

ENVIRONMENTAL PRODUCT DECLARATION

According to ISO 14025 and EN 15804

Owner of the Declaration	Van Merksteijn Steel-Netherlands b.v.
Publisher	NIBE Research bv
Calculation number	EPD-NIBE-20200618-7308
Issue date	04-03-2021
Valid until	04-03-2026

Steel Fabric for Reinforcement of Concrete

Van Merksteijn Steel-Netherlands b.v.

www.epdnibe.com



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1. GENERAL

1.1 COMPANY INFORMATION / DECLARATION OWNER



Manufacturer: Van Merksteijn Steel-Netherlands b.v.
Production Location: Van Merksteijn Steel Netherlands
Address: Bedrijvenpark Twente 237
7602 KJ Almelo
E-mail: swartjes@van-merksteijn.com
Website: www.van-merksteijn.com

1.2 EPD INFORMATION

EPD for: Steel Fabric for Reinforcement of Concrete
Calculation number: EPD-NIBE-20200618-7308
Date of issue: 04-03-2021
End of validity: 04-03-2026
Version NIBE's EPD Application: v2.0
Version Environmental Profile database: v3.00 (2021-01-13)
PCR: NMD Determination method Environmental performance Construction works v1.0 July 2020

1.3 SCOPE OF DECLARATION

This is a cradle to gate with options EPD. The life cycle stages included are as shown below:
(X = included, MND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

1.4 VERIFICATION OF THE DECLARATION

CEN standard EN 15804:2012 serves as the core PCR
Independent verification of the declaration. according to EN ISO 14025:2010. Internal External

See verification statement.

Third party verifier: Rene Kraaijenbrink, LBP Sight

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2. PRODUCT

2.1 PRODUCT DESCRIPTION

Steel Fabric for Reinforcement of Concrete is used in the construction sector for reinforcing of concrete. Without reinforcement, concrete is poorly resistant to tensile forces that are common in buildings and other structures. The mesh is prefabricated and the concrete is poured over during construction.



2.2 DESCRIPTION OF THE MANUFACTURING PROCESS

Production

The raw material (wire rod), which is largely produced from scrap (82% in 2019), is supplied by ship, train and occasionally by truck. The raw material is stored at various places on site before it is processed on wire drawing- and stretching- machines. While drawing the wire, the mill scale is stripped from wirerod, adjusted to thickness (from 5 to 20 mm), provided with its profile and the wire is given the correct properties concerning physical values. The mill scale is disposed as waste, mainly iron oxide, and is recycled. The reinforcement mesh is welded from ribbed wire on welding lines. Longitudinal and transverse wires are welded together by means of current (spot resistance welding). No other additives or raw materials are added. A large number of articles are produced en kept in stock. They can be stored before they are transported to the customers. The articles do not contain any packaging materials other than 100% recyclable steel wire.

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3. CALCULATION RULES

3.1 CUT-OFF CRITERIA

In the Life cycle assessment the following is included in this study:

Product stage (A1-A3)

The production stage consists of the extraction of raw materials, transportation of the raw materials, processing the raw materials into materials and the production of the product. The required energy for production, external treatments, ancillary materials, packaging material and production emissions are included.

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3.2 ALLOCATION

There is no allocation applied for the environmental profiles / datasets used in this LCA.

3.3 SOURCE OF BACKGROUND DATA

Material	Source	Comments
Raw Material profiles		
Steel, low-alloyed, electric production (Belarus)	NIBE/EcoInvent 3.5 (2018)	The process Steel, low-alloyed {RER} steel production, electric, low-alloyed Cut-off, U is adapted by changing the electricity mix to Belarus
Steel, low-alloyed, electric production (EU)	EcoInvent 3.5 (2018)	
Steel, low-alloyed, electric production (Italy)	NIBE/EcoInvent 3.5 (2018)	The process Steel, low-alloyed {RER} steel production, electric, low-alloyed Cut-off, U is adapted by changing the electricity mix to Italy
Steel, low-alloyed, electric production (Russia)	NIBE/EcoInvent 3.5 (2018)	The process Steel, low-alloyed {RER} steel production, electric, low-alloyed Cut-off, U is adapted by changing the electricity mix to Russia
Steel, low-alloyed, electric production (Spain)	NIBE/EcoInvent 3.5 (2018)	The process Steel, low-alloyed {RER} steel production, electric, low-alloyed Cut-off, U is adapted by changing the electricity mix to Spain
Steel, low-alloyed, electric production (Turkey)	NIBE/EcoInvent 3.5 (2018)	The process Steel, low-alloyed {RER} steel production, electric, low-alloyed Cut-off, U is adapted by changing the electricity mix to Turkey
Steel, unalloyed, converter production (EU)	EcoInvent 3.5 (2018)	
Steel, unalloyed, converter production (RoW)	EcoInvent 3.5 (2018)	
Energy profiles		
Diesel, burned in machine (incl. emissions)	NMD/EcoInvent 3.5 (2018)	The combustion emissions of diesel are included in the environmental profile. A energy content of 35,8 MJ per liter is used
Electricity (NL) - medium voltage (1kV - 24kV)	EcoInvent 3.5 (2018)	
Hot rolling, steel processing (EU)	EcoInvent 3.5 (2018)	
Hot rolling, steel processing (RoW)	EcoInvent 3.5 (2018)	
Emission profiles		
Emission to Air - Particulates, < 10 um (mobile) (kg)		
Emission to Air - Particulates, < 2.5 um (kg)		
Waste profiles		
Materials for recycling, no waste processing taken into account	NIBE	
Pig iron production (GLO)	EcoInvent 3.5 (2018)	
Scrap steel {Europe without Switzerland} treatment of scrap steel, inert material landfill Cut-off, U	NMD/EcoInvent 3.5 (2018)	

%}

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4. RESULTS

4.1 DECLARED UNIT

Impact category	Unit	Total Amount
Depletion of abiotic resources-elements	Kg Sb	1.46E-3
Depletion of abiotic resources-fossil fuels	Kg Sb	8.83E+0
Global warming	Kg CO2 Equiv.	1.19E+3
Ozone layer depletion	Kg CFC-11 Equiv.	9.35E-5
Photochemical oxidants creation	Kg Ethene Equiv.	1.32E+0
Acidification of soil and water	Kg SO2 Equiv.	5.94E+0
Eutrophication	Kg PO43- Equiv.	7.50E-1
Human toxicity	kg 1.4 DB	6.42E+2
Ecotoxicity. fresh water	kg 1.4 DB	2.13E+1
Ecotoxicity. marine water (MAETP)	kg 1.4 DB	4.46E+4
Ecotoxicity. terrestrial	kg 1.4 DB	5.22E+1
Acidification (AP)	mol H+ eqv.	7.36E+0
Global warming potential (GWP-total)	kg CO2 eqv.	1.22E+3
Global warming potential - Biogenic (GWP-b)	kg CO2 eqv.	-4.94E-1
Global warming potential - Fossil (GWP-f)	kg CO2 eqv.	1.22E+3
Global warming potential - Land use and land use change (GWP-luluc)	kg CO2 eqv.	1.13E+0
Ecotoxicity, freshwater (ETP-fw)	CTUe	2.41E+4
Particulate Matter (PM)	disease incidence	1.04E-4
Eutrophication marine (EP-m)	kg N eqv.	1.39E+0
Eutrophication, freshwater (EP-fw)	kg PO4 eqv.	6.15E-2
Eutrophication, terrestrial (EP-T)	mol N eqv.	1.70E+1
Human toxicity, cancer (HTP-c)	CTUh	1.03E-5
Human toxicity, non-cancer (HTP-nc)	CTUh	2.64E-4
Ionising radiation, human health (IR)	kBq U235 eqv.	4.28E+1
Land use (SQP)	Pt	3.88E+3
Ozone depletion (ODP)	kg CFC 11 eqv.	1.01E-4
Photochemical ozone formation - human health (POCP)	kg NMVOC eqv.	6.01E+0
Resource use, fossils (ADP-f)	MJ	1.58E+4
Resource use, minerals and metals (ADP-mm)	kg Sb-eqv.	1.46E-3
Water use (WDP)	m3 world eqv.	6.89E+2
Parameter	Unit	Total Amount
renewable primary energy ex. raw materials	MJ	8.53E+2
renewable primary energy used as raw materials	MJ	0.00E+0
renewable primary energy total	MJ	8.53E+2
non-renewable primary energy ex. raw materials	MJ	1.69E+4
non-renewable primary energy used as raw materials	MJ	0.00E+0
non-renewable primary energy total	MJ	1.69E+4
use of secondary material	Kg	8.29E+2
use of renewable secondary fuels	MJ	0.00E+0
use of non-renewable secondary fuels	MJ	0.00E+0
use of net fresh water	M3	1.78E+1
hazardous waste disposed	Kg	5.73E-2
non hazardous waste disposed	Kg	2.60E+2
radioactive waste disposed	Kg	4.43E-2
Components for re-use	Kg	0.00E+0
Materials for recycling	Kg	1.24E+1
Materials for energy recovery	Kg	0.00E+0
Exported energy	MJ	0.00E+0
Exported Energy Thermic	MJ	0.00E+0
Exported Energy Electric	MJ	0.00E+0

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4.2 PRODUCT STAGE (A1 - 3)

- A1. raw material extraction and processing. processing of secondary material input (e.g. recycling processes)
- A2. transport to the manufacturer
- A3. manufacturing

Impact category	Unit	A1	A2	A3
Depletion of abiotic resources-elements	Kg Sb	1.21E-3	7.08E-5	1.78E-4
Depletion of abiotic resources-fossil fuels	Kg Sb	5.78E+0	6.19E-1	2.43E+0
Global warming	Kg CO2 Equiv.	7.75E+2	8.92E+1	3.21E+2
Ozone layer depletion	Kg CFC-11 Equiv.	5.64E-5	1.43E-5	2.28E-5
Photochemical oxidants creation	Kg Ethene Equiv.	8.52E-1	8.24E-2	3.87E-1
Acidification of soil and water	Kg SO2 Equiv.	3.36E+0	1.43E+0	1.15E+0
Eutrophication	Kg PO43- Equiv.	4.49E-1	1.48E-1	1.53E-1
Human toxicity	kg 1.4 DB	4.90E+2	3.82E+1	1.13E+2
Ecotoxicity. fresh water	kg 1.4 DB	1.49E+1	7.26E-1	5.63E+0
Ecotoxicity. marine water (MAETP)	kg 1.4 DB	3.04E+4	3.22E+3	1.10E+4
Ecotoxicity. terrestrial	kg 1.4 DB	5.10E+1	1.32E-1	1.13E+0
Acidification (AP)	mol H+ eqv.	4.17E+0	1.77E+0	1.42E+0
Global warming potential (GWP-total)	kg CO2 eqv.	8.04E+2	9.02E+1	3.30E+2
Global warming potential - Biogenic (GWP-b)	kg CO2 eqv.	-9.62E-1	1.21E-1	3.48E-1
Global warming potential - Fossil (GWP-f)	kg CO2 eqv.	8.04E+2	9.00E+1	3.30E+2
Global warming potential - Land use and land use change (GWP-luluc)	kg CO2 eqv.	8.19E-1	5.88E-2	2.52E-1
Ecotoxicity, freshwater (ETP-fw)	CTUe	1.73E+4	9.16E+2	5.90E+3
Particulate Matter (PM)	disease incidence	7.98E-5	3.57E-6	2.04E-5
Eutrophication marine (EP-m)	kg N eqv.	7.57E-1	3.82E-1	2.55E-1
Eutrophication, freshwater (EP-fw)	kg PO4 eqv.	4.48E-2	1.83E-3	1.49E-2
Eutrophication, terrestrial (EP-T)	mol N eqv.	9.52E+0	4.31E+0	3.21E+0
Human toxicity, cancer (HTP-c)	CTUh	9.16E-6	3.42E-8	1.07E-6
Human toxicity, non-cancer (HTP-nc)	CTUh	2.54E-4	7.90E-7	9.44E-6
Ionising radiation, human health (IR)	kBq U235 eqv.	2.57E+1	5.90E+0	1.12E+1
Land use (SQP)	Pt	2.74E+3	4.22E+2	7.27E+2
Ozone depletion (ODP)	kg CFC 11 eqv.	5.86E-5	1.77E-5	2.43E-5
Photochemical ozone formation - human health (POCP)	kg NMVOC eqv.	3.46E+0	1.13E+0	1.41E+0
Resource use, fossils (ADP-f)	MJ	1.01E+4	1.30E+3	4.32E+3
Resource use, minerals and metals (ADP-mm)	kg Sb-eqv.	1.21E-3	7.08E-5	1.78E-4
Water use (WDP)	m3 world eqv.	3.17E+2	9.49E+0	3.62E+2
Parameter	Unit	A1	A2	A3
renewable primary energy ex. raw materials	MJ	5.74E+2	3.33E+1	2.46E+2
renewable primary energy used as raw materials	MJ	0.00E+0	0.00E+0	0.00E+0
renewable primary energy total	MJ	5.74E+2	3.33E+1	2.46E+2
non-renewable primary energy ex. raw materials	MJ	1.09E+4	1.38E+3	4.64E+3
non-renewable primary energy used as raw materials	MJ	0.00E+0	0.00E+0	0.00E+0
non-renewable primary energy total	MJ	1.09E+4	1.38E+3	4.64E+3
use of secondary material	Kg	8.19E+2	0.00E+0	1.02E+1
use of renewable secondary fuels	MJ	0.00E+0	0.00E+0	0.00E+0
use of non-renewable secondary fuels	MJ	0.00E+0	0.00E+0	0.00E+0
use of net fresh water	M3	8.39E+0	3.03E-1	9.08E+0
hazardous waste disposed	Kg	4.28E-2	8.76E-4	1.36E-2
non hazardous waste disposed	Kg	1.86E+2	1.29E+1	6.15E+1
radioactive waste disposed	Kg	2.53E-2	8.50E-3	1.05E-2
Components for re-use	Kg	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	Kg	0.00E+0	0.00E+0	1.24E+1
Materials for energy recovery	Kg	0.00E+0	0.00E+0	0.00E+0
Exported energy	MJ	0.00E+0	0.00E+0	0.00E+0
Exported Energy Thermic	MJ	0.00E+0	0.00E+0	0.00E+0
Exported Energy Electric	MJ	0.00E+0	0.00E+0	0.00E+0

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5. REFERENCES

ISO 14040

ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044

ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

ISO 14025

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

EN 15804+A1

EN 15804+A1: 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 15804+A2

EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

SBK-verification protocol

SBK-verification protocol – inclusion data in the Dutch environmental database, Final Version 3.0, January 2019, SBK

NMD Determination method

NMD Determination method Environmental performance Construction works v1.0 July 2020, foundation NMD