ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	RHEINZINK GmbH & Co. KG
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-RHE-20180073-IBA1-EN
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Issue date	10/08/2018
Valid to	09/08/2023

RHEINZINK-CLASSIC® bright-rolled

RHEINZINK GmbH & Co. KG

www.ibu-epd.com / https://epd-online.com

1. General Information

RHEINZINK GmbH & Co. KG

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-RHE-20180073-IBA1-EN

This Declaration is based on the Product Category Rules:
Building metals, 07.2014
(PCR tested and approved by the SVR)

Issue date
10/08/2018

Valid to
09/08/2023

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

Dipl. Ing. Hans Peters
(Managing Director IBU)

RHEINZINK®-CLASSIC bright-rolled

Owner of the Declaration
RHEINZINK GmbH & Co. KG
Bahnhofstraße 90
45711 Datteln

Declared product / Declared unit
1 kg of RHEINZINK-CLASSIC® bright-rolled

Scope:
The Life Cycle Assessment (LCA) was carried out according to /DIN ISO 14044/. Specific data from the company RHEINZINK in Datteln, Germany, and from the data base /GaBi 8/ were used. The LCA was carried out for the manufacturing phase of the products, taking into account all background data such as raw material production and transports ("cradle to gate"). The use phase of the titanium zinc sheets is divided into several application areas: roofing applications, roof drainage and facade claddings. The treatment for the titanium zinc sheets was modelled in re-melting furnaces for the end of life phase. The thereby resulting credit of extracted zinc is counted as replacement for primary zinc.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The CEN Norm /EN 15804/ serves as the core PCR
Independent verification of the declaration according to /ISO 14025/
☐ internally ☒ externally

Mr Carl-Otto Neven
(Independent verifier appointed by SVR)

2. Product

2.1 Product description / Product definition

The basis of the RHEINZINK®-CLASSIC bright-rolled is electrolytic high-grade fine zinc in accordance with /EN 1179/. Added to this are small amounts of titanium and copper based on /EN 988/. In addition to other factors, the alloy composition is not only of importance for the technological material properties of RHEINZINK®, but also for the colour of its patina.

CLASSIC

For the placing on the market in the EU and EFTA (with the exception of Switzerland) the Regulation (EU) No. 305/2011 applies. The products need a Declaration of Performance taking into consideration /EN 14782/ or /EN 14783/ respectively and the CE-marking.
For the application and use the respective national provisions apply.

2.2 Application

• Titanium zinc sheets, strips and profiles for roofing and facade cladding according to
- /EN 14782/ -Self-supporting metal sheet for roofing, external cladding and internal lining
- /EN 14783/ - Fully supported metal sheet and strip for roofing, external cladding and internal lining. The products are CE-marked based on these standards.

• Roof drainage systems (roof gutters, pipes and accessories) according to /EN 612/ - Eaves gutters with bead stiffened fronts and rainwater pipes with seamed joints made of metal sheet.

2.3 Technical Data

The following table gives conversion data from product surface mass per unit area for the relevant product systems in roofing, facade cladding and roof drainage.

System	Area of Application	Thickness of metal	Weight per m²
Double-standing seam	Roof	0,70 mm	5,6 kg
Roll-cap System	Roof	0,70 mm	5,8 kg
Square tiles	Roof	0,70 mm	7,7 kg
Gutter	Roof drainage	0,70 mm	1,7 kg
Downpipe	Roof drainage	0,70 mm	1,6 kg
Angle-standing seam	Façade cladding	0,70 mm	5,7 kg
Angle-standing seam	Façade cladding	0,80 mm	6,6 kg
Flat-lock tiles	Façade cladding	0,70 mm	7,0 kg
Reveal panel	Façade cladding	1,00 mm	9,8 kg
Horizontal panel	Façade cladding	1,00 mm	9,8 kg
Shipboard panel	Façade cladding	1,00 mm	10,4 kg

Performance data of the product in accordance with the respective declaration of performance with respect to its essential characteristics according to /EN 14782/ and /EN 14783/ respectively.

Constructional data

Name	Value	Unit
Coefficient of thermal expansion *	22	$10^{-6}K^{-1}$
Tensile strength /EN 10002-1/	≥150	N/mm^2
Modulus of elasticity *	≥80000	N/mm^2
Melting point *	420	°C
Thermal conductivity *	109	W/(mK)
Electrical conductivity at 20°C *	17x10^6	$\Omega^{-1}m^{-1}$
Density *	7200	kg/m^3

2.4 Delivery status

The material RHEINZINK® is delivered in thicknesses from 0.5 – 1.5 mm. The maximum width of strips and sheets is 1.000 mm. The standard sheets are delivered in 1x2 m and 1x3 m, coils are delivered with a maximum weight of 1 t. Finished products are delivered to customer specification.

Application rules
/EN 988, Zinc and zinc alloys - Specification for rolled flat products for building

/EN 506/, Roofing products from metal sheet-specification for self-supporting products of copper and zinc sheet

/EN 612/, Eaves gutters with bead stiffened fronts and rainwater pipes with seamed joints made of metal sheet

2.5 Base materials / Ancillary materials

-Components of RHEINZINK-alloy

- Special-High-Grade zinc 99.995% (Z1 according to /DIN EN 1179/)
- Copper: 0.1 - 0.18%
- Titanium: 0.07 - 0.12%
- Aluminium: ≤ 0.015%

-Auxiliary substances

RHEINZINK® is an alloy of zinc with small amounts of copper and titanium. No compound of the alloy > 0.1% is listed in the “Candidate List of Substances of Very High Concern for Authorisation” (SVHC) dated 01/2018. The product does not contain any substances with CMR properties > 0.1%. RHEINZINK products do not contain biocide properties as defined by the (EU) Ordinance on Biocide Products No. 528/2012).
Lubricant emulsion (rolling process): 0.08 kg/t zinc

2.6 Manufacture

Structure of the manufacturing process:
The manufacturing process comprises seven steps:
Pre-alloy: To improve the quality, and for energy-saving reasons, a pre-alloy is produced at 760 °C in an induction crucible stove (meltdown of fine zinc, copper, titanium and aluminium). The pre-alloy blocks produced contain the titanium and copper portions of the subsequent rolled alloy.

Melting: The pre-alloy blocks and fine zinc are melted together in large melting stoves (induction channel stoves) at 500 – 550 °C and mixed together completely with induction currents.

Casting: The final alloy is cooled down below melting point with a closed water circuit in the casting machine, resulting in a solid cast string.

Rolling: There is a cooling distance between casting machine and roller racks. The rolling is done by 5 roller pairs, so-called roller racks. With adequate pressures the material thickness is reduced by up to 50% at each of these roller racks. Simultaneously, the material is cooled and greased using a special emulsion.

Coiling: Subsequently, the readily rolled RHEINZINK® is wound up into coils of 20 to (so-called big coils). They are still at a temperature of 100 °C and are stored for further cooling.

Stretching and cutting: The tensions developed inside the RHEINZINK® bands during rolling are “stretched out” by a stretching-bending-straightening process.

Quality control:
Control by the manufacturer and by TÜV Rheinland Group. Control of zinc material according to the QUALITY ZINC list of requirements as set up by TÜV Rheinland Group. Quality management control according to /ISO 9001/.

2.7 Environment and health during manufacturing

Environmental management according to /ISO 14001/.
Energy management according to /ISO 50001/.
CSR - Corporate Social Responsibility based on /ISO 26000/. These management systems ascertain that the legal requirements concerning worker health and environmental protection are fulfilled. Best Available Technology is used throughout the plant.

2.8 Product processing/Installation

Basic principles:
During transportation and storage, RHEINZINK® must be kept dry and ventilated to avoid the formation of zinc hydroxide. For the same reason, when laying RHEINZINK® on wet surfaces or in the rain it should be ensured that the base material does not have hygroscopic properties.

The thermic stretching of the material has to be taken into consideration when handling/installing the product.

Due to the typical brittleness of zinc under cold conditions, the temperature of the product during installation should be 10 °C. In other cases, adequate mechanical equipment should be used, e.g. hot air blasts.

2.9 Packaging
The packaging materials in use, paper/cardboard, polyethylene (PE foils), polypropylene (PP foils) and steel, are recyclable (non-reusable wooden pallets, reusable wooden and metal pallets). If gathered separately, return in Germany is organized by INTERSEROH which collects the packaging material at given sites with exchangeable containers upon request and complies with legal regulations. The reusable wooden and steel pallets are taken back and are reimbursed by RHEINZINK GmbH & Co. KG and the wholesale trade (refund system).

2.10 Condition of use
RHEINZINK® is UV-resistant and does not rot. It is resistant against a rust film, non-flammable and resistant to radiating heat and against most of the chemical substances used in building construction. Effects on the durability of RHEINZINK® products with regard to snow, rain and hail are not known. The effects of snow and rain may be neglected.

This material has a repellent effect to electro smog (electromagnetic radiation in excess of 98%).

RHEINZINK® develops a superficial protective coating, the so-called patina, which darkens only slightly over the years and which is responsible for the high resistance of zinc against corrosion. In the chemical process that forms this patina, zinc oxide develops in contact with the oxygen in the air. Next, due to the influence of water (precipitation), zinc hydroxide develops, which will be transformed into a tight, strongly adhering and non-water-soluble coating of basic zinc carbonate (patina) on reaction with the carbon dioxide in the air. Therefore RHEINZINK® does not require any maintenance and cleaning during period of use.

2.11 Environment and health during use

Environmental aspects:
The transfer of zinc ions via rain water is constantly reduced due to the development of the natural protecting coat of zinc carbonate (Patina). The further transfer of zinc ions depends mainly on the air contamination with 'acid' pollutants, particularly with SO_2. As a result of the reduction of SO_2 concentration in the air to 20-% of the former values during the last 30 years, the zinc concentration of precipitation has subsequently been reduced by the same amount in the rainwater. The total-zinc-concentration has been lower than the prescriptive limits for drinking water.
In aquatic systems only a small part of the total zinc concentration is available for an organism - this amount is called bioavailable. It is related to the physical-chemical conditions of the receiving water body. The bioavailability is for example influenced by the amount of zinc which is organically or inorganically bound, linked to particles or competes with other ions.

Health aspects:
There will be no effects to health if the RHEINZINK® products are used according to their designated function. Zinc, like iron, belongs to the essential metals. Zinc is not accumulated in the body. The recommended daily intake of zinc according to the Deutsche Gesellschaft für Ernährung (DGE - German Society for Nutrition) is 15 mg.

	Roof drainage	Roofing	Facade cladding
Average Material thickness	0,70 mm	0,70 mm	0,80 mm
Density	7,2 g/cm³	7,2 g/cm³	7,2 g/cm³
Exposed surface	50%	75%	10%
Max. Run-off rate	3,0 g/m²/a	3,0 g/m²/a	3,0 g/m²/a
Min. Run-off rate	2,0 g/m²/a	2,0 g/m²/a	2,0 g/m²/a
Max. zinc Run-off (per m²)	**1,5 g/m²/a**	**2,25 g/m²/a**	**0,3 g/m²/a**
Min. zinc Run-off (per m²)	**1,0 g/m²/a**	**1,5 g/m²/a**	**0,2 g/m²/a**
Max. zinc Run-off (per kg)	**0,3 g/kg/a**	**0,45 g/kg/a**	**0,05 g/kg/a**
Min. zinc Run-off (per kg)	**0,2 g/kg/a**	**0,3 g/kg/a**	**0,03 g/kg/a**

Lit.: R. H. J. Korenromp et al, "Diffusive Emissions of zinc due to atmospheric corrosion of zinc and coated (galvanised) materials", TNO-MEP R99/441 (1999)

2.12 Reference service life
Service lifetime according to /BBSR/: > 50 years, theoretical lifetime according to available literature > 100 years. The standard /ISO 15686/ has not been considered. Influences on ageing when applied in accordance with the rules of technology.

2.13 Extraordinary effects

Fire
The RHEINZINK® products comply with /DIN 4102/, Part 1 and to /DIN EN 13501-1/ the Requirements of

Building Material Class A1 “non-combustible”.

Fire protection

Name	Value
Building material class /EN 13501/ /DIN 4102/	A1
Burning droplets /EN 13501/	D0
Smoke gas development /EN 13501/	-

Smoke production/smoke concentration:
When heated above 650 °C vaporization as zinc oxide (ZnO) occurs.

Toxicity of the fumes:
The ZnO smoke may cause zinc fever (diarrhoea, fever, dry throat) when inhaled over some period time, this disappears completely 1 to 2 days after inhalation.

Water
Zinc is not classified as hazardous for the aquatic environment, /WFD/ -European water framework directive.

Mechanical destruction
None

2.14 Re-use phase

Disassembly end of live
When renovating or disassembling a building end of live, RHEINZINK® products can easily be collected.

Circulation in Production
The trimming scrap produced during manufacturing the material is 100% remelted at RHEINZINK GmbH & Co. KG and processed into new products. The cuttings occurring at building sites as well as used zinc from renovation sites are gathered and may be sent directly or via scrap gathering organizations to secondary melting plants - several exist in Germany. The energy necessary for recycling titanium zinc sheets is only 5% of the primary energy content of zinc. The demand for zinc scrap, resulting from zinc recycling’s low energy requirement, is also mirrored by the fact that generally about 70% of the value of the zinc content is reimbursed. According to the newest information, the total recycling rate is up to 96%.

2.15 Disposal
A small amount of zinc is weathered away, and another small amount might be lost during collection and erroneously disposed. All in all, this amounts to less than 4%. The European Waste Code for zinc is 17 04 04.

2.16 Further information
Additional information: www.rheinzink.de

3. LCA: Calculation rules

3.1 Declared Unit

Declared unit
The declared unit is 1kg of RHEINZINK-CLASSIC® bright-rolled.

Name	Value	Unit
Declared unit	1	kg

3.2 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), processing of secondary material input (A1), transport of the raw materials to the manufacturer (A2), manufacturing of the product (A3) and the packaging materials (A3).
The special high grade zinc allows an input of secondary material of 1.5% zinc scrap. The post-consumer scrap is used to saturate this input and is discounted from the material flow of module D.
The transport to module C4 is considered under module C2.
Module C4 takes into account the non-recovered scrap due to losses and sorting efficiency as desribed in 2.15.
The EoL of the product (Modul D) is also included.

3.3 Estimates and assumptions
No assumptions and estimations were necessary for the LCA.

3.4 Cut-off criteria
All inputs and outputs to a (unit) process are included in the calculation, for which data were available. The applied cut – off criteria is 1% of renewable and non-renewable primary energy usage and 1% of the total mass input of that unit process in case of insufficient input data or data gaps for a unit process. The total of neglected input flows per module, e.g. per module A, B, C or D is a maximum of 5% of energy usage and mass.

3.5 Background data
Background processes are taken from the latest GaBi Database GaBi ts 8 with Service Pack 34.
Country and region-specific data on energy sources including electricity and region-specific data on raw materials such as high-grade zinc were taken from GaBi databases.

3.6 Data quality
The process data and the used background data are consistent.
Regarding foreground data, this study is based on high quality of primary data, collected by RHEINZINK. Data were delivered in form of excel tables and was checked for plausibility. Therefore, the data quality can be described as good.

3.7 Period under review
Modelling is based on production data from 2016. Background data refer from 2013 to 2016.

3.8 Allocation
In this study, allocation was avoided wherever possible.
However, the following allocations had to be done:

- Mass allocation for zinc tross in the zinc sheet production based on market prices (Module A1)
- Credits from energy recovery of production waste (Module A3)
- Credits from recycling from the end of life of the product (Module D)

3.9 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. The special high grade zinc dataset used for this study is from the International Zinc Association (IZA) and published in 2012..

4. LCA: Scenarios and additional technical information

Modules A4, A5, B1, B2, B3, B4, B5, reference service life, B6, B7 and C1, C2, C3 are not considered and declared in this study.
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.

End of life (C4)

Name	Value	Unit
Landfilling	4	%

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

Name	Value	Unit
Recycling	96	%

5. 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	MNR	MNR	MNR	MND	MND	MND	X	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg RHEINZINK-CLASSIC® bright-rolled

Parameter	Unit	A1-A3	C2	C4	D
Global warming potential	[kg CO_2-Eq.]	3.06E+0	9.30E-4	1.92E-3	-2.27E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	-1.07E-8	3.12E-16	4.64E-15	9.76E-9
Acidification potential of land and water	[kg SO_2-Eq.]	1.77E-2	3.89E-6	5.47E-6	-1.46E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	2.64E-3	9.69E-7	6.73E-7	-2.17E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	9.19E-4	-1.43E-6	5.14E-7	-7.26E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	4.29E-4	7.49E-11	3.92E-10	-3.85E-4
Abiotic depletion potential for fossil resources	[MJ]	2.36E+1	1.29E-2	2.75E-2	-1.58E+1

RESULTS OF THE LCA - RESOURCE USE: 1 kg RHEINZINK-CLASSIC® bright-rolled

Parameter	Unit	A1-A3	C2	C4	D
Renewable primary energy as energy carrier	[MJ]	1.31E+1	6.48E-4	2.08E-3	-8.73E+0
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	1.31E+1	6.48E-4	2.08E-3	-8.73E+0
Non-renewable primary energy as energy carrier	[MJ]	3.03E+1	1.29E-2	2.86E-2	-2.12E+1
Non-renewable primary energy as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	3.03E+1	1.29E-2	2.86E-2	-2.12E+1
Use of secondary material	[kg]	1.53E-2	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	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	0.00E+0
Use of net fresh water	[m³]	6.98E-1	1.20E-6	1.21E-7	-6.34E-1

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 kg RHEINZINK-CLASSIC® bright-rolled

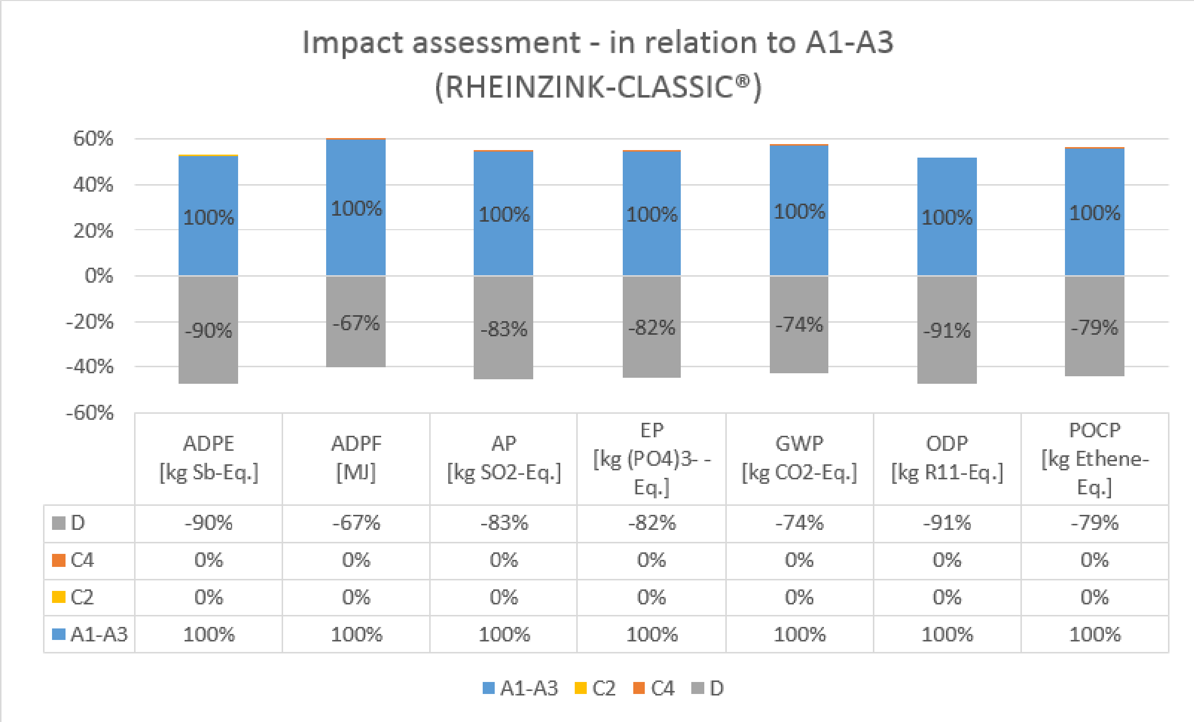
Parameter	Unit	A1-A3	C2	C4	D
Hazardous waste disposed	[kg]	7.34E-6	6.78E-10	1.39E-10	-6.67E-6
Non-hazardous waste disposed	[kg]	3.45E-1	9.87E-7	3.95E-2	-1.41E-1
Radioactive waste disposed	[kg]	2.65E-3	1.76E-8	4.25E-7	-2.14E-3
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	9.45E-1	9.59E-1
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0

6. LCA: Interpretation

The figures below show the relative contributions of the production stages (Module A1-A3), transport to waste treatment (Module C2), waste treatment (Module C4) and the benefits and loads beyond the product system boundary (Module D).

The production of the high-grade zinc is still the dominating contributor to the indicators of the impact assessment as main raw material, followed by the generation of electricity.

The high credits given in module D are the results of the 100% recyclability of the zinc products. At the EoL of the zinc products a collection rate of 96% was assumed. The 4% remaining are forwarded to the waste treatment (module C4). Overall, C2 and C4 have a minimized contribution.



	ADPE [kg Sb-Eq.]	ADPF [MJ]	AP [kg SO2-Eq.]	EP [kg (PO4)3- -Eq.]	GWP [kg CO2-Eq.]	ODP [kg R11-Eq.]	POCP [kg Ethene-Eq.]
D	-90%	-67%	-83%	-82%	-74%	-91%	-79%
C4	0%	0%	0%	0%	0%	0%	0%
C2	0%	0%	0%	0%	0%	0%	0%
A1-A3	100%	100%	100%	100%	100%	100%	100%

The negative production values for ODP (ozone depletion potential) in the results table is mostly caused by emissions from the pre-chains of power generation processes within the zinc dataset. The nuclear power share in the electricity generation is very little, resulting in a low ODP impact. The credit calculations within the zinc dataset are based on an average worldwide zinc production mix for which the share of nuclear power generation is much higher. This leads to negative zinc values for module A1-A3.

7. Requisite evidence

Runoff rates
In a report of /TNO-MEP-R99/441/, a literature study was undertaken to determine the runoff rates of zinc in Europe.
The following conclusions were taken in this report:

Corrosion rates refer to the loss of metallic zinc, initially accumulating as ionic zinc in the patina layer. Run-off rates refer to the "wash-off" of ionic zinc from the patina layer, the difference being the amount of zinc remaining in the patina layer. Run-off rates will in general be lower than corrosion rates or at maximum equal to the corrosion rates.
Available data for corrosion and run-off rate result from exposure of standard test panels mounted on standard test racks. Only little data are available from testing (on) real objects under the variety of typical microclimate conditions to which they are exposed. Recent experimental data with very large test racks (simulating zinc roofs) suggest that small test racks may overestimate the run-off rate.

The decrease of the corrosion rates runs parallel to the decrease of the ambient concentrations of SO_2, which is generally accepted as the dominant air pollution factor determining corrosion of zinc.

Corrosion rates decrease with time due to the increasing protection of the patina layer. Therefore, long term (20 years) average corrosion rates will be substantially lower (60% of initial value) than those during the first years of fresh not patinated materials. After a period of about 10 years, the run-off rate will be approximately 2/3 of the corrosion rate.
Run-off rates can be calculated to be 3 g/m²/a in areas with higher SO_2 concentrations and 2 g/m²/a in areas with lower concentrations.

8. References

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

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

/GaBi 8/
GaBi 8, GaBi ts. Software and Databases for Life Cycle Engineering. LBP, University of Stuttgart und PE International, 2013

/EN 1179/
EN 1179, Zinc and zinc alloys- Primary zinc

/EN 988/
EN 988, Zinc and zinc alloys

/EN 612/
EN 612, Eaves gutters with bead stiffened fronts and rainwater pipes with seamed joints made of metal sheet

/ISO 9001/
ISO 9001:2015, Quality management systems – Requirements

/EN 10002/
EN 10002-1, Metallic materials - Tensile testing

/ISO 14001/
ISO 14001:2015, Environmental management systems - Requirements with guidance for use

/DIN ISO 14040/
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Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel	+49 (0)30 3087748- 0
Fax	+49 (0)30 3087748- 29
Mail	info@ibu-epd.com
Web	**www.ibu-epd.com**

Programme holder
Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel	+49 (0)30 - 3087748- 0
Fax	+49 (0)30 – 3087748 - 29
Mail	info@ibu-epd.com
Web	**www.ibu-epd.com**

Author of the Life Cycle Assessment
thinkstep AG
Hauptstrasse 111- 113
70771 Leinfelden-Echterdingen
Germany

Tel	+49 711 341817-0
Fax	+49 711 341817-25
Mail	info@thinkstep.com
Web	**http://www.thinkstep.com**

Owner of the Declaration
RHEINZINK GmbH & Co. KG
Bahnhofstraße 90
45711 Datteln
Germany

Tel	+49 2363 605-0
Fax	+49 2363 605-209
Mail	info@rheinzink.de
Web	**www.rheinzink.de**