

# Environmental Product Declaration



In accordance with ISO 14025 and EN 15804 for:

## For PC-strand: Prestressed steel for reinforcement of concrete from Severstal-metiz



Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
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## Programme information

<b>Programme:</b>	<p>The International EPD® System</p> <p>EPD International AB Box 210 60 SE-100 31 Stockholm Sweden</p> <p><a href="http://www.environdec.com">www.environdec.com</a> <a href="mailto:info@environdec.com">info@environdec.com</a></p>
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PCR: PCR 2012:01. Construction products and construction services. 2.33

<p>Product category rules (PCR): PCR 2012:01. Construction products and construction services. UN CPC code: 412</p>
<p>PCR review was conducted by:</p> <p>The Technical Committee of the International EPD® System. See <a href="http://www.environdec.com">www.environdec.com</a> for a list of members. Review chair: Massimo Marino. Contact via <a href="mailto:info@environdec.com">info@environdec.com</a></p>
<p>Independent third-party verification of the declaration and data, according to ISO 14025:2006:</p> <p><input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification</p>
<p>Third party verifier: <i>Dr Hudai Kara, Metsims Sustainability Consulting (www.metsims.com)</i></p> <p><i>In case of recognised individual verifiers:</i> Approved by: The International EPD® System</p>
<p>Procedure for follow-up of data during EPD validity involves third party verifier:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

## Company information

### Owner of the EPD:

Open Joint Stock Company "Severstal-metiz",

Address: Bld. 1/33, 50-letiya Oktyabrya street, Cherepovets, Vologda region, Russia, 162610

E-mail: [info@severstalmetiz.com](mailto:info@severstalmetiz.com)

Phone: + 7 8 800 350 39 14

### Description of the organisation:

Severstal-metiz was founded on July 1, 2004, as a management company for three manufacturing companies, namely ChSPZ (Steel Wire Plant, Cherepovets), OSPAZ (Steel Rolling Plant, Orel), and VolgoMetiz (Steel Wire and Rope Plant, Volgograd).

Severstal-metiz is a corporate group which consolidates metalware assets of Severstal company. It is ranked in in the TOP-5 of the biggest European companies in its business segment and has the development strategy aimed at the achievement of shared corporate objectives of PAO Severstal.

The Severstal-metiz corporate group is an efficient enterprise aimed at the improvement of its business-processes, operating in niche segments with a high added value (markets, fields, products) and seeking to create unique value proposition through the best "product-service" offer.

Quality management system (QMS) of the Company meets the requirements of the international standard ISO 9001-2015. The Company has also obtained the International Certification Network IQNet certificate of conformity. This certificate confirms the full compliance of the management of the Company to international standards requirements. The certification denotes a high estimation of Severstal-metiz QMS and gives the Company additional advantages on the international market.

### Name and location of production site:

Severstal-metiz, Bld. 1/33, 50-letiya Oktyabrya street, Cherepovets, Vologda region, Russia, 162610

## Product information

### Product name:

**PC-strand: Prestressed steel for reinforcement of concrete**

### Product identification:

Severstal-metiz PC-Strands product range consist of 7- wire strands made from high-quality wire rod.

### Product description:

PC-strands are manufactured in accordance with standards for the products such as

*prEN 10138-3:2006:2009;*

*SFS 1265-1:2014;*

*SFS 1265-3:2014;*

*SS 212551:2013;*

*SS 212553:2013;*

*prEN 10138-1:2006;*

*prEN 10138-3:2006;*

*FprEN 10138-3:2009;*

*FprEN 10138-1:2009;*

*AT-15-9772/2016;*

*ITB-KOT-2020/1526;*

*ASTM 416/A416M-18;*

*BS 5896:2012;*

*GOST R 53772-2010;*

*Company Standard 71915393- Technical Specifications 096-2010;*

*IBDiM-KOT-2020/0465;*

*STO 71915393- Technical Specifications 100-2011;*

*GOST R 58386-2019;*

*EAD-160004-00-0301;*

*EAD-160027-00-0301;*

*XP A 35-045;*

*XP A 35-037.*

The product studied are low alloyed steel wire rods that are drawn to smaller dimensions and twined into strands, also known as PC-strand. For transportation and storage the PC- strands are winded into coils.

Further information is available on <https://metiz.severstal.com/en/>.

The typical product composition of PC- strand is described in the table below:

Table 1. The typical product composition of PC- strand

Element	%
Iron	97,86
C	0,81
Mn	0,55
Si	0,3
P	0,03
S	0,03
Cr	0,10
Ni	0,13
Cu	0,13
V	0,08
Cr	0,10

Application:

PC- strands are designed for use in prestressed concrete structures, namely:

- Applied as steel reinforcement of unbonded post-tensioned concrete structures,
- Applied as a steel reinforcement of pre-stressed concrete constructions,

- Applied as a steel reinforcement of prestressed thin concrete constructions,
- Strand for heavy lifting produced by Severstal-metiz.

Technical information:

**Rope diameter, mm:** 9/12/15

**Weight of 1 m of rope length, kg:** 0,419 / 0,736 / 1.099

**Breaking strength, N (kgf):** not less than 93,5 (9540) / 164,0 (16700) / 232,0 (23600)

**Effort at the conditional yield point, N (kgf):** not less than 79,5 (8105) / 139,5 (14200) / 197,0 (20050)

**Elongation before breaking,%:** not less than 4

**Temporary tensile strength, N / mm<sup>2</sup> (kgf / mm<sup>2</sup>):** not less than 1770 (180) / 1770 (180) / 1670 (170)

**Conditional yield strength, N / mm<sup>2</sup> (kgf / mm<sup>2</sup>):** not less than 1500 (153) / 1500 (153) / 1410 (144)

**Relaxation on vacation, no more:** not less than 2.5

UN CPC code: 412

Geographical scope: Global

## LCA information

Declared unit:

The declared unit is one kilogram (1 kg) of PC-strands.

Time representativeness:

The primary data cover the period January 2019 - December 2019

Database(s) and LCA software used:

GaBi databases content version 2021.1; GaBi software version 10.0.1.92

System boundaries and lifecycle stages excluded

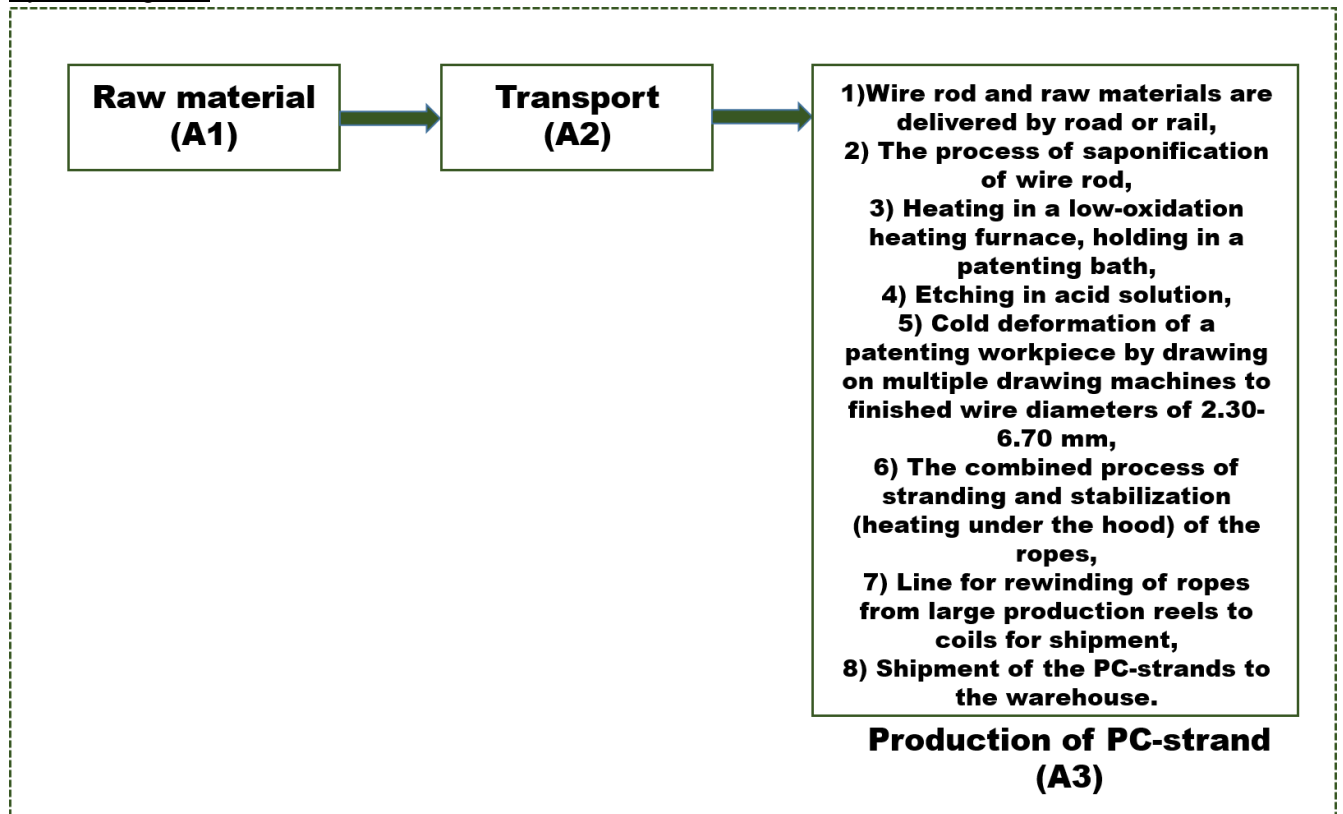
The system boundaries include the mandatory modules A1, A2, A3 provided by the Standard EN 15804 (CEN, 2012) as shown in the following table according to an application of type “from cradle-to-gate”.

It should be noted that lifecycle modules under construction, use, EoL stages and benefits beyond system boundaries are not included in the LCA. Therefore, the inclusion of these modules in the subsequent update of this EPD remains relevant.

More information:

All the relevant information regarding the product technical characteristics and other information you could find on the manufacturer official website – <https://metiz.severstal.com/en/>.

System diagram:



The underlying LCA report was prepared by: Coordinating Informational Center of CIS Member States on approximation of regulatory practices (CIS Center) - <https://ciscenter.org/en/>

Table 2. System boundaries and LCA modules included/excluded\*

Product stage			Construction process stage		Use stage							End of life stage				Benefits beyond system boundaries
Raw materials	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
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	ND	ND	ND	ND	ND

\*X – module included in the EPD; ND – module not declared

The EPD covers the raw material extraction and energy production stages, the raw material transport as well as the production stage. The exploitation and EoL modules have been excluded.

Assumptions:

In a product system within the system boundaries modelling some uncertainties are occurring and in particular the following:

- The electricity mix was modelled according to the national grid mix dataset.
- 1 (one) dataset older than 10 years was used due to lack of more recent suitable ones.

Cut-offs:

- Overall, the packaging materials have a mass share of 0.87%. Due to the low weight compared to product, no modelling was carried out. It can also be strongly assumed that the environmental impact of packaging materials will not exceed 1% each or 5% in total.
- Waste transfer service is outsourced. Due to the Severstal-metiz does not purchase fuel for transport and this is done by the contractor, no modelling was carried out.
- Due to the Severstal-metiz does not have its own sources of wastewater discharges into water bodies, no modelling was carried out.

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## Environmental performance

### Potential environmental impact for 1kg of PC-strand.

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3
Global warming potential (GWP)	kg CO <sub>2</sub> eq.	2,63E+00	5,18E-04	2,84E-02	2,66E+00
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	1,68E-15	8,54E-20	6,91E-21	1,68E-15
Acidification potential (AP)	kg SO <sub>2</sub> eq.	7,95E-03	2,10E-06	1,61E-04	8,12E-03
Eutrophication potential (EP)	kg PO <sub>4</sub> <sup>3-</sup> eq.	6,05E-04	4,05E-07	4,17E-05	6,47E-04
Formation potential of tropospheric ozone (POCP)	kg C <sub>2</sub> H <sub>4</sub> eq.	8,31E-04	-5,43E-07	1,11E-05	8,42E-04
Abiotic depletion potential – Elements	kg Sb eq.	1,00E-05	2,80E-11	2,47E-12	1,00E-05
Abiotic depletion potential – Fossil resources	MJ, net calorific value	5,48E+01	6,94E-03	6,54E-04	5,48E+01

### Use of resources for 1kg of PC-strand.

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1,47E+00	3,28E-04	2,11E-05	1,47E+00
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	MJ, net calorific value	1,47E+00	3,28E-04	2,11E-05	1,47E+00
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	2,98E+01	7,37E-03	6,62E-04	2,98E+01
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	MJ, net calorific value	2,98E+01	7,37E-03	6,62E-04	2,98E+01
Secondary material	kg	0	0	0	0	
Renewable secondary fuels	MJ, net calorific value	0	0	0	0	
Non-renewable secondary fuels	MJ, net calorific value	0	0	0	0	
Net use of fresh water	m <sup>3</sup>	1,42E+00	4,19E-04	1,40E-06	1,42E+00	

## Waste production and output flows

### Waste production

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3
Hazardous waste disposed	kg	2,08E-08	1,13E-13	2,45E-03	2,45E-03
Non-hazardous waste disposed	kg	2,25E-01	1,22E-06	1,26E-03	2,26E-01
Radioactive waste disposed	kg	2,80E-04	1,47E-07	4,81E-10	2,80E-04

### Output flows

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3
Components for reuse	kg	0	0	0	0
Material for recycling	kg	0	0	7,83E-03	4,95E-03
Materials for energy recovery	kg	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0

## Life cycle interpretation

The results refer to the potential environmental impacts over an analysis period of 100 years. Long-term emissions (> 100 years) are not considered in the impact assessment. The impact categories and characterisation factors described in EN 15804+A1 Annex C were applied.

Note: Impact assessment results are only relative statements that make no statements about endpoints of the impact categories, exceedances of threshold values, safety margins or risks.

The largest impact is on the GWP calculation categories. In this case, the largest contribution to GWP is observed in module A1. Module A2 does not significantly contribute to the cumulative impact when considering modules A1-A3.

Considering the results of calculations on the use of resources, one can draw attention to the fact that the greatest value is concentrated when calculating the Nonrenewable primary energy as energy carrier. Also, as in the case of impact assessment, the most significant contribution comes from module A1. The largest amount of generated waste belongs to the category of the Non-hazardous waste disposed. The most significant values of indicators are also observed in module A1.



## References

EPD International (2017) General Programme Instructions for the International EPD® System. Version 3.0. [www.environdec.com](http://www.environdec.com).

PCR 2012:01. Construction products and construction services. 2.33

ISO 14025:2006, Environmental labels and declarations – Type III Environmental declarations – Principles and procedures, International Organization for Standardization (ISO)

ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework, International Organization for Standardization (ISO)

ISO 14044:2017 Environmental management – Life cycle assessment – Requirements and guidelines, International Organization for Standardization (ISO)

EN 15804:2012+A1:2013, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

Official website of the company, <https://metiz.severstal.com/en/>

### Owner of the EPD



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