



A SUSTAINABLE MATERIAL

Made for generations

SUSTAINABLE BUILDING WITH RHEINZINK



BUILT WITH TRUST

There is no alternative to trust

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Sustainability - the word has spread. It describes the ability of using a natural system to the fullest. This can refer to dealing

with the environment and natural resources in a responsible manner. It can also describe a company's reliability that sets it

apart from others.

Definitely after the latest climate report, people all over the world focus strongly on climate protection and sustainability. In the near future, also in Germany, laws will be coming into effect to regulate the contact between human beings and nature in the right manner.

Especially in the field of sustainable construction there is a set of new challenges which will affect architects, planners, and constructors. Soon, when planning a building, the basics of sustainable construction will have to be respected: For example, there will be an energy certificate for the building that will make it possible to calculate and analyze a building's energy consumption. A "sustainability certificate" will document the quality of a building and categorize it according to sustainability criteria such as ecological and economic aspects, socio-cultural and functional as well as technical aspects, and it will determine the influence the building and its materials have on the environment.

Terms like ecological construction, low energy buildings, CO₂ discussions, renovation of old buildings and energy efficiency are becoming more important for constructors and planners. This has the effect that the use of sustainable materials will inevitably become more important. Ecological home construction will advance to becoming the standard in years to come. With RHEINZINK the coming standards will be easily met. The natural material for roof, façade, and roof drainage systems has been uniting the sum of all positive ecological aspects for over 40 years. The outstanding ecological balance is fully documented in the ECO* product declaration according to DIN ISO 14025, type III.

RHEINZINK-products have a realistic durability of more than 75 years^{**} and do not need any maintenance or care during that time. The aesthetic patina created by natural weathering protects the material for generations and with time, scratches simply disappear.

Especially the comparatively low CO₂ emission during manufacturing and thus a low amount of energy needed in production, makes RHEINZINK the lightweight option among metals for roofing and claddings. RHEINZINK is 100% recyclable and compared to coated or other compound materials, it is, immediately and without needing further preparation whatsoever, recyclable again right away. This only requires about 5% of the primary energy demand.

RHEINZINK – a sustainable material:

- Sustainability documented according to DIN ISO 14025, Type III
- 100% recyclable
- Recycling quota of pure zinc of 98%
- Low primary energy demand
- Low secondary energy demand (recycling)
- Comparatively low CO₂ emission among construction metals
- Lowest global warming potential
- High scrap metal value
- Over 40 years of experience
- Natural surface with self-healing effect (patina)
- Longevity and maintenance-free
- Seepage of rainwater possible
- Zinc is an indispensable trace element
- Social responsibility "MADE IN GERMANY"
- Applicable in the multiplicity of architecture

Find more information on: www.rheinzink.co.uk/ecology

^{*} Institute Construction and Environment

^{**} Study TNO, Breda, Netherlands

ZINC IS ONE OF LIFE'S COMPONENTS

And so is RHEINZINK!

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The discussion on climate change shows that, also in Germany, the topic "sustainable construction" will have to gain importance. After all, we are responsible for about 20 % of the CO₂ emissions in the field of construction and living. It is therefore worthwhile to take a closer look and to preserve our resources, save energy, and avoid emissions.

In this context, the use of the ecological material zinc also becomes more important. It is gained from zinc ore through the use of energy in an electrolysis technique. The resources known to us today of 3,400 million tons provide a zinc stock for a time period of roughly 700 years without taking the recycling material into account. Refined zinc is also the source material for the high-quality RHEINZINK alloy. In melting, casting or rolling RHEINZINK, comparably little energy is needed due to zinc's low melting point. The result: The name RHEINZINK stands for the most economical primary energy concentration in the field of construction metals.

And also here RHEINZINK is scoring in the field of climate protection. Based on a square meter of RHEINZINK-standing seam the primary energy concentration for RHEINZINK compared to other roofing and cladding materials is three to eight times less*. This is another aspect that – even when using a completely independent design – turns this natural material into a real alternative for sustainable construction.

The economical RHEINZINK-energy balance is maintained within the material cycle also after usage. In order to convert zinc scrap back into refined zinc, only 5% of the energy needed to manufacture refined zinc will be needed.

RHEINZINK - naturally ecological.

The ecological performance capacity of a material is evaluated in a so-called Live Cycle Assessment (LCA). Here, material and energy flows as well as potential effects on the environment in the course of the entire life cycle are evaluated. The result for RHEINZINK is clear: The natural material's contribution to the so-called impact categories (global warming potential, ozone depletion potential, acidification potential, overfertilization potential and summer smog potential) is also the lowest among all metals used for construction. A result that is reported in detail in the "Documentation of the Environment Profiles of Metal Sheets" (PE International GmbH. Leinfelden-Echterdingen) and that is also documented by the German Federal Environment Agency.

The RHEINZINK energy data sheet:

- Primary energy consumption 187.5 MJ/m² (standing seam cover, metal thickness 0.70 mm)
- CO₂ emission: 3478 g/m² (standing seam cover, metal thickness 0.70 mm)
- Recycling energy demand: 5 % of the demand for zinc manufacturing from ore
- Resources for over 700 years
- Climate-protecting metal
- Climate protection in action for over 40 years

When referring to primary energy, we are talking about energy that is naturally available in its existing energy forms or from energy sources in Germany. Primary energy sources are for example fossil fuels (carbon, natural gas, crude oil), nuclear energy, but also renewable energies like the sun, wind, and hydraulic power. When estimating the primary energy concentration of a product, not only the manufacturing process of the material is being classified, but also the energy expenses that arise from transportation as well as how many additives and lubricants are needed during the production process.

* Source: PE International GmbH, Leinfelden-Echterdingen, Germany and the German Federal Environment Agency (UBA)

NATURALLY SUSTAINABLE

Recycling instead of downcycling

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In a time where handling resources in a responsible manner becomes ever more important, deciding on the adequate mate-

rial in the field of future oriented and sustainable construction is not an easy task. New regulations worldwide have called the

attention to material recycling after usage.

Until today, materials are used for roof and façade covers and roof drainage which consume a high amount of energy during production and which can only be re-used for secondary means (downcycling), or which cause a lot of expenses during disposal. Due to the described current conditions, a general trend towards natural materials is already foreseeable.

The material RHEINZINK has been able to claim the title "sustainable" from production all the way to its permanent application for over 40 years. RHEINZINK combines economic and ecological preservation of resources par excellence because here, real recycling has been practiced since the very beginning: Zinc scrap material can be made available again after its usage thanks to a closedloop material cycle, and it can be processed again and again.

(See chart below) Zinc is 100 % recyclable. Today, for construction zinc, a real recycling quota of 98 % is achieved. In practice this means that each RHEIN-ZINK-product today already consists to 10% of secondary material. For a RHEINZINK gutter that is three metres long for example, this means that over 30 cm has already done past service. An impressive result that is hard to be outdone because of the extremely long life cycle of RHEINZINK-products. RHEINZINK-products live up to 75 years or even longer maintenance-free.

The RHEINZINK recycling data:

- 100% recyclable without further production steps such as decoating or separating from compound materials
- 98% real recycling quota with zinc
- A RHEINZINK roof gutter consists of at least 10% recyclable material
- Real recycling instead of downcycling



Manufacturing and recycling of zinc

NATURAL WATER COURSE

RHEINZINK-Roof Drainage System

According to the German water management authorities, rainwater that needs to be drained from hard-surfaced and thus sealed plot areas should be allowed to seep into the ground of another area of the plot to join the groundwater. The aim of this requirement is to ensure the drinking water supply and reduce flooding. From a quality management point of view, it requires special attention.

Over the past years, various German federal states have dealt in detail with the topic of rainwater seepage - and with good cause: Before joining the groundwater through the earth by means of troughs, infiltration ditches or soakaway pits, the rainwater may come into contact with roofs, roof drainage systems, and the materials used for sealing the surface. As a result, roofs and roof drainage systems that may potentially harm the quality of ground water became subjects to special approval procedures. In this context, zinc, a natural material, was wrongly included in this measure by the German water management authorities.

Over the past ten years, various independent institutes have conducted countless international research projects to investigate the potential effects of zinc in rainwater. The unanimous result: Zinc in rainwater is not toxic. As long as the relevant technical rules and specifications are met, the seepage of rainwater by means of soakaway pits and drainage troughs is completely harmless. For example, according to recent publications of the German Federal Environment Agency (UBA), only 2% of all zinc that is added to the environment originate in zinc-coated building surfaces. Of this, less than 0.5% end up in the ground a portion so small that it is completely harmless. The precautionary principle that various German states have been practicing is therefore no longer maintainable with regard to zinc.

As a result, the German water management authorities are updating their regulations. Baden-Württemberg has already acted – here, rainwater drainage by means of troughs no longer requires approval. Bavaria has announced an updated version of its rainwater exemption regulation for early this year. More federal states will soon follow these examples.

Zinc is one of life's components.

A natural component of our environment, zinc is the second most important trace element after iron. Since our bodies are not able to produce micronutrients, we have to ingest them with our daily food. Up until now, the allowed portion of zinc in drinking water was up to 5 mg per liter. However, due to its harmlessness, the new regulations will no longer impose such limits.

And so is RHEINZINK.

For more than 150 years, zinc has traditionally been used to cover roofs and façades and to drain roofs. For decades, it has been playing an important role in international architecture in the form of the natural material RHEINZINK. RHEIN-ZINK is of stable value, maintenancefree, and has been declared as an environmentally friendly building product. Due to atmospheric influences, a protective zinc patina (zinc carbonate) forms on the surface of the material. It is UV resistant and guarantees longevity and a timeless beauty. Over time, the atmospheric influences wash away metal ions. However, at a corrosion rate of only 0.3 to 0.4 µm per year, the concentration of zinc in the water running off the roof is similar to that in drinking water.

Natural rainwater seepage with RHEINZINK:

- No toxic substances
- No pathogenic substances
- Proven harmlessness
- The essential trace element zinc is bound in the ground
- Research has invalidated the authorities' precautionary principle
- Supporting the natural water balance through rainwater seepage improves the microclimate and protects the environment

NATURAL PROTECTION ALL AROUND

RHEINZINK-roof and façade coverings



Roofs, façade coverings, and roof drainage systems – for more than 40 years, RHEINZINK has been known as the material of choice for safe and ecological building protection and as Europe's best-selling roof drainage system. Thanks to its diverse product portfolio, RHEINZINK can be used in almost any area and architectural style. In addition to its traditional technical material characteristics (malleability, enduring stability, ability to be worked on with tools on the building site, solderability), the material has a number of protective properties:

RHEINZINK is non-combustible.

RHEINZINK-Roof Coverings avert the spreading of fire and sparks, also in combination with various types of separating layers.

RHEINZINK averts lightning strokes.

According to DIN EN 62305-3 RHEINZINK on a roof and façade is an integral part of the external lightning protection. The natural, uncoated metal surface intercepts the lightning, diverting it across surface areas and locking joints together with the grounding line. Lightning protection in form of ungainly antennas and fanned-out, disfiguring deflectors is no longer needed.

RHEINZINK averts electric smog.

The effect that electromagnetic radiation has on human beings is a highlydiscussed and oftentimes controversial topic. In this light, the International Gesellschaft für Elektrosmogforschung (International Society for Electric Smog Research) has extensively tested the shielding characteristics of the RHEIN-ZINK material. The biological measurements taken on human beings confirm the technical measurements. They show that RHEINZINK-covered surfaces, especially when grounded, have a harmonizing effect on heart, circulation, and nervous system, and increase relaxation of the human organism. 99.93% of electromagnetic radiation are deflected.

Technical properties of the RHEINZINK material:

- Superior material quality
- Quality tested by TÜV (German Association for Technical Inspection)
- Protection of valuable buildings
- Integrated lightning protection
- Health-promoting
- Maintenance-free

NATURAL INTEGRATION RHEINZINK-solar solution



The sun's energy output which reaches us in only 40 minutes is sufficient to cover the energy needs of all of mankind for one year. With the RHEINZINK-solar solution, we have succeeded in making the most of Nature's gift in a highly aes-

thetic way.

The integrated, sophisticated, and award-winning solar solution RHEIN-ZINK-SolarThermie enable a multifunctional use of roofs. A one-step mounting technology that has proven itself for decades is all it takes to obtain an aesthetic building protection that uses the sun's free energy from day one.

RHEINZINK-SolarThermie – Strikingly invisible.

SolarThermie, or solar thermal, stands for the transformation of solar energy into directly usable heat. This technology seems made for RHEINZINK, given the excellent thermal conduction properties of this natural material: In contrast with glazed collectors that collect the direct sunlight and convert it into energy, unglazed collectors also use an environmental absorber. This means that they also take in heat that does not result from direct solar radiation. The unglazed zinc collectors - together with a heat pump - are perfectly suited for use in geothermal energy facilities. This combination increases the facility's output considerably. Furthermore, the zinc collector can be used to preheat tap water by up to 30% or, for example, to heat the water of a swimming pool.

By employing a RHEINZINK-solar solution, you benefit the environment in two ways: You have opted for a natural material with an exemplary ecological balance and you make the most of the sun's free energy. The advantages of the roof-integrated RHEINZINK solar solution:

- Multifunctional surface area usage – weather protection and energy supply
- A single mounting step leads to an aesthetic, integrated solar solution
- Climate protection through innovative solar technology using sustainable material
- Architecturally valuable and CO₂ efficient in two ways

NATURALLY RHEINZINK

We conserve value



*"*Sustainable development means satisfying the needs of the present generation without compromising the ability of future generations to satisfy theirs." This phrase, coined in 1987 by Norwegian politician Gro Harlem Brundtland during her tenure as chairwoman of the World Commission on Environment and Development of the United Nations, stimulated an increasing international preoccupation with sustainability. From the beginning, this legendary sentence was not only relevant from an ecological point of view. It stood and continues to stand for the responsible use of resources. No company today can afford to ignore theses challenges of the future.

RHEINZINK conserves value.

For more than 40 years, we have been living up to this responsibility and see ourselves as conscientious advocates of sustainability. The careful use of natural, material, financial, and human resources is and will remain an integral part of our corporate philosophy. Our loyalty to Germany as a business location guarantees much more than just the valuable label "MADE IN GERMANY". At RHEINZINK, customer interaction has always been our focus. Only in cooperating closely with our customers will we be able to persist, improve, and meet the considerable challenges of the future. In this regard, our employees are our crucial asset. Only when working in a secure and harmonious environment will they be able to fulfill their tasks to the highest standards of quality.

Loyal employees.

We remunerate our employees within the framework of the German tariff system and according to the agreements for the German metal and electrical industry. With the tariff system, each employee receives the pay he or she is entitled to. A comprehensive social environment takes each employee's personal situation into account as much as possible and offers numerous possibilities of finding the ideal arrangement between job requirements and family life. Our employees are happy with RHEINZINK – and this shows in their great personal commitment and minimal labor turnover.

Loyal company.

We value fair partnerships with our customers and suppliers and strive to develop lasting business relationships. We maintain a personal contact with trade, the crafts, architects, and planners. Our comprehensive service is one of the central reasons for the global success of RHEINZINK's roof, façade, roof drainage, and solar products. If you should ever have reason to complain, we will do our best to find a viable solution immediately – we are only human after all.

RHEINZINK –

Quality made in Germany.

We see our loyalty to Germany as a business location as another contribution to sustainability. For more than 40 years, we have stood by our production site in Datteln/Westphalia on the edge of the Ruhr area. Our regional service is carried out close to our customers – at seven locations in Germany. Branches and subsidiaries in more than 30 countries ensure that our products are delivered according to country-specific regulations and technical standards as well with the characteristics and specifications customary to the region. We speak our customer's language, manufacture according to the customer's wishes and offer customized service.

The corporate culture of RHEINZINK:

- Social and fair environment for our employees
- Lasting relationships with customers and suppliers
- Social engagement and consideration of the local economic situation
- Loyalty to business locations
- We speak our customer's language

Find more information on: www.rheinzink.co.uk/ecology



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