ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and DIN EN 15804

Owner of the Declaration	Asturiana de Laminados S.A.
Programme holder	Institut Bauen und Umwelt (IBU)
Publisher	Institut Bauen und Umwelt (IBU)
Declaration number	EPD-ELZ-2013111-E
Issue date	01.04.2013
Valid to	31.03.2018

elZinc Natural

Asturiana de Laminados S.A.

www.bau-umwelt.com

Institut Bauen
und Umwelt e.V.

General information

Asturiana de Laminados S.A.

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Rheinufer 108
D-53639 Königswinter

Declaration number

EPD-ELZ-2013111-E

This Declaration is based on the Product Category Rules:

Building metals, 16-07-2012
(PCR tested and approved by the independent expert committee [SVA])

Issue date

01.04.2013

Valid to

31.03.2018

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(Chairman of SVA)

ElZinc Slate

Owner of the Declaration

Asturiana de Laminados S.A.

Polígono Industrial de Olloniego, Parcela 1, 33660 Olloniego, Asturias

Spain

Declared product / Declared unit

1 kg elZinc Natural

Scope:

Within this study a life cycle analysis according to ISO 14040/44 and EN 15804 is performed for elZinc Natural manufactured by Asturiana de Laminados S.A. at the production plant located in Olloniego, Spain. The life cycle analysis is based on the data declared by Asturiana de Laminados S.A. The life cycle analysis is representative for the products introduced in the declaration for the given system boundaries.The life cycle analysis covers the manufacturing of the products from cradle to grave.

The owner of the declaration shall be liable for the underlying information and evidence.

Verification

The CEN standard EN 15804 serves as the core PCR.
Verification of the EPD by an independent third party as per ISO 14025
☐ internally ☒ externally

Matthias Schulz
(Independent tester appointed by SVA)

Product

Product description

elZinc® titanium zinc comes under the EN 988 standard, which defines the general requirements for titanium zinc strips and sheets for use in the building industry.

The alloying components are high-grade refined zinc of the highest standardised level of purity Zn 99.995 according to EN 1179, with precisely defined additions of copper and titanium. Further components, such as aluminium and other trace elements, are accurately limited and the purity of the alloy is extremely precisely monitored by regular controls.

The precision in the composition of the alloy used and the implementation controlled lamination, which define the thermo-mechanical processes and the material's micro-structural changes, are the keys to the process's and the product's excellence.

elZinc Natural is characterized by:

- High malleability, regardless of the direction of rolling
- High stability once conformed
- Optimal electrowelding performance due to its low surface oil content
- Limited fragility at low temperatures.

elZinc Natural's life starts with a metallic gray color. It is the original zinc obtained as a result of different transformation processes. After exposure to weathering, the natural patina coating protects it and provides it with exceptional resistance against corrosion while giving it its final color (gray).

Application

elZinc Natural is a material used by architects and professional roofers. Its main applications are:

- Facades and roofs (E.g sandwich panels, cassettes, standing seam, batten roof system, etc)
- Roof drainage systems (E.g gutters, water pipes and accessories).
- Interior Design.

Technical Data

elZinc has stablished a quality magement system based on the standard ISO 9001.

elZinc Natural exceed the requeriments stablished by the EN 988, giving as result excellent mechanical properties:

Name	Testing standard	Value	Unit
Yield strength elasticity (Rp 0,2)	EN ISO 6892-1	>110	N/mm^2
Tensile strength (Rm)	EN ISO 6892-1	> 150	N/mm^2
Breaking elongation (A50)	EN ISO 6892-1	>40	%
Vickers hardness (HV3)	EN ISO 6507-4	>45	-
Erichsen test	EN ISO 20482	min 7,5	mm
Remaining stretch in creeping behaviour test (Rp 0,1)	EN ISO 204	max 0,1	%
Density	-	7,2	g/cm^3
Thicknesses tolerance	-	± 0.02	mm
Coefficient of linear thermal expansion	ASTM E289-04	22E-06	m/mk
Melting point	ASTM B774	~420	ºC
Heat conductivity at 20 ºC	ASTM E1952-11	110	w/mK
Electric conductivity at 20 ºC	ASTM E1004-09	17	mS/m

Base materials / Ancillary materials

elZinc Natural is a Zn-Cu-Ti alloy with the following composition:

Base materials in mass (%)

Component	ElZinc Natural
Copper	0,08- 0,2 %
Titanium	0,07-0,12 %
Alumnium	< 0,015 %
Zinc (Z1)	Remainder

None of the components of the end product is included in the “Candidate List of Substances of Very High Concern for Authorisation”.

Reference service life

The documentation of the RSL is not required for the EPD of Asturiana de Laminados since the entire life cycle is not declared (Modules A1-A3 and D).

LCA: Calculation rules

Declared unit

The declared unit is 1kg of elZinc Natural

System boundary

Type of the EPD: cradle to gate - with options

In this study, the product stage information modules A1, A2, and A3 are considered. These modules include production of raw material extraction and processing (A1), , transport of the raw materials to the manufacturer (A2), manufacturing of the product and the packaging materials (A3).

The EoL of the product (Modul D) is also included

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 and additional technical information

The credits given in Module D are a result of the 100% recyclability of each zinc-product. After the scrap collection (a collection rate of 96% was assumed), zinc scrap is sent to a re-melting process, where the scrap is converted to secondary zinc. The credit for the zinc gained through re-melting is calculated with the dataset of the primary production.

LCA Results

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

PRODUCT STAGE			CONSTRUC-TION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BE-YOND THE SYSTEM BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	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	MND	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1kg elZinc Natural

		Manufacturing	Credits
Parameter	**Einheit**	**A1-A3**	**D**
GWP	[kg CO_2-Äq.]	3,5E+00	-2,6E+00
ODP	[kg CFC11-Äq.]	3,3E-07	-2,9E-07
AP	[kg SO_2-Äq.]	2,3E-02	-1,8E-02
EP	[kg PO_4^{3-}- Äq.]	2,5E-03	-2,0E-03
POCP	[kg Ethen Äq.]	1,5E-03	-1,1E-03
ADPE	[kg Sb Äq.]	1,3E-03	-1,2E-03
ADPF	[MJ]	4,7E+01	-3,4E+01
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources		

RESULTS OF THE LCA - RESOURCE USE: 1kg elZinc Natural

		Manufacturing	Credits
Parameter	**Einheit**	**A1-A3**	**D**
PERE	[MJ]	9,1E+00	-6,6E+00
PERM	[MJ]	0,0E+00	0,0E+00
PERT	[MJ]	9,1E+00	-6,6E+00
PENRE	[MJ]	4,8E+01	-3,4E+01
PENRM	[MJ]	0,0E+00	0,0E+00
PENRT	[MJ]	4,8E+01	-3,4E+01
SM	[kg]	1,6E-02	0,0E+00
RSF	[MJ]	1,3E-04	4,0E-03
NRSF	[MJ]	1,3E-03	4,2E-02
FW	[m³]	-*	-*
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary 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 material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water		

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1kg elZinc Natural

		Manufacturing	Credits
Parameter	**Einheit**	**A1-A3**	**D**
HWD	[kg]	-*	-*
NHWD	[kg]	-*	-*
RWD	[kg]	4,6E-03	-3,6E-03
CRU	[kg]		
MFR	[kg]		9,6E-01
MER	[kg]		
EE [Typ]	[MJ]		
EE [Typ]	[MJ]		
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier		

*The non-EN 15804-conform LCIs are significant to the total result. The indicators are not declared (decision of IBU advisory board 2013-01-07)

References

Institut Bauen und Umwelt 2012

Institut Bauen und Umwelt e.V., Königswinter (pub.): Generation of Environmental Product Declarations (EPDs);

General principles

for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2011-09

www.bau-umwelt.de

PCR 2012, Part A

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. September 2012

www.bau-umwelt.de

PCR 2012, Part B

PCR Guidance-Texts for Building-Related Products and Services. From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU). Part B: Requirements on the EPD Building Metals, 07-2012.

ASTM E 289

ASTM E 289:2004, Standard Test Method for Linear Thermal Expansion of Rigid Solids with Interferometry

ASTM B 774

ASTM B 774:2000, Standard Specification for Low Melting Point Alloys

ASTM E 1952

ASTM E 1952:2011, Standard Test Method for Thermal Conductivity and Thermal Diffusivity by Modulated Temperature Differential Scanning Calorimetry

ASTM E 1004

ASTM E 1004:2009, Standard Test Method for Determining Electrical Conductivity Using the Electromagnetic (Eddy-Current) Method

ISO 14025

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

EN 15804

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

EN 988

DIN EN 988:1996-08, Zinc and zinc alloys - Specification for rolled flat products for building; German version EN 988:1996

EN ISO 204

DIN EN ISO 204:2009-10 , Metallic materials - Uniaxial creep testing in tension - Method of test (ISO 204:2009

EN 1179

DIN EN 1179:2003-09, Zinc and zinc alloys - Primary zinc; German version EN 1179:2003

EN ISO 6507-4

DIN EN ISO 6507-4:2006-03, Metallic materials - Vickers hardness test - Part 4: Tables of hardness values (ISO 6507-4:2005)

EN ISO 6892-1

DIN EN ISO 6892-1:2009-12, Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2009)

EN ISO 20482

DIN EN ISO 20482:2003-12, Metallic materials - Sheet and strip - Erichsen cupping test (ISO 20482:2003)

GaBi 6 2012

GaBi 6: Software and Database for Life Cycle Engineering, IKP [Institute for Polymer Testing and Polymer Science] University of Stuttgart and PE Europe AG, Leinfelden-Echterdingen, 2012

GABI 6 2012B

GaBi 6: Documentation of GaBi6-Datasets for life cycle engineering. LBP University of Stuttgart and PE INTERNATIONAL AG, 2012.
http://documentation.gabi-software.com/

ISO 9001

DIN EN ISO 9001:2008, Quality Management System- Requirements

Publisher
Institut Bauen und Umwelt e.V.
Rheinufer 108
53639 Königswinter
Germany

Phone +49 (0)2223 2966 79- 0
Fax +49 (0)2223 2966 79- 0
E-mail info@bau-umwelt.com
Web **www.bau-umwelt.com**

Programme holder
Institut Bauen und Umwelt e.V.
Rheinufer 108
53639 Königswinter
Germany

Phone +49 (0)2223 2966 79- 0
Fax +49 (0)2223 2966 79- 0
E-mail info@bau-umwelt.com
Web **www.bau-umwelt.com**

Owner of the Declaration
Asturiana de Laminados
Polígono industrial de Villallana, parcela 1
33695 Villallana, Asturias
España

Phone +34 984 116 331
Fax: +34 985 493 202
E-mail: elzinc@aslazinc.com
Web **www.elzinc.es**

Author of the Life Cycle Assessment
PE INTERNATIONAL AG
Hauptstraße 111 - 113
70771 Leinfelden-Echterdingen
Germany

Phone +49(0) 711 34 18 17-0
Fax: +49 [0] 711 341817-25
E-mail: info@pe-international.com
Web **www.pe-international.com**