RHEINZINK®

Petter Dass Museum, Sandnessjøen, Norway; Architect: Snøhetta, Oslo, Norway

THE ENVIRONMENTALLY COMPATIBLE BUILDING PRODUCT

Many years ago, the German Institut Construction and Environment (ECO) declared RHEINZINK material to be an environmentally compatible building product, following a complete and comprehensive assessment of its entire lifecycle. Now an additional Environmental Product Declaration according to ISO 14025 has been created within a new programme for ECO Environmental Declarations. This unique programme provides a standardized starting point from which to evaluate the environmental compatibility of a product within the context of its application. Ecological balance as per the internationally applicable ISO 14040 Standard is the fundamental principle for this evaluation, along with other product-specific specifications. All relevant product data are recorded, tested and verified by an independent committee of experts.

Natural material for roofing and façade

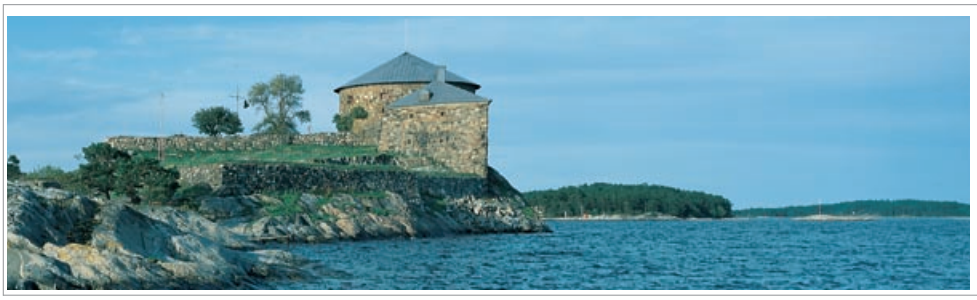
Energyefficient production

Long useful life - maintenance free

100% recyclable – 95% recycling rate

Environmental Product Declaration according to ISO 14025

Environmental Management System according to ISO 1400



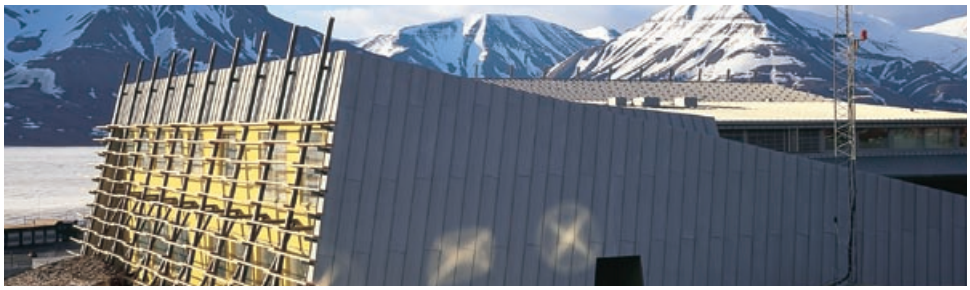
Short version

Environmental Product Declaration

IBU – Institute Construction and Building e.V. Member of the Environmental Construction products Organisation ECO **www.bau-umwelt.com**	**Program holder**
RHEINZINK GmbH & Co. KG Bahnhofstraße 90 45711 Datteln Germany	**Declaration holder**
EPD-RHE-2009112-D	**Declaration number**
RHEINZINK® – Titanium Zinc This declaration is an Environmental Product Declaration according to ISO 14025 and describes the environmental performance of the above mentioned building products. The declaration should help to advance the development of environmental- and health friendly building. All relevant environmental data are disclosed in this validated declaration.	**Declared building products**
This validated declaration authorises the holder to bear the official stamp of the Institute Construction and Environment e.V.. It only applies to the above mentioned products for three from date of issue. The declaration holder is liable for the information and evidence on which the declaration is based.	**Validity**
The **declaration** contains in detail: - Product definition and physical data - Information about raw materials and origin - Specifications on manufacturing the product - References for product processing - Information on product in use, singular effects and end of life - LCA results - Evidence and verifications	**Content of the declaration**

20th June 2009	**Date of issue**
Prof. Dr.-Ing. Horst J. Bossenmayer (Chairman)	**Signatures**

This declaration, and the rules which it is based on, have been verified by the independent Advisory Board (SVA) according to ISO 14025.		**Verification of the declaration**
Prof. Dr.-Ing. Hans-Wolf Reinhardt (Chairman of the SVA)	Dr. Eva Schmincke (Verifier appointed by the SVA)	**Signatures**



Summary

Environmental Product Declaration

Product description

The material RHEINZINK® – Titanium Zinc is an alloy based on fine zinc with additives of copper, titanium and aluminium. All RHEINZINK® products are made of this alloy. The declaration applies to all three qualities of surfacing: RHEINZINK® -bright rolled and RHEINZINK®-"preweathered pro blue-grey" and RHEINZINK®-"preweathered pro graphite-grey".

The titanium zinc sheets are produced in different thicknesses. These vary according to the type of titanium zinc sheet from 0.6 mm (5 kg/m²) to 2.0 mm (14.4 kg/m²). The moulded density of zinc is 7.2 g/cm³.

Applications

Titanium zinc sheets are used for roofings and wall claddings as well as for roof drainage systems (roof gutters, pipes and equipment).

For roof drainage, the titanium zinc sheets are processed into roof gutters, down pipes, fascia boards, small parts or constructive sheets.

A reduction of the wetted surface relating to the material is achieved for the roof drainage by using cuttings when tailoring sheets, gutters and pipes and also by overlapping when putting together and joining with brazing as well as by mounting under a roof overhang.

For roofing applications, the wetted surface is reduced by having rebated joints, splays, covers, clippings etc. depending on the method of installation. A reduction of the wetted surface can be achieved for wall claddings through vertical assembly (roof overhang, orientation and shadowing effects e.g. through adjacent housing or trees).

Scope of the LCA

The **Life Cycle Assessment (LCA)** was carried out according to DIN ISO 14040 et sqq. Specific data from the company RHEINZINK in Datteln, Germany, statistical data form the WirtschaftsVereinigung Metalle as well as the data base "GaBi 4" were used. The LCA was carried out for the manufacturing phase of the products, taking into account all background data such as raw material exploitation and transports ("cradle to gate").

The use phase of the titanium zinc sheets is divided into several application areas: roofing applications, roof drainage and wall claddings. The treatment for the titanium zinc sheets was modelled in melting stoves for the end of life phase. The thereby resulting credit of extracted zinc is counted as replacement for primary zinc.

Results of the LCA

Titanium zinc sheet				
Parameter	**Unit per kg**	**Sum of production and recycling potential**	**Production**	**Recycling potential**
Primary energy, non-renewable	[MJ]	**16.3**	45.5	- 29.2
Primary energy, renewable	[MJ]	**0.9**	3.8	- 2.9
Global Warming Potential (GWP)	[kg CO_2 eqv.]	**0.96**	2.62	- 1.65
Ozone Depletion Potential (ODP)	[kg R11 eqv.]	**$0.18 * 10^{-6}$**	$0.56 * 10^{-6}$	$- 0.39 * 10^{-6}$
Acidification Potential (AP)	[kg SO_2 eqv.]	**$3.32 * 10^{-3}$**	$13.5 * 10^{-3}$	$- 10.2 * 10^{-3}$
Eutrophication Potential (EP)	[kg PO_4 eqv.]	**$0.28 * 10^{-3}$**	$1.03 * 10^{-3}$	$- 0.76 * 10^{-3}$
Photochemical Ozone Creation Potential (POCP)	[kg ethene eqv.]	**$0.29 * 10^{-3}$**	$1.10 * 10^{-3}$	$- 0.80 * 10^{-3}$

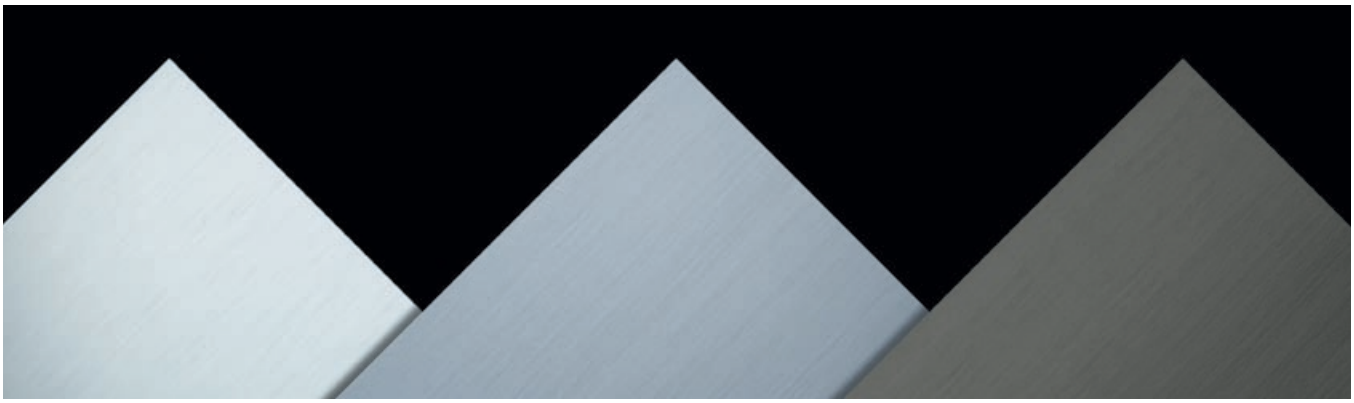
Issued by PE Europe GmbH, Leinfelden-Echterdingen, Germany

PE EUROPE GMBH Life Cycle Engineering

Evidence and verifications

The following **evidence** and **verifications** are also described in the Environmental Product Declaration:

- Atmospheric corrosion and surface loss (erosion), measurement of the rates of corrosion and the erosion of zinc ions due to precipitation over a test period of eight years (1991 – 1998)



RHEINZINK-bright rolled *RHEINZINK-"preweathered^{pro} bue-grey"* *RHEINZINK-"preweathered^{pro} graphite-grey"*

Three natural surface finishes

RHEINZINK – the ecological material
Within the context of sustainable building, the importance of environmental compatibility of building products has increased significantly, influencing decisions of building owners and planners when selecting materials. Apart from its durability, the advantages of this material include: low energy consumption during production, a high recycling rate, and energy savings as a result of the high rate of recycling.

RHEINZINK – durable and sustainable
RHEINZINK has always ranked very high when it comes to environmental performance. Ecological standards are set from the beginning: energy consumption during raw material extraction and processing is minimal. The latest production equipment keeps emissions to a minimum. RHEINZINK can be100% recycled and, with a lifespan of several decades, sets a very high standard. Apart from exemplary ecological properties, its "self-healing" surface is very impressive: the aesthetically pleasing protective patina, which develops as a result of weathering, evens out any scratches and minor damage quite naturally and guarantees durability with little or no maintenance. This feature applies to all RHEINZINK surface qualities. RHEINZINK maintains its value even after its life as a roof, façade cladding or roof drainage product is complete: as the energy consumption for recycling is only about 5% of its primary energy content and the price for scrap metal is up to 60% of the raw material price for pure zinc, a decision in favour of RHEINZINK is also a decision in favour of future generations. Thanks to the high rate of recycling – over 95% – a further reduction of energy consumption for primary material is attained. Scrap metal from the RHEINZINK-manufacturing process is fed right back into the smelting process without any additional pre-treatment.

Solid Values
Build with RHEINZINK, secure in the knowledge that you are acquiring lasting value. In addition to its statutory liability, RHEINZINK offers a 30 year material guarantee. That provides reliability.

RHEINZINK provides protection against electromagnetic radiation
There is a very controversial discussion in the public domain surrounding electromagnetic radiation; within this context, the International Society for Electro-Smog Research (IGEF e.V.) has analyzed and determined the protective properties of RHEINZINK.
The result: more than 99 % of electromagnetic radiation is screened off by RHEINZINK. Biological tests on humans confirm this and indicate a harmonizing effect on heart, circulation and nervous system, especially when grounded, and a relaxing effect on the whole body.

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