

**100 PERCENT NATURE. NO WASTE.**  
CRADLE TO CRADLE® – A FUTURE-ORIENTED PRODUCT  
LIFE CYCLE

# CRADLE TO CRADLE®

## **Do you know Cradle to Cradle®? Our products are Certified™.**

Can product life cycles be endless? From the day we began producing vitrified clay pipes and fittings, the concept of regenerative design has been a main focus of our work. Today, Steinzeug-Keramo products are among the first to have been granted Cradle to Cradle® certification, a third-party, multi-attribute eco-label for products based on regenerative methods and principles.

With products that support these principles and are manufactured according to globally respected European standards and regulations, Steinzeug-Keramo safeguards production sites and jobs in Europe.

Steinzeug-Keramo. Inspired by Nature.



# THE CONCEPT THAT LEAVES NO WASTE INSPIRED BY NATURE

It sounds simple, yet it is a fundamentally new concept: products that are manufactured, used and recycled without any waste. Each and every material component can be reused and treated as a resource for the generation of a new product. In fact, that is what Cradle to Cradle® is all about: regenerative life cycles.

In our industrialized world, Cradle to Cradle® sounds revolutionary, yet nature has been surviving on this principle since time immemorial. A tree grows thousands of blossoms that are later discarded when they become too heavy for the branch to carry. Only a few seeds are needed to make a new tree grow, although all the blossoms are shed. These serve as nutrients for other organisms and generate a new layer of soil. The same is true in autumn: dead leaves are transformed into nutrition for trees and all nearby plants, thus nurturing a natural process carried out by micro-organisms, wildlife and changing weather conditions.



Nature's life cycle:  
**Blossoms generate fruit.**

## The core concept

Cradle to Cradle® adopts what is known as a biomimetic approach. It uses nature's 'biological metabolism' processes as a model for developing a 'technical metabolism' for industrial materials, based on continuous recovery and reutilization.

- All components are nutrients, nutrition and recyclable
- Not a single component is superfluous, harmful or waste
- Once created values and resources are conserved for mankind and the environment

# REVOLUTION INSTEAD OF REDUCTION

## THE SYSTEM IS THE KEY

Cradle to Cradle® will change our way of thinking. It replaces the former concept of a product life cycle that begins with its creation and ends with its disposal. We can now start thinking in terms of the creation of one product leading to the creation of another. Industry and trade will be revolutionized. Why?

### To date: a linear system

In the current manufacturing process, used materials usually end up in the waste bin or the incinerator. Natural resources, limited as they are, are then irretrievably lost. As a result, the ecosystem is under great strain and future generations will carry the serious consequences. Despite constant attempts to improve the system, and despite recycling and waste reduction, it remains a system centered around waste that 'tolerates' litter and the squandering of natural resources.

### From now on: a cyclic system

With the implementation of Cradle to Cradle®, products and material components flow as resources in infinite life cycles. The program provides guidelines to help businesses proceed from a linear system to an infinite 'loop' system. The design phase already includes ensuring that no material is wasted, but used as nutrition for the creation of a new product instead.

Copied from nature:  
**Everything is nutrition.**  
**Nothing is waste.**





## NEW SYSTEM – NEW REQUIREMENTS

For such a loop system to work, we need to pick up on two more rules from nature that also apply to industry and trade:

- **Make use of renewable energy resources**  
We must stop exhausting non-renewable energy resources and put an end to nuclear power generation with its unpredictable and far-reaching consequences.
- **Our world is a system of complex interrelations**  
Natural processes function and flourish through the interplay of numerous factors, from the interaction of minuscule particles to changing weather conditions. Recycling is part and parcel of a regenerative product life cycle. This holistic approach is a prerequisite for breakthrough developments and sustainable improvements – and worth striving for in industry, too.

# BYE-BYE CONSUMER SOCIETY

## OUR WORLD IS BEGINNING TO RETHINK

Produce – use – discard. For centuries this has been the characteristic pattern of industrial production. From creation to waste. As a result, huge quantities of valuable and finite resources have gone lost forever. The annual European waste mountain of 221 million tons speaks for itself.

From the moment people began to understand that this throw-away mentality leads to serious consequences, solutions have been sought. Systems have since been optimized, waste amounts cut down, and recycling and re-use have achieved public awareness. To some extent, the massive waste mountain has been reduced. Yet the source of the problem remains. The linear system is still at the core.



### **Environmental protection is winning ground**

Smog, high levels of fine dust particles, huge waste mountains, plastic waste in the oceans, deforested heights, foam in lakes and rivers, climate collapse – these are all undeniable consequences of our living standards. It is mankind's greatest responsibility and challenge to change this, and it has indeed already initiated a worldwide ecological movement. Issues such as 'environmental protection' and 'sustainability' now have pride of place in today's political, economic and civil debate.

It is becoming increasingly clear, though, that merely adapting the linear system in which a product ends up on the waste mountain won't solve the core problem. Cradle to Cradle® is heading in the right direction: an infinite product life cycle without any waste.

# THE NEW DIRECTION IS CYCLIC. EVERY ENDING IS A NEW BEGINNING.

Learning lessons from nature: everything that is or ever has been of use serves another purpose. Without the slightest amount of waste, this gives rise to a highly sustainable product life cycle.

**The remains  
of the fruit  
generate new life.**



Cradle to Cradle® revolutionizes current production processes and the underlying principles.

Cradle to Cradle® replaces a linear product design with a cyclic one, thus upgrading the value chain.

### **The aim: product enhancement**

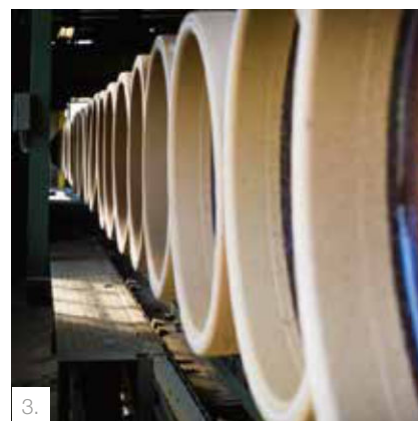
Products designed and manufactured according to the Cradle to Cradle® requirements have unique quality features. They are cost-effective, do not pollute the environment, and are extremely user-friendly.

Cradle to Cradle® offers the ideal framework for product enhancements. The objectives are:

- to increase the value, usability and efficiency of the product
- to protect the health of all those involved in the product's life cycle
- to add economic and ecological advantages

# CRADLE TO CRADLE®

## CERTIFICATION PROVES AUTHENTICITY



Companies who produce in accordance with the Cradle to Cradle® principles can subject their products and manufacturing processes to an independent quality control. If all the stringent requirements are met, the multi-attribute eco-label administered by the Cradle to Cradle® Products Innovation Institute will be awarded. A core requirement of the certification process is the use of environmentally friendly and recyclable materials that are safe for man and the environment (Material Health & Reutilization). Certification also takes into account renewable energy & carbon management, water stewardship and social fairness.

1. Raw material clay
2. Extruding
3. Vitrified clay pipes

### EPEA INTERNATIONALE UMWELT-FORSCHUNG GMBH

EPEA, short for Environmental Protection Encouragement Agency, is an international research and consultancy service. Its main goal is to improve the quality and usability of materials, products and services. The office, with its headquarters in Hamburg, was founded by Prof. Dr. Michael Braungart, father of Cradle to Cradle® and responsible for the permanent development and the worldwide introduction of the concept.

### CRADLE TO CRADLE® PRODUCTS INNOVATION INSTITUTE (C2CPII)

The Cradle to Cradle® Products Innovation Institute is a non-profit organization founded by William McDonough and Michael Braungart, based on their thirty years of industry experience. The organization's mission is to radically change current production methods. With the Cradle to Cradle®-Certified<sup>CM</sup> Program, the organization renders support to designers and product developers for realizing quality improvements in terms of safety and human and ecological health.



# FOUR STEPS TO CERTIFICATION PASSED!

The certificate always relates to the product and the production process – not the company – and holds worldwide recognition and validation. Certification is performed by EPEA and the Cradle to Cradle® Products Innovation Institute (C2CPII) in cooperation with the customer.

## Step 1:

### Material Assessment

Quality control of the raw materials is essential. If the product contains so-called 'banned chemicals', i.e. chemicals defined as harmful under the Cradle to Cradle® rules, certification will not be awarded.

## Step 3:

### Audit

The certification report, including the recommended certification level, is immediately forwarded to C2CPII for further settlement.

## Step 2:

### Process Evaluation

The evaluation of the production process also takes into account the sourcing and consumption of energy and water resources. Criteria such as renewable energy, social fairness, and water stewardship are checked on site at the production plant.

## Step 4:

### Certificate

A product that has been certified is authorized to carry the Cradle to Cradle® logo.



## PRODUCTS OF STEINZEUG-KERAMO INSPIRED BY NATURE

The first stage is complete: our pipes and fittings made of vitrified clay have received the Cradle to Cradle® certification in silver. We made a conscious choice for Cradle to Cradle® and are proud to announce the validation to the outside world. Apart from confirming the outstanding quality of our products, it also endorses our social and environmental responsibility.

### Sustainable value creation

Sustainable value creation is a prerequisite for stable, profitable and future-oriented business. That goes for us as well as for our customers who carry the responsibility of ensuring safe sewage disposal over the long term. Having Cradle to Cradle® Certified<sup>CM</sup> products is a result of our purposeful business strategy and represents another clear argument in favor of choosing vitrified clay for your building projects.

### Environmental aspects

Our vitrified clay pipes are made of 100% natural resources, do not release any pollutants into the environment, have a service life of over 100 years and are therefore highly sustainable, are 100% recyclable, consist of recycled materials, are produced by means of renewable energy resources and energy reduction programs (i.e. biomass-plants in Bad Schmiedeberg, heat exchangers in Frechen). All these aspects are clear evidence of our explicit environmental awareness that adds value to our products. An added value that has now earned acknowledgement through certification.



**Vitrified clay: deeply rooted in nature**  
Now also **Cradle to Cradle® Certified<sup>CM</sup>**.

# STEINZEUG-KERAMO LIFE CYCLE RESPONSIBILITY IN PRACTICE

Our awareness for human and ecological health has always been high – long before the emergence of the Cradle to Cradle® Certified™ Program that specifically focuses on product quality. From mining clay to recycling vitrified clay, eco-friendliness is integral to each stage of the product life cycle:

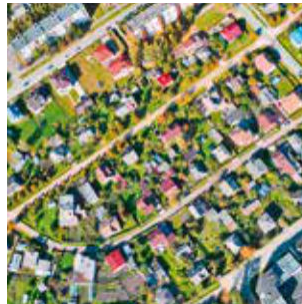
## 8 Recycling

- Ceramics are 100 % recyclable and turned into grog for the production of vitrified clay pipes



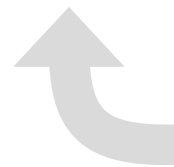
## 7 Operation

- Sustainable in use: low maintenance and repair costs, and long service life ( $\geq 100$  years)



## 6 Installation

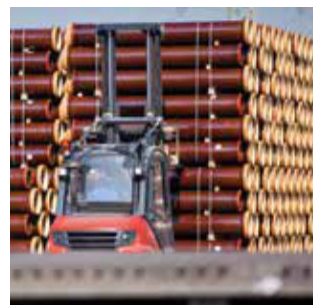
- Installation assistance and consultancy on site
- Pipe systems for installation in open trenches and for trenchless construction methods



**At Steinzeug-Keramo we have been implementing these principles since the onset of our pipe and fittings production, i.e. long before the Cradle to Cradle® certification.**

## 5 Logistics

- Fine-tuned logistics and optimized cargo loads for better eco-efficiency
- Flexible and quick – the shortest route to the contractor and/or building site





#### 1 Mining of raw materials

- Local clay mining: environmentally friendly mining with rehabilitation of the excavated area



#### 2 Raw material transport

- Easy on resources and low CO<sub>2</sub> emissions: short distances between quarry and production site



#### 3 Raw materials

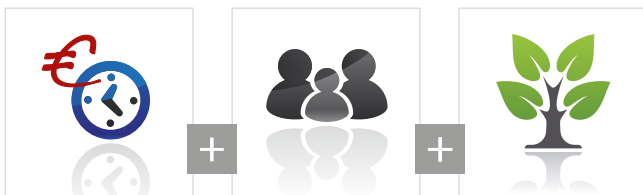
- Clay, grog and water: 100% natural resources in exact quantities



#### 4 Production process

- Fulfillment of the Cradle to Cradle® criteria at each level of the production process
- Energy reduction programs (i.e. biomass plants, heat exchangers, Ecopower®)



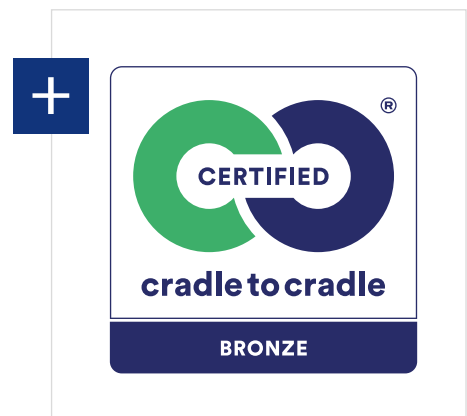


### Reinforcing public awareness

Vitrified clay pipes comply with the most stringent environmental standards. Thanks to their outstanding technical, chemical and physical features such as high resistance, impermeability and hardness (according to the Mohs scale), extremely high abrasion and corrosion resistance, they offer unique gains. Vitrified clay is up to 100% recyclable. A long service life in combination with low maintenance and repair costs adds to its economical viability. These benefits can be reaped over generations. With their expected lifespan of over 100 years, vitrified clay pipes are kind on resources and keep the costs of maintenance and repairs to a minimum.

### CRADLE TO CRADLE® CERTIFICATION: ACKNOWLEDGEMENT AND COMMITMENT

Cradle to Cradle® Certification underlines the unique features of the product. However, certification is not the result of a one-off product evaluation but a continuous assessment process. Unlike single-attribute eco-labels, the Cradle to Cradle® Certified<sup>CM</sup> product standard takes a comprehensive approach to evaluating the design of a product and the practices employed in manufacturing. The Cradle to Cradle® Certified<sup>CM</sup> Program is a multi-attribute and multi-level certification that acknowledges continuous improvements in product materials and processes towards the goal of a product that is wholly beneficial for people and the planet.



**Cradle to Cradle® Certification of our vitrified clay products sets new standards for the preservation of nature by and for society and the environment.**

**Steinzeug-Keramo. Inspired by Nature.**

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