiency relative to U235 [1]

ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]

HTP-c = Potential Comparative Toxic Unit for humans [2]

HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]

SQP = Potential soil quality index [2]

Disclaimer [1]

- 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]

- 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.

## RESOURCE USE per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1.23 E+0	1.19 E-1	6.57 E-1	2.01 E+0	4.64 E-3	4.28 E-3	5.29 E-3	3.43 E-5	-1.00 E-1
PERM	MJ	1.54 E-7	2.80 E-8	3.95 E-8	2.22 E-7	1.98 E-9	2.12 E-9	6.21 E-10	7.89 E-12	1.41 E-6
PERT	MJ	1.23 E+0	1.19 E-1	6.57 E-1	2.01 E+0	4.64 E-3	4.28 E-3	5.29 E-3	3.43 E-5	-1.00 E-1
PENRE	MJ	1.53 E+1	3.91 E+0	4.92 E-1	1.97 E+1	8.11 E-1	2.78 E-1	5.57 E-2	1.13 E-3	-4.42 E+0
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	1.53 E+1	3.91 E+0	4.92 E-1	1.97 E+1	8.11 E-1	2.78 E-1	5.57 E-2	1.13 E-3	-4.42 E+0
SM	kg	7.74 E-1	0.00	0.00	7.74 E-1	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m3	3.24 E-2	7.79 E-4	3.25 E-4	3.35 E-2	6.39 E-5	3.93 E-5	2.25 E-5	2.58 E-6	-1.77 E-2

PERE = Use of renewable energy excluding renewable primary energy resources

PERM = Use of renewable energy resources used as raw materials

PERT = Total use of renewable primary energy resources

PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 materials

RSF = Use of renewable secondary fuels

NRSF = Use of non renewable secondary fuels

FW = Use of net fresh water

## OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.20 E+0	0.00
RWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	1.46 E+1	0.00	0.00
MFR	kg	0.00	0.00	9.10 E-3	9.10 E-3	0.00	0.00	1.01 E+0	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ETE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

HWD = Hazardous Waste Disposed

RWD = Radioactive Waste Disposed

MFR = Materials for recycling

EEE = Exported Electrical Energy

NHWD = Non Hazardous Waste Disposed

CRU = Components for reuse

MER = Materials for energy recovery

ETE = Exported Thermal Energy



## BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
BCCpr	kg C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BCCpa	kg C	0.00	0.00	1.45 E-2	1.45 E-2	0.00	0.00	0.00	0.00	0.00

BCCpr = Biogenic carbon content in product

BCCpa = Biogenic carbon content in packaging

## CALCULATION RULES

### Cut-off criteria and allocation procedures

A cut-off was applied for minor auxiliary components used within the factory, which constitute less than 1% of the total inputs based on electricity use (on-site transport), and are therefore not expected to contribute significantly. No other cut-offs were intentionally applied to inputs and outputs within the system boundaries in the models. For allocation procedures, it was not possible to allocate the environmental impacts between the different steel fiber types thus no allocation was applied. Instead, impacts were calculated per kg steel fiber. Cut-off and allocation procedures in the background processes are according to the respective methodologies.

Data quality and data collection period:

Data quality requirements follow EN15804+A2:2019 and data was checked for plausibility with mass balances in the foreground processes. Used datasets are complete according to the system boundary, and are as current as possible. The data collection period is of reference year 2022, representing 1-year total data. For data gaps such as end-of-life scenario's and benefits and loads beyond the system boundary, Eurostat recycling scenarios and current technological practices were selected. Processes used in the background modelling are referring to Ecoinvent 3.9.1, the most recent version of the widely used database and are consistent with the foreground modelling in system limits and allocation procedures. The technological and geographical coverage reflects the physical reality as far as possible taking into account the technology mix, location, and representativeness of technologies, input materials, and input energies for the region. Data quality is assessed as good and adequate to the goal and scope of the study.

## SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

The product stage is reported in life cycle stages A1-A3. This life cycle stage includes the extraction and processing of raw materials for the product and the packaging, their transportation to the production site, and the manufacturing process. The manufacturing stage (A3) includes all processes related to production, i.e. electricity use for shaping and cutting and waste treatment.

Electricity consumption was modelled based on primary data on the amount and sources of purchased electricity using Ecoinvent 3.9.1 datasets.

Data on the end-of-life stage (C) are derived from current steel recycling practices (100% recycling, assuming no corrosion takes place) and Eurostat data on packaging waste treatment. Formula D.6. and D.8. from EN15804+A2 were used to calculate the benefits and loads beyond the system boundaries.



### DECLARATION OF SVHC

As required under article 33 of the EU REACH regulation, any substance contained in a product (or one of its sub-components) which is present on ECHA's Candidate List of substances of very high concern for Authorisation (SVHC) needs to be communicated. None of the substances contained in the product under study are listed in the "Candidate List of Substances of Very High Concern for authorisation" or they do not exceed the communication threshold of 0.1 % by weight.

### REFERENCES

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

ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework

ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B. (2016). The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218-1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8>

European Commission (2020). Annex C V2.1 of Product Environmental Footprint (PEF) calculations, <https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml>

### REMARKS

None