

**LCA (LIFE CYCLE ASSESSMENT) OF REBAR PRODUCTS MADE BY ÓZD STEELWORKS LTD.(2024.01.31)**



**Description of the product**

The company produces rod and wire products according to MSZ and DIN standards by hot rolling. The rolling mill is a 360 000-tonne/year nominal capacity continuous pass mill suitable for the production of reinforcing bars and rounds in the 8-40 mm range and wire rods in the 5,5-16 mm range.

The newest, highly- weldable and strength Euro conforming products according to the standards of:

- B 500 B, B 500 C, B 500 SP
- German Din 488
- MSZ 339
- Polish PN-H 93220 and MSZEN 10025

are manufactured in strand.

**Reference parameters for environmental life cycle assessment (LCA)**

The declared unit that the analyses referred to was:

- 1 tonne of average rebar with a diameter of 8-40mm produced by ÓAM

The system boundary of the analysis was "cradle to gate", that take into account the raw material production (A1), raw material transportation (A2) and manufacturing processes (A3).

The main characteristics of the analysed rebar are presented in the following chart:

Product components	Weight (%)	Post-consumer recycled material, (weight %)	Biogenic material, (weight % and kg C/kg)
Steel	96.12-98.26-	100	0 resp.0
Carbon	0.19-0.24		
Manganese	0.7-1.6		
Silicon	0.65-0.7		
Phosphorous	0.05-0.55		
Sulphur	0.05-0.055		
Copper	0.65-0.8		
Nitrogen	0.013-0.12-		
Packaging materials	Weight (kg)	Weight % (versus the product)	Weight biogenic carbon, kg C/kg
SUM	0	0	0

**Results of the LCA – Based on the impact categories of EN15804+A2 standard**

Results per declared unit					
Indicator	Unit	A1-A3	OAM_Rebar_Production_2022		
			A1_Stage (Upstream)	A2_Stage (Upstream)	A3_Stage (Upstream)
GWP-total	[kg CO <sub>2</sub> eq.]	4.24E+02	9.89E+01	1.13E+01	3.14E+02

GWP-fossil	[kg CO <sub>2</sub> eq.]	4.23E+02	9.88E+01	1.13E+01	3.13E+02
GWP-biogenic	[kg CO <sub>2</sub> eq.]	9.57E-01	3.18E-02	-1.51E-01	1.08E+00
GWP-luluc	[kg CO <sub>2</sub> eq.]	1.70E-01	3.58E-02	1.02E-01	3.19E-02
ODP	[kg CFC-11 eq.]	5.05E-07	5.85E-08	1.23E-12	4.46E-07
AP	[Mole of H <sup>+</sup> eq.]	1.02E+00	3.64E-01	9.29E-02	5.67E-01
EP-freshwater	[kg P eq.]	7.32E-03	1.16E-03	4.03E-05	6.12E-03
EP-marine	[kg N eq.]	2.66E-01	7.75E-02	4.62E-02	1.43E-01
Eutrophication, terrestrial EP-terrestrial	[Mole of N eq.]	2.82E+00	8.44E-01	5.10E-01	1.47E+00
POCP	[kg NMVOC eq.]	9.02E-01	2.31E-01	1.14E-01	5.57E-01
RU- mineral and metals	[kg Sb eq.]	7.47E-05	5.24E-05	7.23E-07	2.16E-05
RU- fossil	[MJ]	5.14E+03	9.29E+02	1.52E+02	4.06E+03
WU	[m <sup>3</sup> world equiv.]	1.65E+02	1.71E+01	1.31E-01	1.48E+02
Acronyms	GWP-total= Climate Change, total GWP-fossil = Climate Change, fossil; GWP-biogenic = Climate Change, biogenic; GWP-luluc = Climate Change, land use and land use change; ODP = Ozone depletion; AP = Acidification potential; EP-freshwater = Eutrophication, freshwater t; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Photochemical ozone formation, human health; RU-minerals&metals = Resource use, mineral and metals; RU-fossil = Resource use, fossils; WU = Water use				

### Interpretation of the environmental results:

In relation to greenhouse gas emissions (GWP total), the impact of the raw material production (A1) was 23.32%, the supply of materials (A2) was 2.66%; and the manufacturing stage (A3) is responsible for about 74.01% of the total environmental burden.

### Reference standards and applied rules during the analysis

- ISO 14040-44 – Life cycle assessment
- MSZ EN 15804:2012+A2
- PCR 2019:1 Construction products (Version 1.3.1)