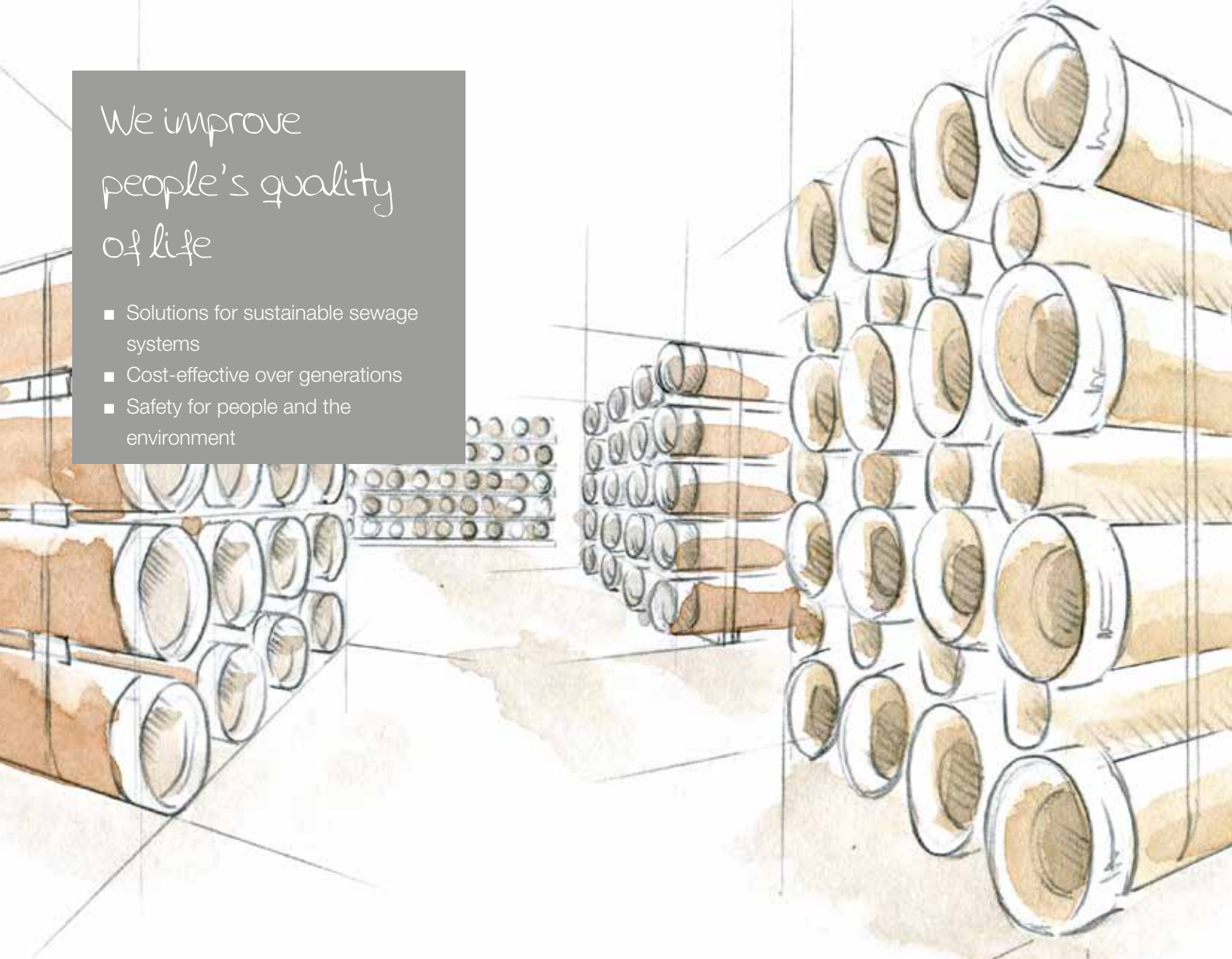




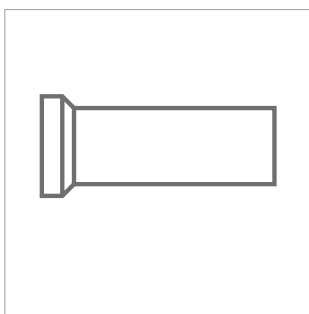
**FLOW
ING INTO
THE FUTURE**

We improve
people's quality
of life

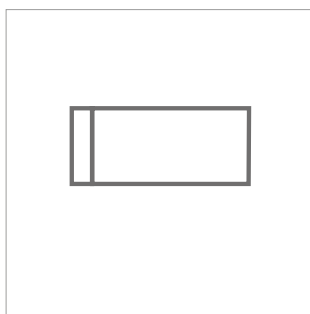
- Solutions for sustainable sewage systems
- Cost-effective over generations
- Safety for people and the environment



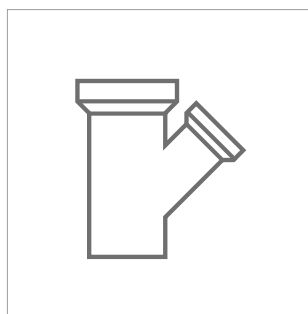
Products for open trench and trenchless construction



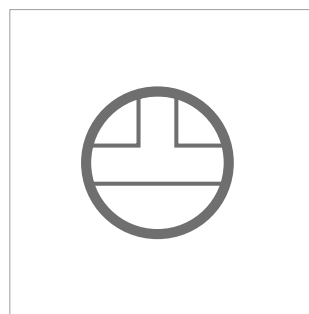
Socket pipes



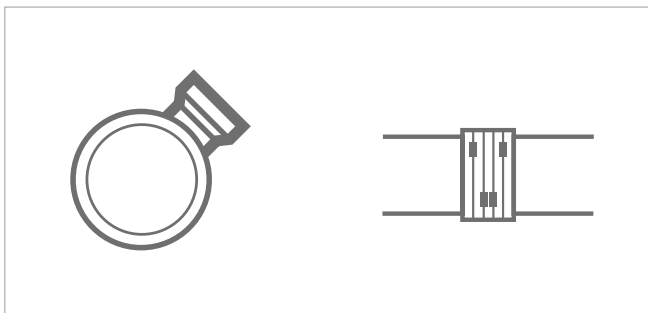
Jacking pipes



Fittings



Manholes



Accessories

Steinzeug-Keramo's materials

We produce and supply vitrified clay pipes and manholes and the respective accessories. These products are made of 100% natural raw materials: clay, fireclay and water. Our core product range is supplemented with appropriate non-ceramic products such as flexible couplings.

THE STEINZEUG-KERAMO SYSTEM

WELL-ROUNDED AND CONVINCING

Steinzeug-Keramo, a Wienerberger AG company, is Europe's largest manufacturer of vitrified clay components for sewage disposal purposes. We have three manufacturing sites in Germany and Belgium, where we produce vitrified clay pipes and fittings of the highest quality for safe, reliable and economic use.



wienerberger.de

Our Cradle-to-Cradle® certified products meet the highest standards of environmental compatibility, sustainability and service life:

- Natural raw materials and state-of-the-art process engineering ensure highly resistant parts.
- Their lifespan exceeds 100 years and they can be fully recycled.
- The pipes and fittings are streamlined for efficient construction site management.

Vitrified clay is future-proof.

That's why our sewage system solutions are in international demand.

3 
manufacturing
sites

Branch offices in
Belgium, Germany, France, Italy,
Poland

Additional partners in
Luxembourg, the Netherlands,
Austria, Portugal, Romania,
Switzerland, Spain, Czech Republic


530 employees



AN ECO-SOUND SOLUTION FOR THE WHOLE WORLD

170 YEARS OF FORWARD THINKING

Right from the start, our objective has been to ensure perfect hygiene and active health management through safe drains and sewers.

The challenges of industrialisation

With the onset of industrialisation around two centuries ago, cities began to become more densely populated. This resulted in a new awareness for the necessity of planned urban sewage networks that would meet the following key objectives:

1. Hygiene

Fast sewage removal from towns and cities

2. Enhancement

Expansion of the existing technical infrastructure

3. Cleaning

Water pollution control through full drainage to the sewage treatment plant

4. Groundwater protection

On no account may sewage end up in the ground

As a manufacturer of vitrified clay pipes and modern-day system supplier, our task was and is the continuous adaptation of our components in terms of installation and operation in open and trenchless construction, and the further development of all necessary system components such as seals.

The long service life of our products is a key specification and requires a high level of workmanship. Not only do we meet all the valid standards, we exceed them. Our benchmark for quality goes beyond merely meeting the standards.

MILESTONES IN INDUSTRIAL PRODUCTION

PIPE STRENGTH

By increasing pipe strength, the pipes can withstand growing traffic loads and are suitable for greater installation depths.



Bad Schmiedeberg

Fast-firing plant

We are experiencing change. To our company and our products, and to stay on top of developments.

FACTORY-FITTED JOINTS

Our in-house developed 'Joint S' made us the first manufacturer to provide factory-fitted joints, rather than making them at the construction site as was the previous practice.

JACKING PIPES FOR TRENCHLESS CONSTRUCTION

We also set new benchmarks by enabling wall strengths of up to 100 mm and increasing the crushing strength to 100 N/m.



Frechen

Large-diameter pipes/
jacking pipes



Hasselt

Manholes/small-diameter pipes/
medium pipes

MEETING ALL THE REQUIREMENTS OF MODERN SEWAGE NETWORKS

VITRIFIED CLAY SCORES TOP MARKS

ROBUSTNESS

94 %

Bending tensile strength 15 bis 40 N/mm²
Fatigue strength resistan
Impact strength Wall thicknesses up to 10 cm

92 % | 70 %

ECOLOGY

97 %

Clay, fireclay and water
Selected natural raw materials
Recycled materials 40 %

78 % | 50 %

MAINTENANCE/REPAIRS

92 %

Inspection-friendly thanks to glaze
Cleanability
Self-cleaning effect
High-pressure water jetting resistance up to 280 bar

73 % | 68 %

KEY

- % Vitrified clay materials
- % Mean value for all flexurally rigid materials (vitrified clay, concrete, coated concrete)
- % Mean value for all flexible materials (PE/PP, PVC, GFRP, moulded)

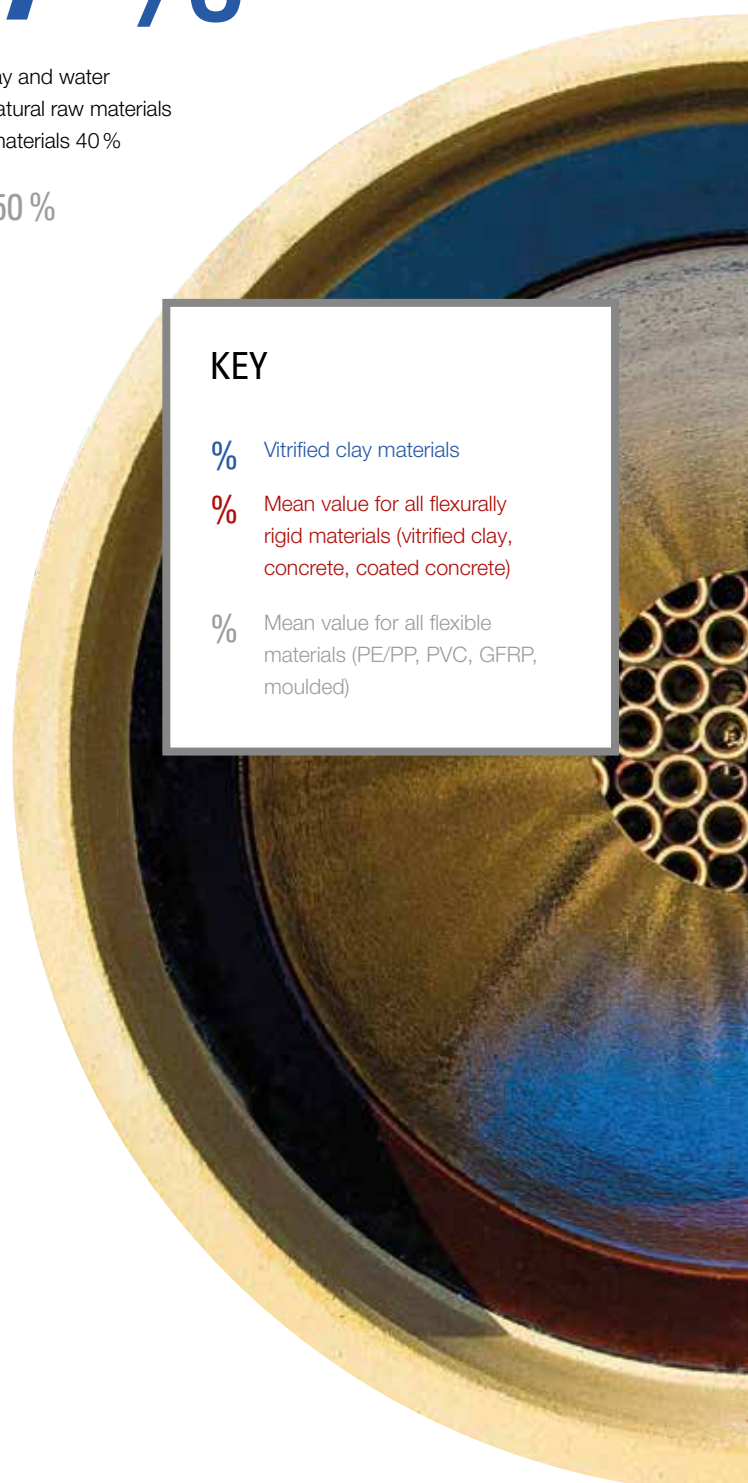
YOUR REQUIREMENTS? OUR BUSINESS!

EASE OF INSTALLATION

- Different strength classes for different installation conditions
- No reaction to oversteering resulting from deformations
- Positional and form stability when compacting
- Optimal construction lengths for trench-lining systems
- Buoyancy-safe
- Easy to machine (cutting/drilling)

64 %

66 % | 75 %



REFURBISHABILITY

90 %

All refurbishing techniques, e.g. drilling, grinding, trowelling, lining, are possible. Additional connections can be retrofitted

80 % | 59 %

HYGIENE

95 %

Hydraulic smoothness - excellent cleaning properties
Watertightness up to 2.4 bar Protection of soils and groundwater

74 % | 77 %

RESISTANCE

96 %

Resistance to corrosion	assured
Chemical resistance	pH 0 to 14
Frost resistance	assured
Biological resistance	assured
Ozone resistance	assured
Watertightness	up to 2,4 bar
Resistance to root damage	assured
High-pressure jetting resistance	up to 280 bar

73 % | 70 %

SAFETY

96 %

Hardness (according to Mohs) ~ 7
Wall thicknesses up to 10 cm
Deformation-resistant and positionally stable
Non-buoyant

73 % | 71 %



VERTICAL PRODUCTION

TIME-TESTED AND VERSATILE

1. Preparing



2. Moulding



3. Drying



Vitrified clay pipes are traditionally manufactured vertically. We produce lengths from 1 m to 2.5 m. Vitrified clay pipes are ceramic products and the manufacturing process accordingly involves several stages: preparing, moulding, drying, glazing, firing, and finishing.

4. Glazing



5. Firing



6. Socketing



7. Inspection



8. Packaging



Clay
 + fireclay
 + water
 + firing
 —————
 100 % Steinzeug

Today, technology and know-how allow the production of ceramic pipes with an inner diameter of up to 1200 mm. Alongside socket pipes, jacking pipes are gaining importance. They are increasingly becoming the product of choice for urban construction projects that involve heavy traffic volumes.

HORIZONTAL PRODUCTION

FAST AND ENERGY-EFFICIENT

1. Preparing



2. Moulding



3. Drying



4. Glazing



5. Firing



6. Socketing



7. Inspection



8. Packaging



The characteristic feature of the improved firing technology is the significantly shorter production times of only 22 hours, which we achieve with shorter drying times and optimised firing curves.

The firing rate can be accelerated by ensuring optimal heat input and discharge.

Our state-of-the-art production method for DN 200 and DN 250 pipes enables production lengths of up to 2.5 metres.

In this case, the pipes are dried and fired horizontally.

The joints are fitted after the pipes have passed through the kiln.

We use up to 40% ceramic recycled material in our raw material mix for specific ceramic pipes, thus significantly contributing to resource efficiency.

MANHOLE PRODUCTION

CORROSION-RESISTANT AND LEAKPROOF

1. Cutting



2. Drilling



3. Grinding



4. Making the seals



5. Adding the base element



6. Making the connections



Installed base element



7. Adding the concrete



8. Final inspection



As sewage content is becoming increasingly aggressive, sewage systems have to be all the more corrosion-resistant and leakproof. Vitriified clay manholes are used for ventilation, inspection, maintenance, cleaning and bridging purposes, and also serve as intersections and transfer points.

Our manholes

- are monolithic up to transport height and have attachments with integrated seals
- can be installed to depths of more than 8 metres, depending on the structural statics
- withstand enormous amounts of pressure, including heavy duty traffic
- are absolutely dent-resistant and buoyancy-safe due to the rigidity of the material
- Every connection is fully embedded in the shaft wall. There are no exposed or projecting sockets – everything is flush with the outer pipe wall



SPECIAL FITTINGS

We manufacture individually – and customise products on demand!

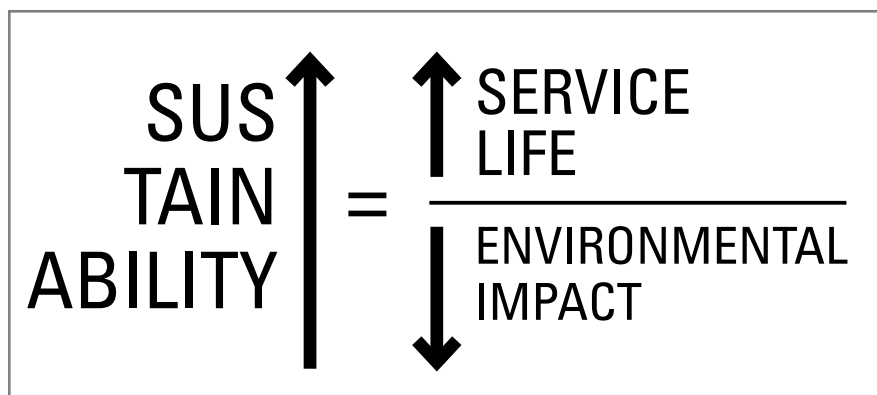
WE PUT OURSELVES IN YOUR POSITION AND PROVIDE QUALIFIED SUPPORT FROM THE START


Whatever your project, we are here to help – with personal on-site consulting and online knowledge bases.

Time and again, we develop innovative and pioneering solutions based on direct practical experience. We like to think outside the box and make use of synergies in underground engineering, for example.

We actively participate in expert conferences, symposia, talks and seminars, create networks and platforms, and cultivate close personal customer contacts at all levels.

We are the sewage system managers of the urban world.





When planning the construction sites, our pricing always takes the full system lifespan into account, because we know exactly where and how our products impact the overall project costs. The result is a cost-effectiveness solution, also for the fee-paying user.

Sewage systems based on vitrified clay products are extremely long-lasting and resource-friendly solutions made of recyclable and 100% reusable materials.



INFOPOOL

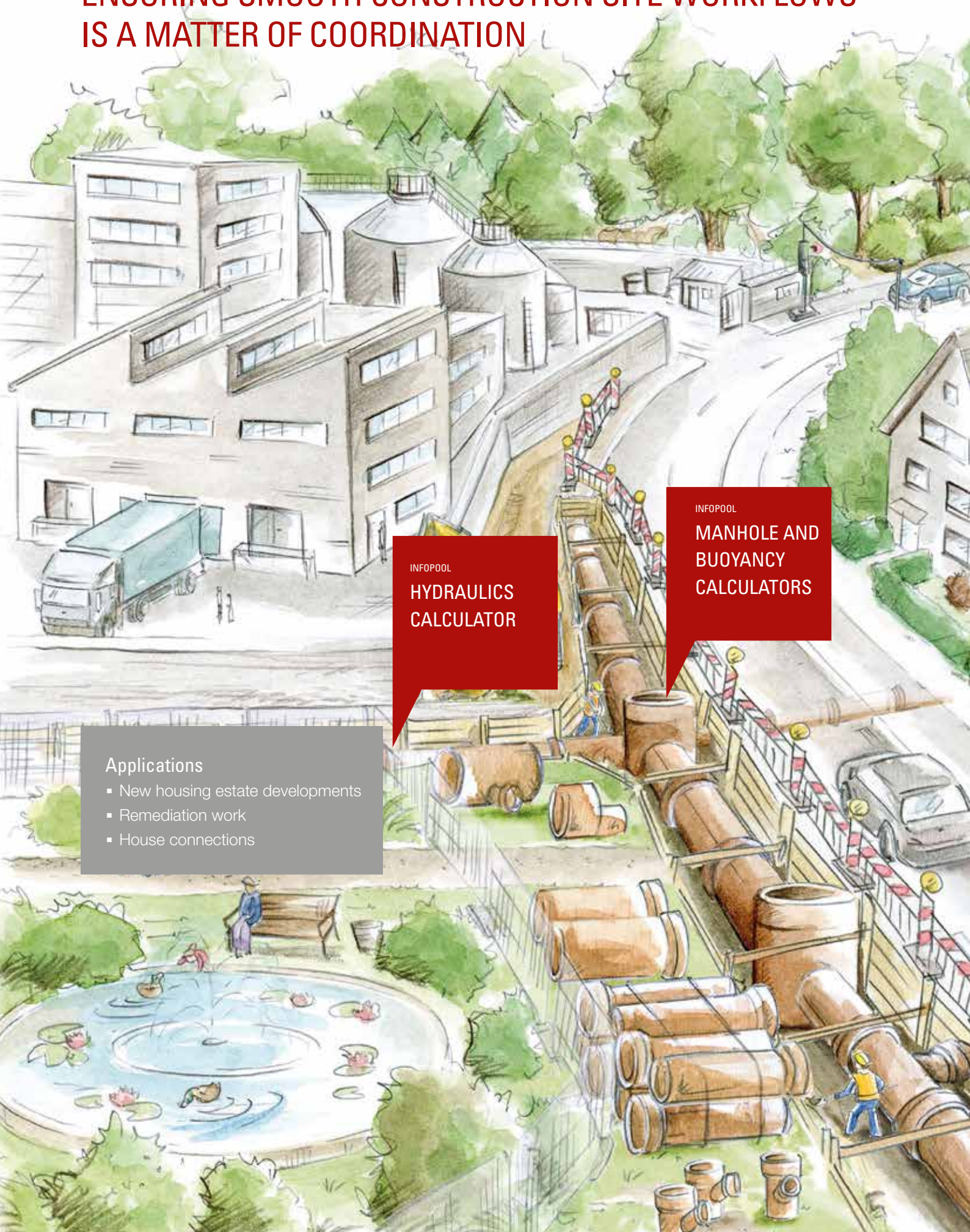
Find out more about vitrified clay, read interesting field case reports, and access our Infopool with its handy calculators, at **www.steinzeug-keramo.com**

Service offer

- Regional contacts
- Personal on-site consulting
- Internet service
- Infopool (online consulting with useful tools)
- Download forms

OPEN TRENCH CONSTRUCTION

ENSURING SMOOTH CONSTRUCTION SITE WORKFLOWS IS A MATTER OF COORDINATION



INFOPOOL

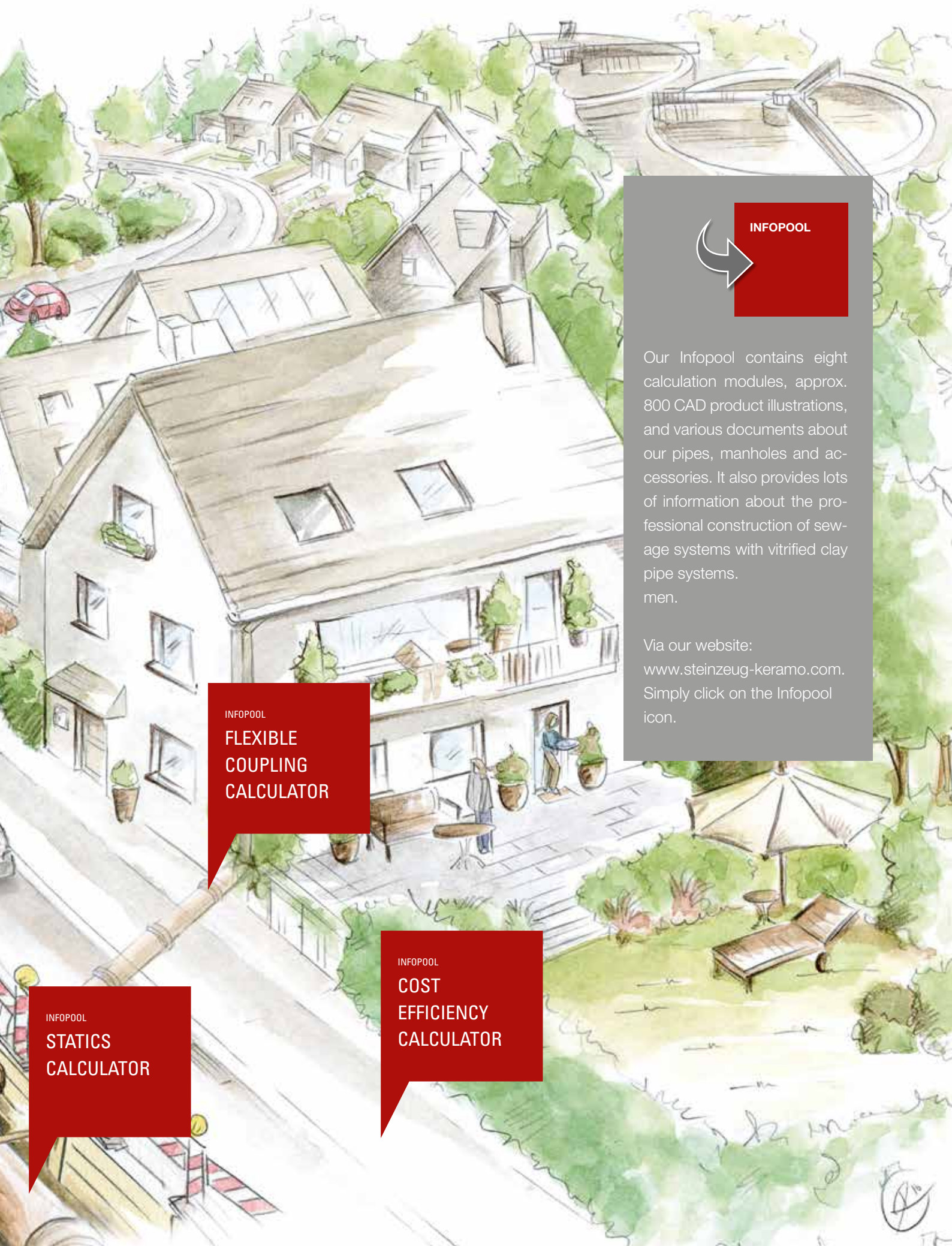
HYDRAULICS
CALCULATOR

INFOPOOL

MANHOLE AND
BUOYANCY
CALCULATORS

Applications

- New housing estate developments
- Remediation work
- House connections

**INFOPOOL**

Our Infopool contains eight calculation modules, approx. 800 CAD product illustrations, and various documents about our pipes, manholes and accessories. It also provides lots of information about the professional construction of sewage systems with vitrified clay pipe systems.

Via our website:
www.steinzeug-keramo.com.
Simply click on the Infopool icon.

INFOPOOL**FLEXIBLE
COUPLING
CALCULATOR****INFOPOOL****COST
EFFICIENCY
CALCULATOR****INFOPOOL****STATICS
CALCULATOR**

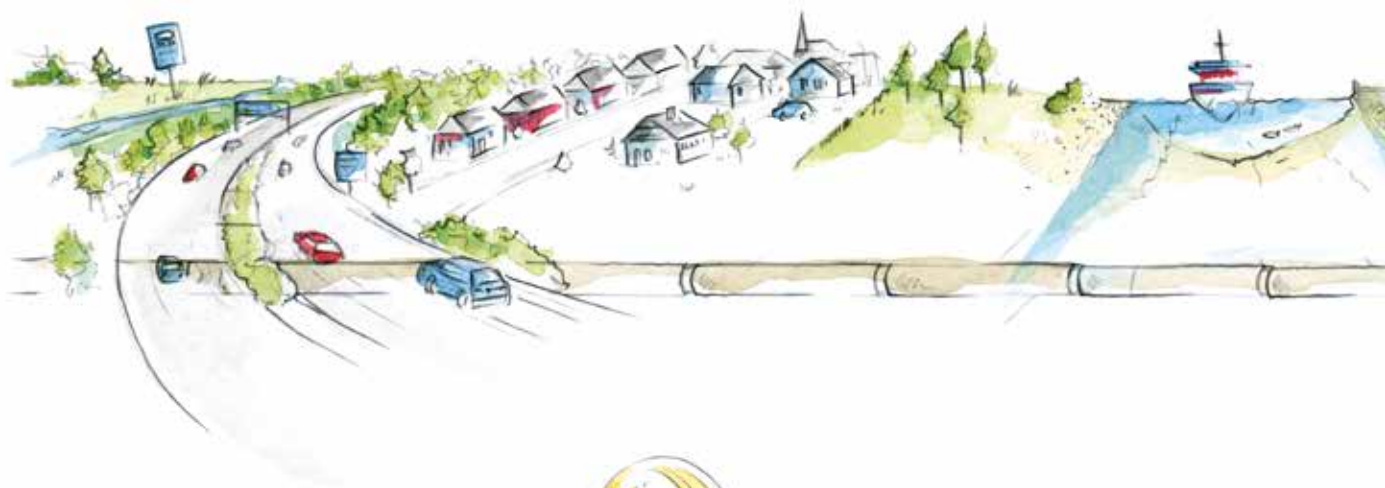
TRENCHLESS INSTALLATION

UNOBTRUSIVE, NON-INTERRUPTIVE AND LOW-IMPACT

The trenchless method offers a whole range of convincing advantages with regard to cost-efficiency and environmental and social impact. Thirty years of experience give us the benefit of the doubt.

Applications

- New housing estate developments
- Remediation work
- House connections
- Underground traversing of roads/motorways | railways | waters
- Underground traversing of heritage buildings | building complexes
- Traversing of water catchment areas



Protection of the ground surface

- Minimum intervention from above
- Environment-friendly: gentle on plant and animal life



Protection of the workers

- Very high work safety

Higher service life

- Extremely high construction quality and sewage system safety
- High jacking pipe reserves for sewage operation
- Construction method least prone to subsidence



Shorter construction times

- No specific disruption of the technical infrastructure
- Citizen-friendly: no disruption of life above ground, e.g. shopping precincts or traffic routes; no noise pollution



Groundwater protection

- Gentle on groundwater
- Construction without groundwater lowering

Positive energy balance

- Less construction and transport equipment
- Shorter transport routes
- Significant reduction of CO₂ emissions and fine dust

QUALITY

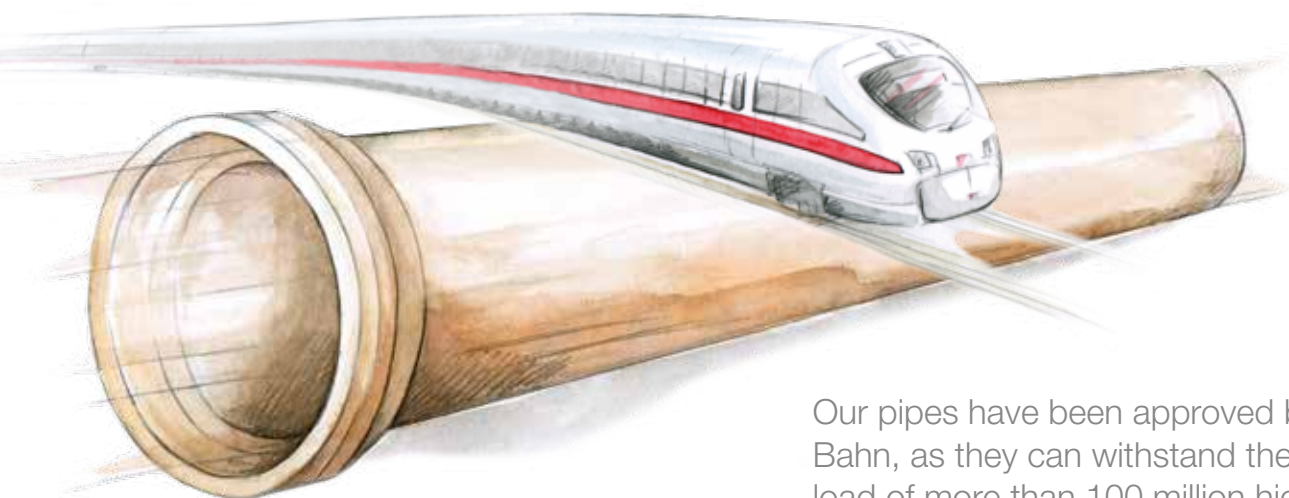
CERTIFICATES & APPROVALS



The minimum requirements are set in the product standards. On top of that, there are additional country-specific requirements of quality control and of the product itself. Together with the quality assurance for further processing in underground construction, these leave no quality gaps for the user. Proof of quality is provided by tests and measures based on the ISO 9001 quality assurance system. Additional quality control is provided by internal and third-party monitoring activities as well as individual approvals for property owners.

Quality inspection

Before a pipe leaves the factory, it is subject to extensive testing and inspection. In addition to our own tests, we also use certified quality assurance provided by internal and third-party monitoring. We have been setting standards for many years with our quality audits.



Our pipes have been approved by Deutsche Bahn, as they can withstand the traverse load of more than 100 million high-speed train axles.

CRADLE TO CRADLE®

A REVOLUTIONARY SYSTEM

A regenerative product life cycle – according to a mindset that we have been following consistently and with conviction since the onset of our pipe and fittings production. Steinzeug-Keramo has become a forerunner for a concept whose practical implementation is regularly officially certified.

Cradle to Cradle® represents a concept for regenerative product life cycles. Contrary to the contemporary “cradle to grave” pattern that begins with a product’s creation and ends with its disposal, here the constituents of one product eventually become the constituents of another. This mindset has not yet taken hold throughout the industry.

What is the fundamental difference?

The linear process becomes cyclic. In contemporary manufacturing processes, used materials typically end up in the “grave”, i.e. landfills or incineration plants. With Cradle to Cradle®, products and all their components flow as resources in infinite material cycles. Cradle to Cradle® is therefore more than simply recycling: at the outset, each material is destined to become the foundation for the next.



ENVIRONMENTAL CYCLE

RESPONSIBILITY IN PRACTICE

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

8

Recycling

Ceramics are 100% recyclable and can be returned to the production process as fireclay.

7

Operation

Sustainable operation: cost-effective due to low maintenance and repair needs and a long service life.

6

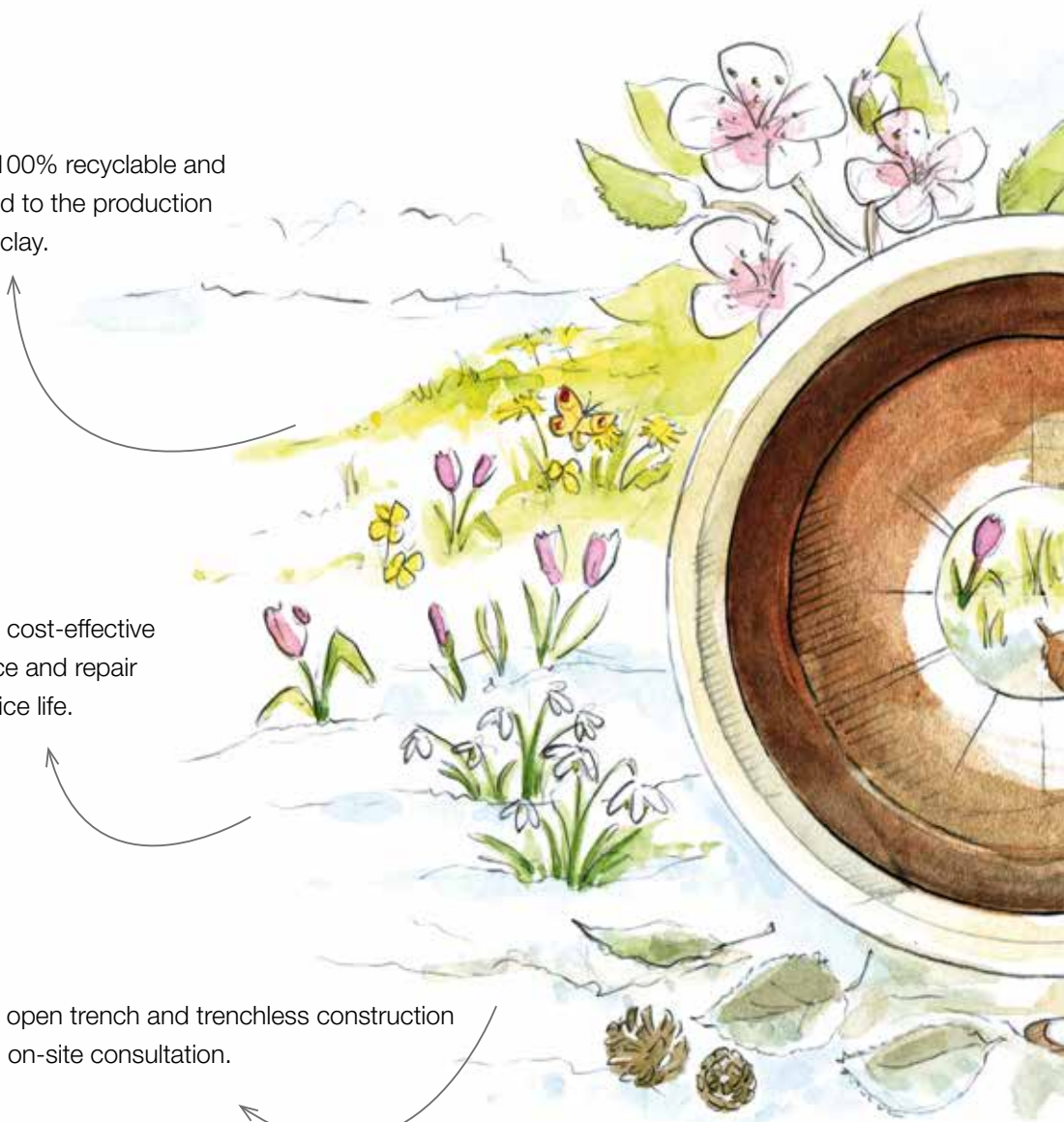
Installation

Pipe systems for open trench and trenchless construction with professional on-site consultation.

5

Logistics

Fine-tuned logistics and optimised cargo loads are more eco-effective. Flexible and fast – short routes to the retailer or directly to the building site.





1 Mining of raw materials

Local clay mining: environment friendly mining with subsequent land rehabilitation.

2 Raw material transport

Easy on resources and low CO₂ emissions: Short distances between mining and production site.

3 Raw materials

Clay, fireclay and water: 100% natural resources in exact quantities.

4 Production process

Consideration of the Cradle to Cradle® criteria at each level of the production process. Energy optimisation measures (use of biomass plants, heat exchangers, green electricity).

FROM EUROPE – FOR EUROPE WE ARE A EUROPEAN MANUFACTURER

Quality and safety

We operate in Europe for Europe. In doing so, we strengthen our region as a business location, secure regional jobs, actively protect the environment, and guarantee our customers products in reliable quality:



Material

- No part is untested. We know the exact composition, service life and environmental impact of every item. Our materials are ecologically sound.

Ceramics are 100% recyclable and can be returned to the production process as fireclay.



Water

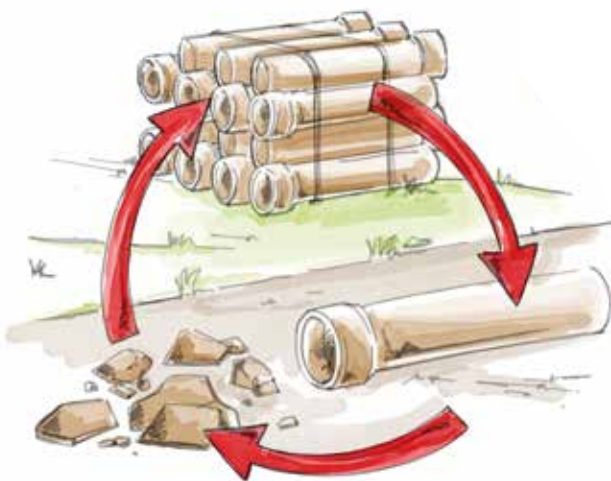
- We are committed to water stewardship and treat this resource with great care, consistently adhering to the Cradle to Cradle® principles. Our production sites are located only in water-rich areas.

As an EU manufacturer,
we are committed to
participation in the EU
ETS scheme for
CO₂ rights.



Energy

- We are constantly optimising our energy consumption. We use fast-firing technology, heat recovery via additionally installed heat exchangers, energy from a regional biogas plant, and only green power gained from up to 100% renewable energy sources – and everything is certified along the entire route.



Recycling

- All the pipes we manufacture are recyclable, but can also remain in the ground. Sustainability, in our opinion, means a perspective over centuries.



Social responsibility

- We see our employees as responsible people and we make every effort to support them in this role. Work safety, a work-life balance, skill enhancements and career planning are core policies.
- We cultivate respectful and honest interactions with our suppliers, customers, and colleagues alike.



Read our
Wienerberger Sustainability Report.

WE ARE NOT PERFECT BUT EVERY DAY WE WORK ON IMPROVING

At first sight, our products are expensive.

On average, the material costs account for less than 10% of the entire construction costs, i.e. 90% of the costs are material-independent. Also considered in the price is the enormously long [service life of up to 150 years and more](#).

Recently, some vitrified clay pipes in the North Sea needed to be replaced with larger ones. The pipes themselves, originally installed in 1895, were still fully intact. We also came across similarly old and unscathed pipes on an urban construction site. Vitrified clay products are made to last!

Overly economising on the material costs will not save much in the long run. On the contrary, it runs the risk of repeated renewals and therefore high expenditure in the future. It is important to take the service life into consideration, particularly in publicly funded projects, as one and the same construction project cannot be financed several times over.

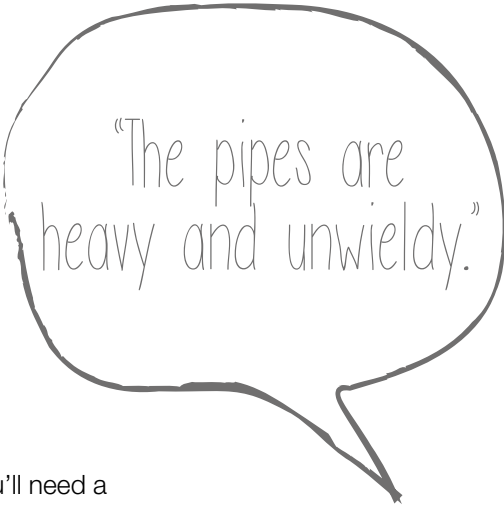


Above all, though, vitrified clay is operation-friendly.

With a [robustness of 94%](#) compared to other rigid and flexible materials used in sewer construction, vitrified clay products are in a different league in terms of robustness. More than ever before, there is a focus on material strength and wall thickness. In addition, our pipes can withstand [high-pressure water jetting up to 280 bar](#) and have an [abrasion resistance of \$am \leq 0.25 \text{ mm}\$](#) , making them extremely resilient in operation. All these facts provide for safety and long maintenance intervals.

Once properly installed, vitrified clay pipes will last longer than any other materials.






"The pipes are heavy and unwieldy."

Weight has its advantages.

Granted, the pipes are heavy. And they can't be laid manually – you'll need a digger. But diggers are standard equipment at construction sites and weight is no big deal for them.

Weight is, in fact, a major benefit for pipelines – it makes sure the pipes sit firmly in the ground. Thanks to [void compaction](#), and [backfilling and layered compaction of the embedment zone](#), the pipes remain stable in terms of both position and shape.

The building lengths are also ideal for most trench-lining systems. As installation requires a certain level of expertise, we provide support and consultation at the construction site and offer a range of time-tested trainings.



"Vitrified clay pipes have been faulty in the past."

The material is perfect. We are improving the system.

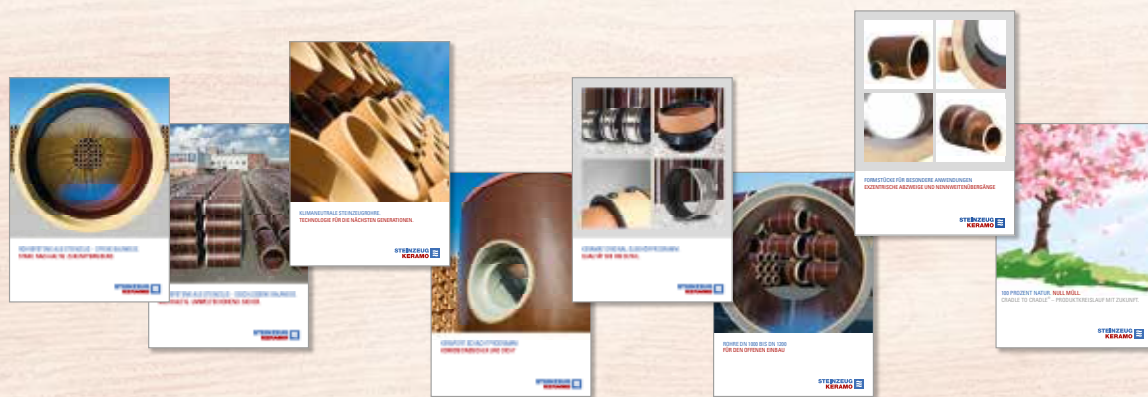
Faults in the past have been the result of improper installation and material fatigue of the seals used at the time. That's why we are determined to keep on improving the system and why customers appreciate our active support during pipe installation.

Today we produce [integrated seals](#) and provide [longer elements](#) of up to 250 cm, to reduce the number of intersections. [Different load-bearing](#) capacities also ensure a maximum level of safety during installation and operation.



All brochures can be
downloaded here: :

www.steinzeug-keramo.com



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