RHEINZINK®

SUSTAINABLE BUILDING WITH RHEINZINK®

Aspects for an intelligent material selection.

RHEINZINK

BUILD WITH TRUST

There is no alternative to trust.

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, sociocultural 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, CO_2 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 CO_2 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 CO_2 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
- Rainwater drainage possible
- Zinc is an indispensable trace element
- Social responsibility „MADE IN GERMANY"
- Applicable in the multiplicity of architecture

* Institute Construction and Environment

** Study TNO, Breda, Netherlands

ZINC IS ONE OF LIFE'S COMPONENTS
And so is RHEINZINK®!

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 CO_2 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 eco-balance. Here, stock 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 concentration 187.5 MJ/m² (standing seam cover, metal thickness 0.70 mm)
- CO_2 concentration: 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 combustibles (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

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

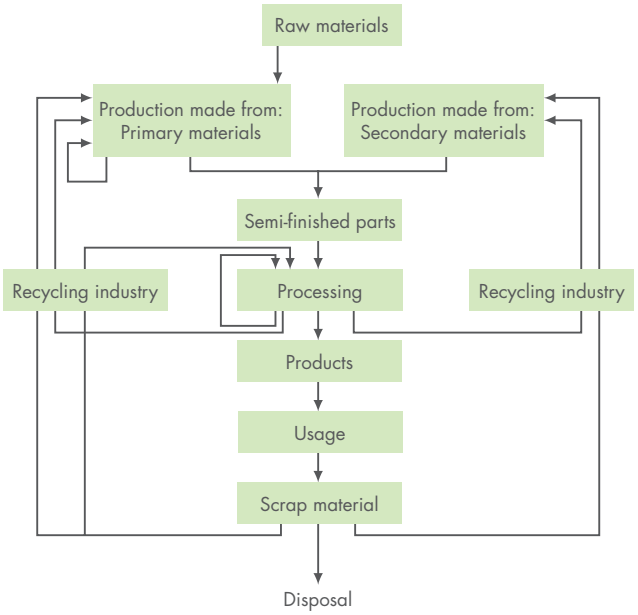
The material RHEINZINK® has been able to claim the title „sustainable" from production all the way to its permanent application for over 40 years. RHEINZINK combines economic and ecological preservation of resources par excellence because here, real recycling has been practiced since the very beginning: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

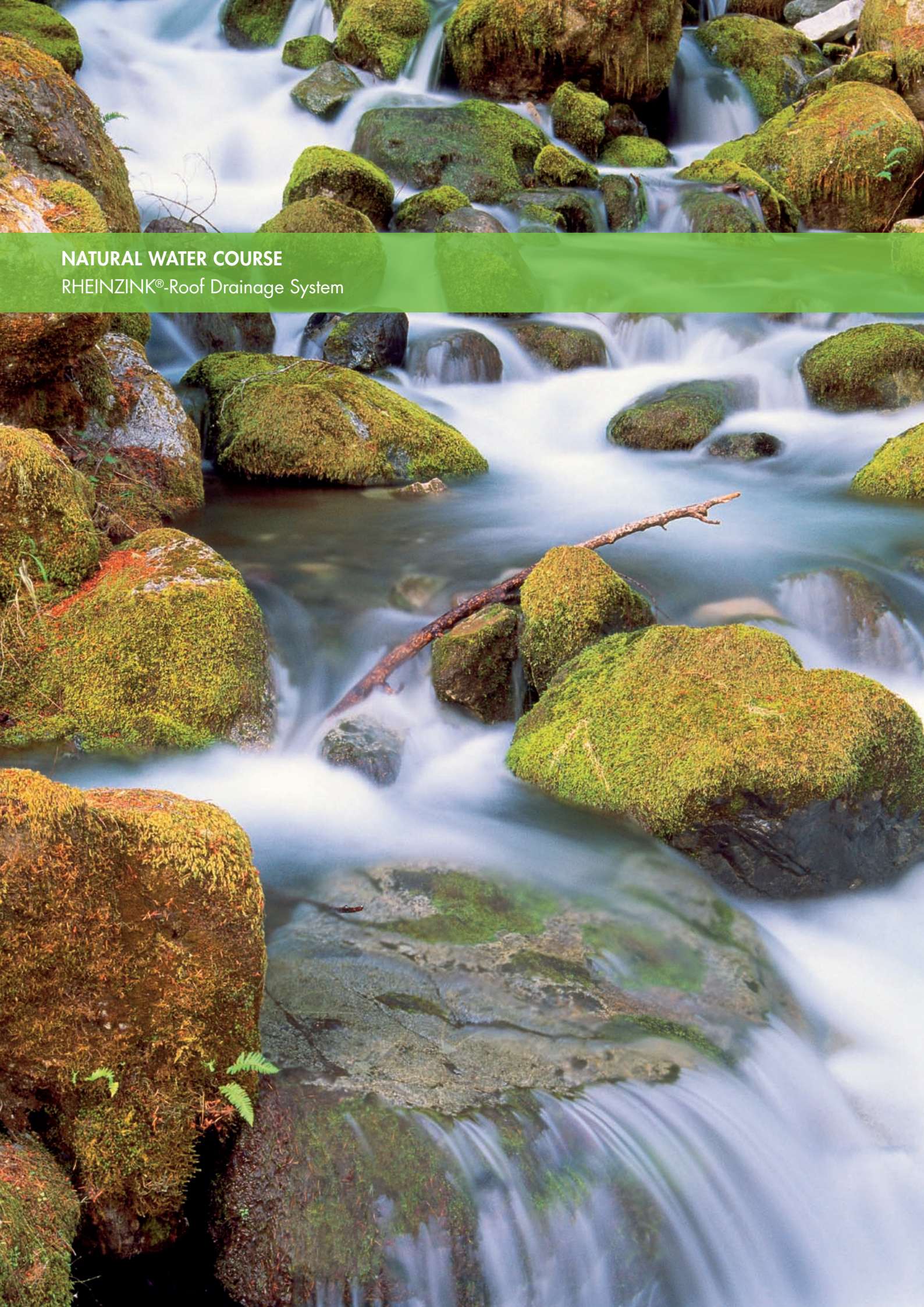
(See chart below) Zinc is 100% recyclable. Today, for construction zinc, a real recycling quota of 98 % is achieved. In practice this means that each RHEINZINK®-product today already consists to 30 % of secondary material. An entire meter of a three meter long RHEINZINK®-roof gutter has theoretically been in use already. 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® energy data sheet:

- 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 30% 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®. RHEINZINK® is of stable value, maintenance-free, 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 covers

Roofs, façade covers, 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 highly-discussed 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 RHEINZINK® 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 solutions

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 solutions, we have succeeded in making the most of Nature's gift in a highly aesthetic way.

The integrated, sophisticated, and award-winning solar solutions RHEINZINK®-Solar PV and RHEINZINK®-SolarThermie enable a multifunctional use of roofs and façades. 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®-Solar PV – Strikingly unobtrusive.
The abbreviation PV stands for photovoltaic, the direct transformation of rays of light into electric energy. As the sun does not shine everywhere with the same intensity, the roof- or façade-integrated RHEINZINK®-PV cells can be used as needed: on the entire roof or only on parts. RHEINZINK®-Solar PV does not need to penetrate the roof, nor does it need additional mounting elements. The PV elements are delivered fixed to the RHEINZINK®-carrier elements. The highly effective Triple Junction Technology enables usage even in dim light or with little direct sun. In addition, the system is extremely light-weight – it is the perfect solution for practically any roof.

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 industrial 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.

What are you waiting for? Check if your country authorities support future-oriented energy solutions today. With the help of a compensation guaranty by law for solar power, and in view of the roof's longevity, the investment in a solar roof will repay itself in no time.

The advantages of the roof-integrated RHEINZINK® solar solutions:

- 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 CO_2 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

Further reading:

www.designing-nature.de (available in German only)
www.rheinzink.com

Prof. Dr.-Ing. habil. Heinz Hullmann,
Prof. Dr.-Ing. habil. Wolfgang Willkomm:
"Recycling von Kupfer und Zink"
(Recycling Copper and Zinc, available in German only),
Offprint from "Metall" 10/2001

International Zinc Association, Europe
www.zincworld.org
"Zink ist überall" (Zinc is Everywhere,
available in German only)
"Die Zinkindustrie bekennt sich …" (The Zinc Industry
Shows its Cards, available in German only)

ECO, Institut Bauen und Umwelt
(Institute Construction and Environment),
Königswinter, Germany
(formerly Arbeitsgemeinschaft Umweltverträgliche
Bauprodukte e.V. (Association for Environmentally
Proofed Building Products)
"ECO product declaration RHEINZINK®"
"ECO – ecological balance of RHEINZINK®"

Initiative Zink (Zinc Initiative) of the Wirtschafts-
Vereinigung Metalle e.V. (Economic Metal Association),
Berlin, Germany

Initiative ProMetalldach (Pro Metal Roof Initiative)
of the Wirtschafts-Vereinigung Metalle e.V. (Economic
Metal Association), Berlin, Germany

Deutsches Institut für Nachhaltiges Bauen e.V (German
Institute for Sustainable Building), Stuttgart, Germany

RHEINZINK® books and brochures

Would you like to find out more? We will be happy to send you detailed information on sustainable building with RHEINZINK®!

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RHEINZINK

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