ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

ZIPpole

Safety Product

V03 - 30/04/2020

SAFETY-PRODUCT

General information

Purpose of document

This environmental Product Declaration (EPD) communicates transparently the environmental performance or impact of the ZIPpole over its lifetime.

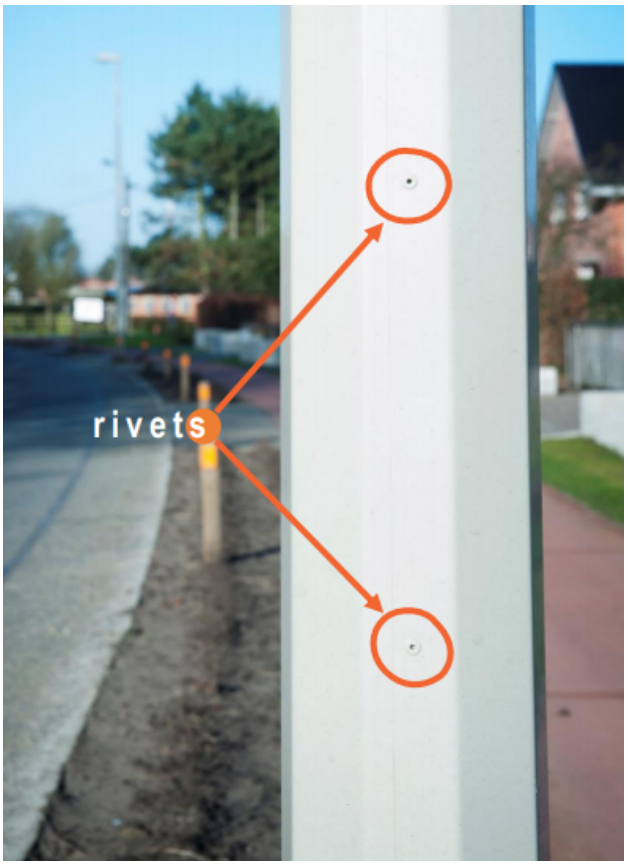
Owner of declaration

Safety Product nv
Beverlosesteenweg 100
3580 Beringen
Belgium

Product

Product description / Product definition

This Environmental Product Declaration applies to the ZIPpole (see picture), that is CE-certified according to EN40, EN12899 and EN12767.



These declared products consist of two steel components: elastic steel plates and rivets of stainless steel. The steel plates are placed in a polygonal conical shape. The overlapping ends of these plates are connected with rivets over the entire length of the pole. The rivets and the distance between them are calculated in that way that the pole is stable and vertically strong to withstand high wind speeds. When the ZIPpole is hit, the rivets break, causing the pole to release its strong shape. The energy from the crash is absorbed by the ZIPpole instead of the vehicle and its occupants. The direction from which the ZIPpole is hit, is of no importance.

Application

The ZIPpole is an application for vertical infra-structure close to the road. For example lighting, ANPR, signalling, 5G, Wifi, ...

Technical data

The performance under impact of the product has been assessed according to the test methods described within EN40-5:2002. CE Declaration of performance has been released for each product in accordance with the specifications outlined in Annex AZ.

Steel lighting columns	ZIPpole	ZIPpole ZP3XL
Resistance to horizontal loads	According variables EN40	According variables EN40
Performance under vehicle impact (passive safety)	100 HE / NE according EN12767:2019	100 HE according EN12767:2019
Durability	Magnelis according EN10346	Magnelis according EN10346

Base materials / Ancillary materials

A ZIPpole is made of the steel grade: HX340LAD with metallic coating Magnelis© ZM310 (EN10346:2015) and has a thickness of 2mm. Magnelis® coated steel is a hot-dip galvanized carbon steel coated on both sides with a zinc-aluminium-magnesium alloy. This alloy, composed of 93.5% zinc, 3.5% aluminium and 3% magnesium, is applied by means of a continuous hot dip galvanising process. This chemical composition has been selected to provide an excellent corrosion resistance.

Detailed steel and coating properties and chemical compositions are available at http://arcelormittal.com.

Reference service life

Use phase (B1-B7) is not declared in this EPD. A reference service life for passive safe poles is not declared, since the lifetime will depend on specific design and application, as well as environmental conditions. The durability of the product, including the foundation design, is ensured by galvanizing components according to EN10346:2015.

LCA: Calculation rules

Declared Unit

The declaration refers to the functional unit of 0.1 metric ton of double-sided Magnelis® coated steel as specified in Part B requirements on the EPD for Structural Steel /PCR Part B/. (2mm steel thickness with 120 g/m² Magnelis® coating)

Name	Value	Unit
Declared unit	1	0.1t
Thickness (of sheet)	2	mm
Density	7828	kg/m³
Conversion factor to 1 kg	0.01	-
Conversation factor to 1 m²	0.003985	-

System boundary

Type of the EPD: cradle-to-gate - with options. Module A1-A3, Module C3 and module D were considered.

Module A1-A3 of the structural steel production include the following:

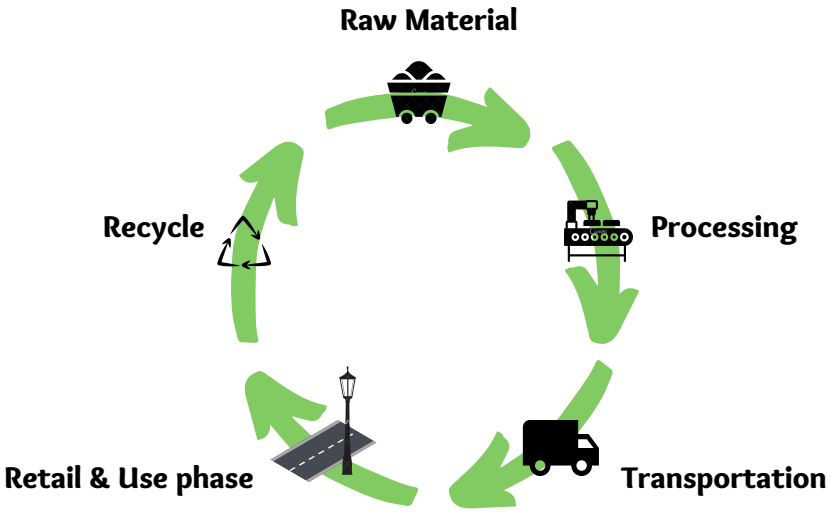
- The provision of resources, additives, and energy
- Transport of resources and additives to the production site
- Production processes on-site including energy, production of additives, disposal of production residues, and consideration of related emissions
- Recycling of production manufacturing scrap. Steel scrap is assumed to reach the end-of-waste status once is shredded and sorted, thus becomes input to the product system in the inventory

Module C3 takes into account the sorting and shredding of after-use steel, as well as the non recovered scrap due to sorting efficiency which is landfilled. A conservative value of 2% landfill is considered.

Module D refers to the End-of-Life of the passive safe pole, including reuse and recycling.

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account.



LCA: Scenarios ad additional technical information

Current practice for the average hot dip galvanized steel consist of 98% recycling and 2% landfill according to the European Commission Technical Steel Research.
98% of the used steel is regained after dismantling, thanks to the magnetic properties of steel. The assumption for the end-of-life for this study is based upon a collecting rate of 98%, taking into account 2% going into landfill due to unforeseen losses after the removal of the steel passive safe pole.

End of life (C3)

Name	Value	Unit
Landfilling	2	%

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Recycling	98	%

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw Material supply	Transport	Manufacturing	Transport from the gate to the 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 100 kg of Magnelis® coated steel

Parameter	Unit	A1-A3	C3	D
Global warming potential	[kg CO2-Eq.]	2,57E+03	2,00E+00	-1,71E+03
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	5,14E-09	6,89E-12	-3,36E-10
Acidification potential of land and water	[kgSO2-Eq.]	4,53E+00	6,78E-03	4,12E+00
Eutrophication potential	[kg (PO4)3--Eq.]	4,69E-01	7,99E-04	-3,53E-01
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	7,40E-01	4,75E-04	-5,29E-01
Abiotic depletion potential for non-fossilresources	[kgSb-Eq.]	5,43E-02	9,53E-07	1,75E-04
Abiotic depletion potential forfossilresources	[MJ]	2,30E+04	2,25E+01	-1,35E+04

RESULTS OF THE LCA - RESOURCE USE: 100 kg of Magnelis® coated steel

Parameter	Unit	A1-A3	C3	D
Renewable primary energy as energy carrier	[MJ]	1,12E+03	1,12E+03	1,24E+03
Renewable primary energy resources as material utilization	[MJ]	0,00E+00	0,00E+00	0,00E+00
Total use ofrenewable primary energy resources	[MJ]	1,12E+03	1,12E+03	1,24E+03
Non-renewable primary energy as energy carrier	[MJ]	2,34E+04	3,43E+01	-1,28E+04
Non-renewable primary energy as material utilization	[MJ]	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources	[MJ]	2,34E+04	3,43E+01	-1,28E+04
Use of secondary material	[kg]	8,32E+01	0,00E+00	8,97E+02
Use of renewable secondary fuels	[MJ]	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	[MJ]	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	[m³]	5,61E+00	1,53E-03	5,99E-01

RESULTS OF THE LCA - OUTPUT FLOWS AND WASTE CATEGORIES: 100 kg of Magnelis® coated steel

Parameter	Unit	A1-A3	C3	D
Hazardous waste disposed	[kg]	1,53E-05	2,18E-07	-8,97E-06
Non-hazardous waste disposed	[kg]	1,18E+01	2,01E+01	-2,72E+01
Radioactive waste disposed	[kg]	1,66E-01	4,70E-03	3,04E-01
Components forre-use	[kg]	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	[kg]	0,00E+00	9,80E+02	0,00E+00
Materials for energy recovery	[kg]	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy	[MJ]	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy	[MJ]	0,00E+00	0,00E+00	0,00E+00

Note: 83kg scrap is used in the manufacturing of 1 ton passive safe pole (=Magnelis® coated steel).
After use, 980 kg steel is recycled. The potential environmental benefit calculated for the end-of-life stage (module D) is based on the net amount of scrap in the system: 980 - 83 = 897 kg. The system has a net output of 897 kg scrap (which carries a potential credit), thus module D shows an environmental benefit.

References

APAWood-europe
Definition of the life cycle stages for EN15804 compliance. www-apawoord-europe.org

IBU 2016
IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin. www.ibu-epd.de

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

EN ISO 9227:2017
Corrosion tests in artificial atmospheres — Salt spray tests

EN 15804
EN 15804:2012-04+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 10346:2015
Continuously hot-dip coated steel flat products for cold forming. Technical delivery conditions

EN ISO 6892:2016
Metallic materials — Tensile testing

EN 40- 5:2002
Lighting Columns.
Requirements for steel lighting columns

European Commission Technical Steel Research
Sansom, M.and Meijer, J.:Life-cycle assessment (LCA) for steel construction, European Commission technical steel research, 2001-12

GaBi ts Software
GaBi ts. Software and Databasis for Life Cycle Engineering. LBP, University of Stuttgart und PE International, 2017.

GaBi ts Documentation
Documentation of the GaBi datasets for Life Cycle Engineering. LBP, Universitity of Stuttgart and PE International, 2017.
http://documentation.gabi-software.com

PCR Part A
Product Category Rules for Building related Products and Services, Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. Institut Bauen und Umwelt e.V. (IBU) 2018 www.bau-umwelt.de

PCR Part B
Requirements on the EPD for Structural steels - Institut Bauen und Umwelt e.V., Berlin (pub.): From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU), 2017