KÖSTER

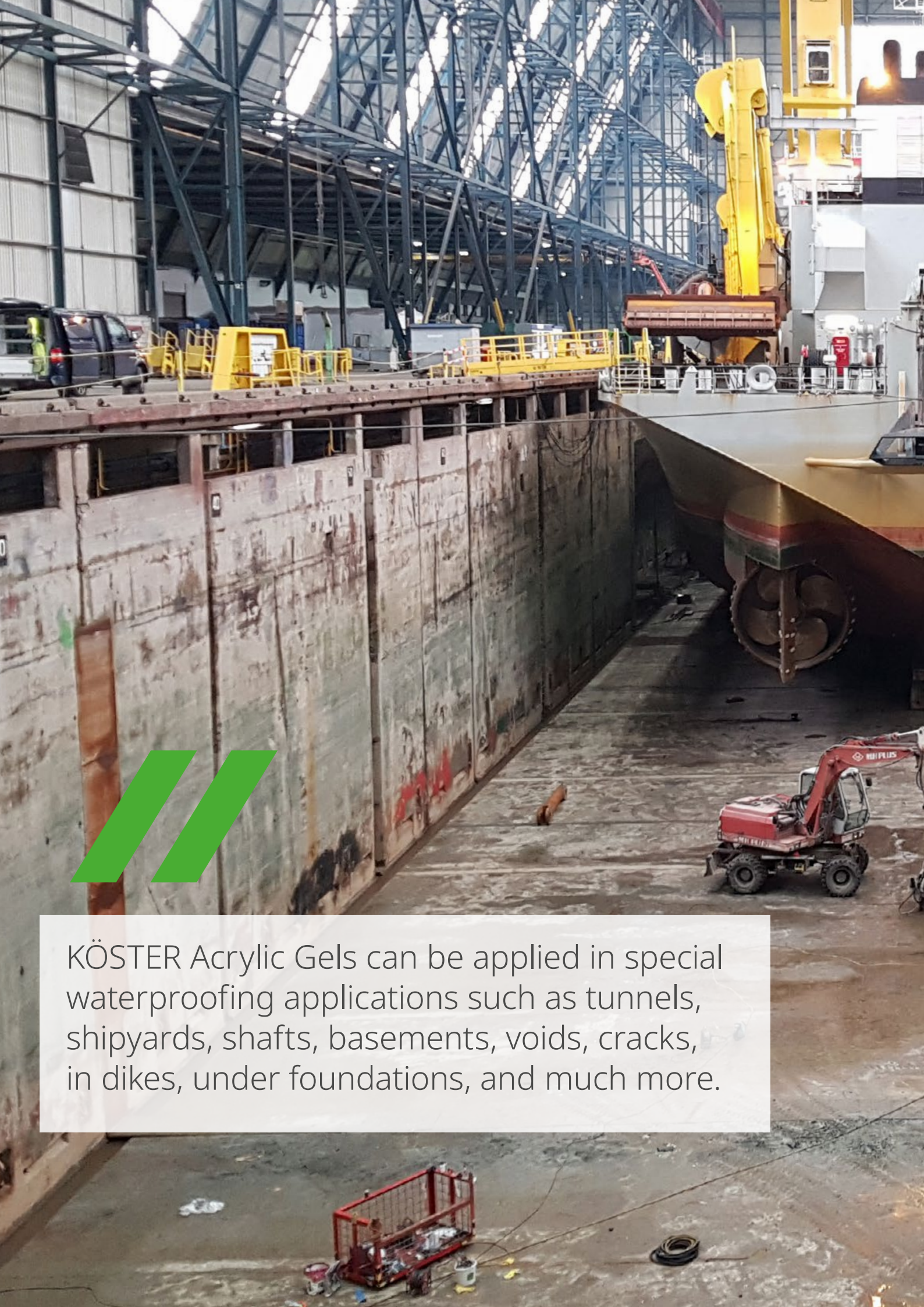
Waterproofing Systems

KÖSTER Acrylic Injection Gels

Fast, precise waterproofing technology for the most difficult cases

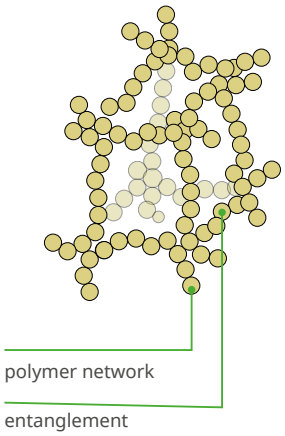
Extremely low viscosity enabling deeper and further penetration

Broad range of applications such as joint waterproofing, curtain, masonry, concrete, and soil injections



KÖSTER Acrylic Gels can be applied in special waterproofing applications such as tunnels, shipyards, shafts, basements, voids, cracks, in dikes, under foundations, and much more.

What are gels?



Per definition, a gel is a non-fluid colloidal network or polymer network that is expanded by a fluid in its entire volume. Typical rheological characteristics of gels are that they have a reversible water intake and evaporation capability, they break with sharp edges and comprise a visco-elastic body.

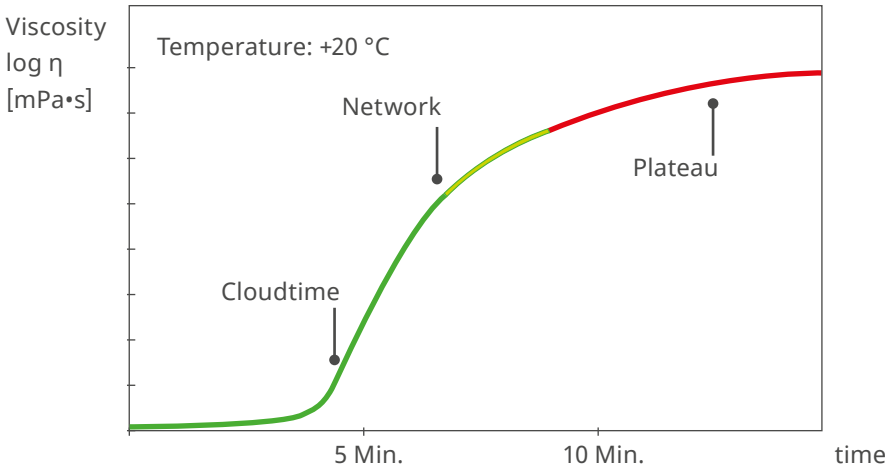
Acrylic gels are typically used for building waterproofing through curtain, masonry, and void injection. Gels used for building waterproofing are characterized, even in the fully reacted state, by having considerable amounts of water, which are physically bound in the polymer network. The binding is sufficient that the water cannot be driven out even by high pressure.

KÖSTER Acrylic gels distinguished themselves among other injection materials due to their intrinsic characteristics and their unique advantages in specific fields of applications.

The right choice with KÖSTER Acrylic Gels

The material

KÖSTER injection gels provide a superior penetration and distribution due to the lowest viscosity among injection materials and multiple step injection is easily managed due to its “S”-form reaction profile. Through this reaction profile a multiple step injection is easily manageable, resulting in a more reliable and even distribution of the material.



Numerous test studies proved the effectiveness and performance of the KÖSTER gels. Such tests certify the material for use in drinking and groundwater environments, reinforced concrete, against high water pressure (up to 7 bar), and even under salt water contact, among others.

You can choose from KÖSTER Injection Gel G4 and KÖSTER Injection Gel S4 (with the B+ component as required). While KÖSTER Injection Gel G4 is primarily used for curtain and masonry injection, KÖSTER Injection Gel S4 mixed with KÖSTER B+ is most commonly used in sealing expansion joints due to its high flank adhesion.

KÖSTER Injection Gel G4

KÖSTER Injection Gel G4 is a water-based elastic hardening acrylic gel with an extremely low initial viscosity of only 2 mPa•s. With an almost water-like consistency, the material can be injected into the finest pores within a structure.

Technical Data	
Solubility	Water soluble
Mixed Viscosity	2 mPa•s / + 20 °C
Application Temperature	> +5 °C
Reaction Start (+20 °C) after approx.	3 Minutes
Network-building time (+20 °C) after approx.	5 Minutes
Final Curing (+20 °C) after approx.	8 Minutes

KÖSTER Injection Gel G4 is recommended for waterproofing below-ground construction elements on the outside through curtain injection, and for injection into full brick masonry in order to waterproof the mortar joints against water ingress.

This KÖSTER acrylic gel can also be applied in specialized waterproofing cases, such as tunnels, shipyards, shafts, voids, joints, and concrete injection, as well as for soil stabilization in dikes and under foundations.

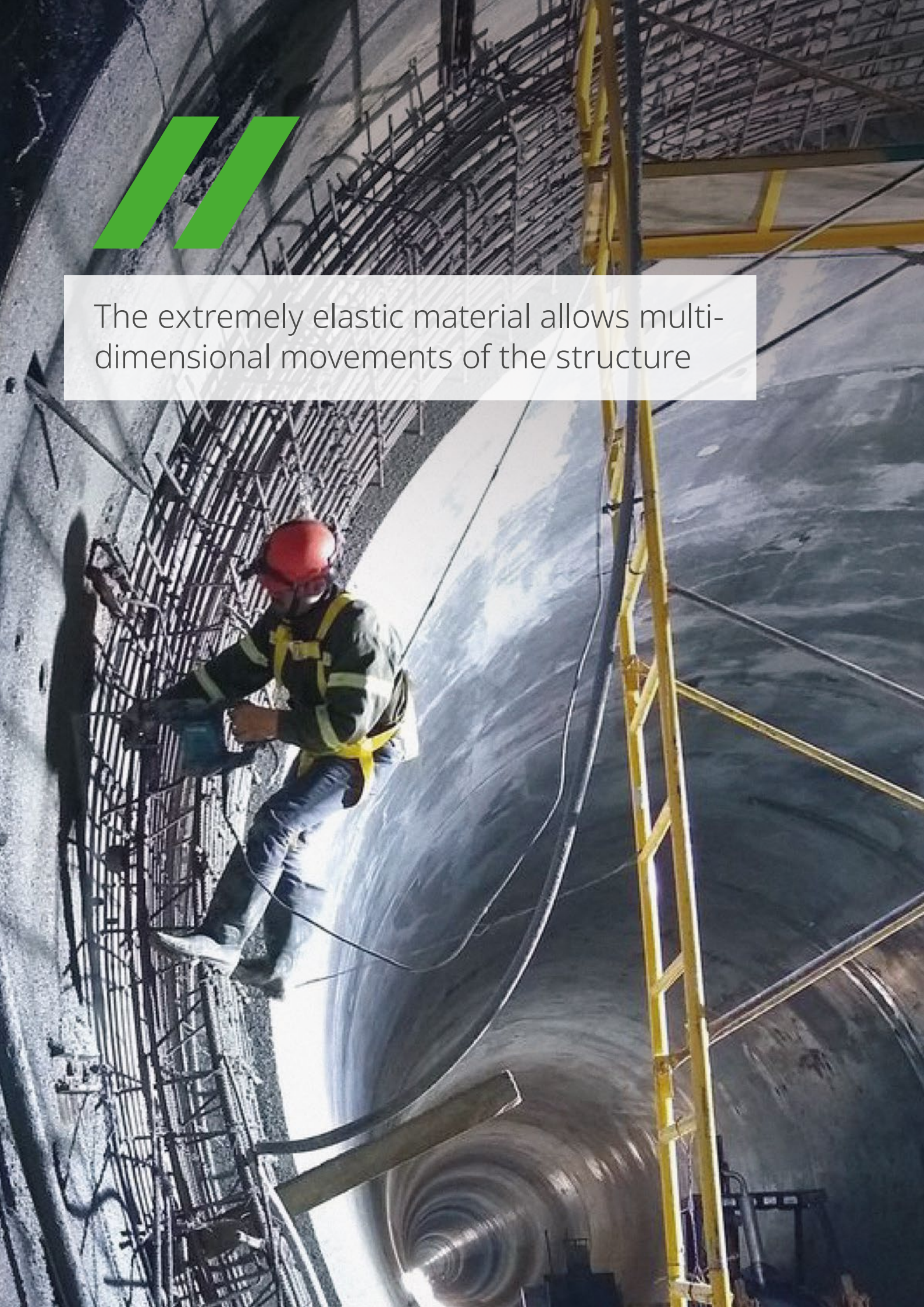
Certificates

- DIBt (German Institute for building technology) - general Test Certificate abZ
- Hygienic institute Gelsenkirchen: Drinking water certification according to the coating guideline of the German Federal Environmental Agency
- MFPA Leipzig: Test report for non-toxic ground water interaction
- MFPA Leipzig: Test report „Determining identifying characteristics of an acrylic based injection gel“
- MFPA Leipzig: Test report „Determining the flammability (Fire Class B2) according to DIN 4102-1
- RWTH Aachen (ibac); corrosion testing of steel reinforcement in contact with an acrylic gel
- Institute IMS RD, Belgrade: Test report Leak test for Gel body up to 7 bar
- IGH Institute Gradivine Hrvatska (Institute of Construction Technology Croatia); Resistance to salt water storage
- CE - EN 1504-5:2004 Concrete injection for the elastic filing of cracks, voids, and defects

KÖSTER Injection Gel S4

KÖSTER Injection Gel S4 is a reaction time adjustable acrylic gel used for stopping active water ingress, curtain injection and quickly waterproofing joints. The setting time can be adjusted between 20 seconds and 3 minutes, depending on the waterproofing needs.

By adding the organic dispersion KÖSTER B+ to the B component, the gel can achieve a particularly high flank adhesion to mineral substrates, enhanced elasticity, and a reduced evaporation rate.



The extremely elastic material allows multi-dimensional movements of the structure

The equipment

The KÖSTER Acrylic Gel Pump is a stainless-steel pneumatic pump for the application of the KÖSTER Injection Gel G4 and KÖSTER Injection Gel S4.

With the KÖSTER Acrylic Gel Pump operation under adverse conditions is possible and maintenance on the job site is kept to a minimum due to its electronic-free pneumatic system.

Product name:	**KÖSTER Acrylic Gel Pump**
Technical Data	
Working pressure	15 – 220 bar
Transmission ratio	1 : 25
Maximum input pressure	8 bar
Material hose length	10 - 50 m
Max. pump output	11 l / min
Delivery volume per double stroke (pistol cycle)	Approx. 85 ml
Mixing/output ratio A : B	1 : 1
Weight	approx. 45 kg
Cleaning the pump	with water only
Compressor requirements	
Optimal air output:	450 l / min
Minimum air output for curtain injection	300 l / min
Minimum air output for Masonry injection	250 l / min

Experience & Technique

The KÖSTER BAUCHEMIE AG specializes in the development and production of high-quality waterproofing products and systems accumulating over 40 years of experience, in solving the most difficult situations around the world by implementing state-of-the-art waterproofing technology and techniques.

The mixture of KÖSTER Injection Gel S4 with KÖSTER B+ achieves higher elasticity and flank adhesion as well as improved drying resistance.

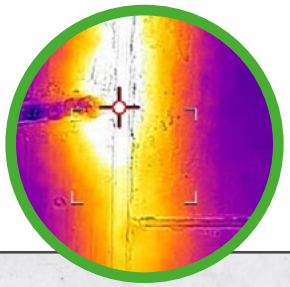
Advantages of KÖSTER Acrylic Gels

Extremely low viscosity:
The KÖSTER Injection Gel G4 with its low initial viscosity of 2 mPa·s allows for the deepest penetration into the injected body (ie. sand, silt, and even some clays). The lower the viscosity, the more pores will be filled.

Environmentally friendly:
With the KÖSTER Injection Gel G4, there is no washing out of substances from the gel harmful to the ground or drinking water, guaranteeing a safe injection into the soil when conducting for example a curtain injection.

Differentiated reaction profile:
The transition between liquid and solid state displaying an "S"-form reaction profile allows for the best results through a multiple step injection process.

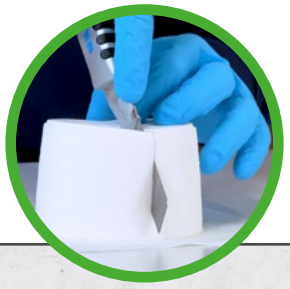
Safe application regarding chemical hazards:
Compared to other injection materials, the material composition contributes to a safer working environment.



Exothermic reaction:
The heat generated during the reaction process provides valuable information about the material distribution during the injection. This can can be made visible with a thermal imaging camera.

Reliable pneumatic machine technique:
With the pneumatic KÖSTER Acrylic Gel Pump, maintenance is kept simple and work under adverse weather conditions is possible due to the lack of electronic components.

Does not promote rebar corrosion:
Fully cured KÖSTER Injection Gel G4 does not interact or promotes corrosion of the reinforcement in concrete.



Does not react with water:
Acrylic gels are the only injection material that takes up water within its structure but does not react with it. It only binds it.

Stainless drying:
Cured material can be easily removed with simple tools without leaving discoloration of the substrate.

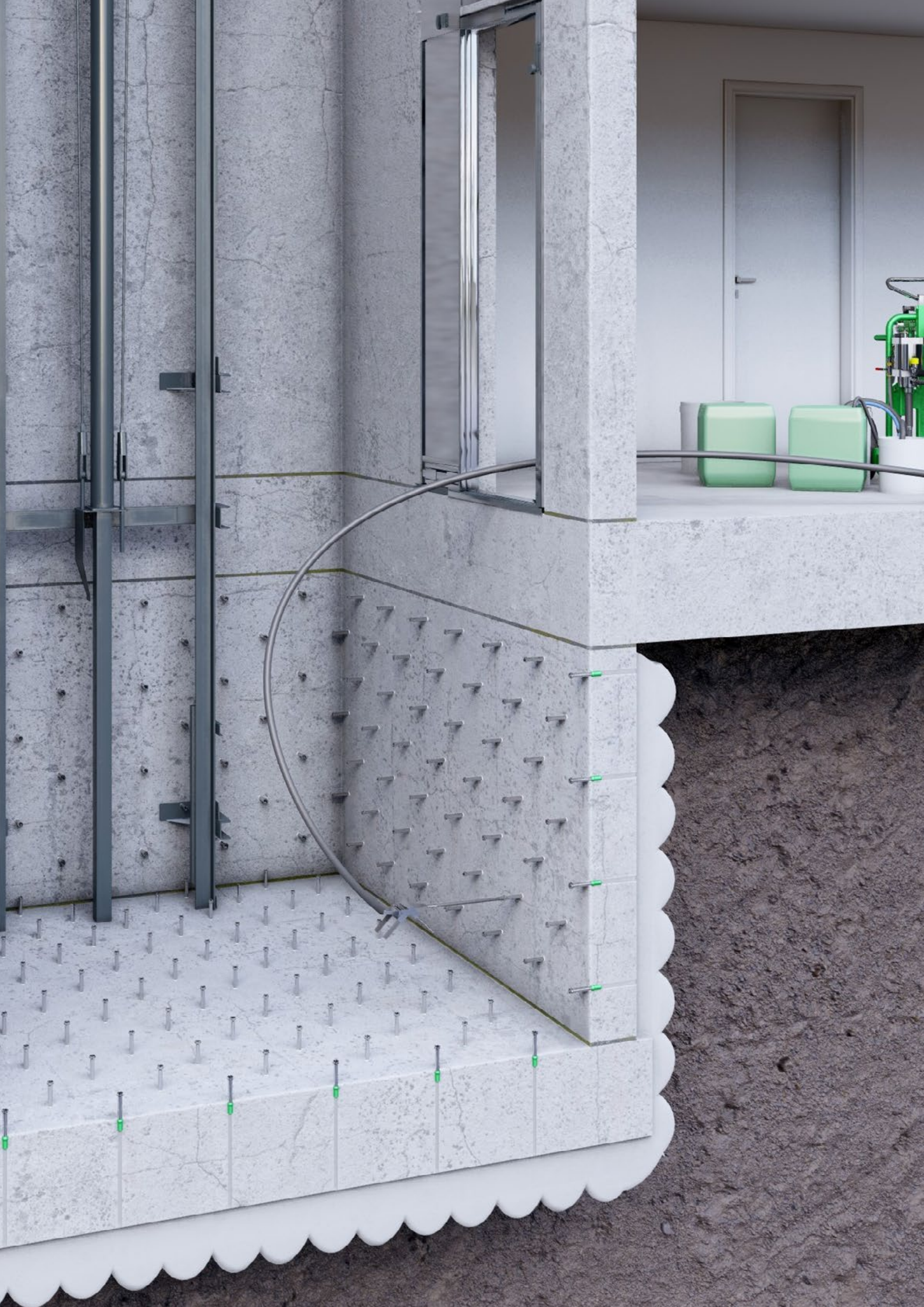
KÖSTER Injection Gels are suitable for sealing against pressurized water as well as for filling cavities and solidifying them.

Curtain injection

Exterior basement waterproofing from inside the building? In the case of renovation, it is not always possible to expose the exterior walls through excavation. An example of this is when the area to be excavated is built upon, or is not accessible such as in tunnels, underground parking garages, elevator shafts and concrete base slabs, or when the economic cost of excavation is deemed too high.

In these cases, a curtain injection with KÖSTER Injection Gel G4 is possible: The gel is injected through the wall from the inside to the outside. The reaction profile of the KÖSTER Acrylic gels is used to its full capacity through a multiple step injection. With each injection step, hemispherical areas of waterproofed material are created on the positive (outer) side of the wall. These areas overlap each other and build the elastic solid barrier which impedes the groundwater from reaching the structure. The injection is carried out with the special two-component KÖSTER Acrylic Gel Pump, using special packers placed in a specific pattern in the structure.

Taking advantage of the low viscosity of the gel, injection into difficult soil conditions such as fine sand, silt, and some clays is possible. Water present behind the wall does not represent a challenge for the KÖSTER injection gels since they do not react with it, but instead it is bound within its matrix.



Joint and void injection

KÖSTER Injection Gel S4 with the KÖSTER B+ component is a specially developed gel for elastically sealing joints with high flank adhesion, improved elasticity, and reduced drying tendency in contact with moving air such as wind.

The injection of joints provides a relatively quick and minimally invasive method of repairing failing waterproofing systems while avoiding the costly excavation of underground structures. In addition, because a small number of packers is sufficient in most cases, drilling is reduced, saving time and money.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Initial viscosity similar to water enables a deep penetration into the building structure.

Masonry injection

Vertical masonry injection (also known as area injection) is a standard method for the subsequent waterproofing of brick building elements in which excavation is neither economical nor possible, or when the architectural appearance requirements are decisive.

Boreholes are drilled in a grid horizontally and vertically with every second-row offset and the KÖSTER Superpackers are inserted into the drill holes. In most cases, it is necessary to install an injection barrier, for example with KÖSTER Injection Barrier, to prevent the loss of injection material due to uncontrolled outflow.

The KÖSTER Injection Gel G4 is injected in multiple steps until pressure resistance is achieved. The pores in the substrates are filled with gel and the wall becomes impervious to water.


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Soil stabilization

Changes in groundwater levels or the presence of water currents within the soil structure can wash out the fine grains, creating voids in the soil. These voids can reduce the integrity of the soil structure until it collapses. Evidence of this phenomenon is usually seen in the settlement of structures or, in the worst cases, the formation of cavities or hollow chambers in the ground.

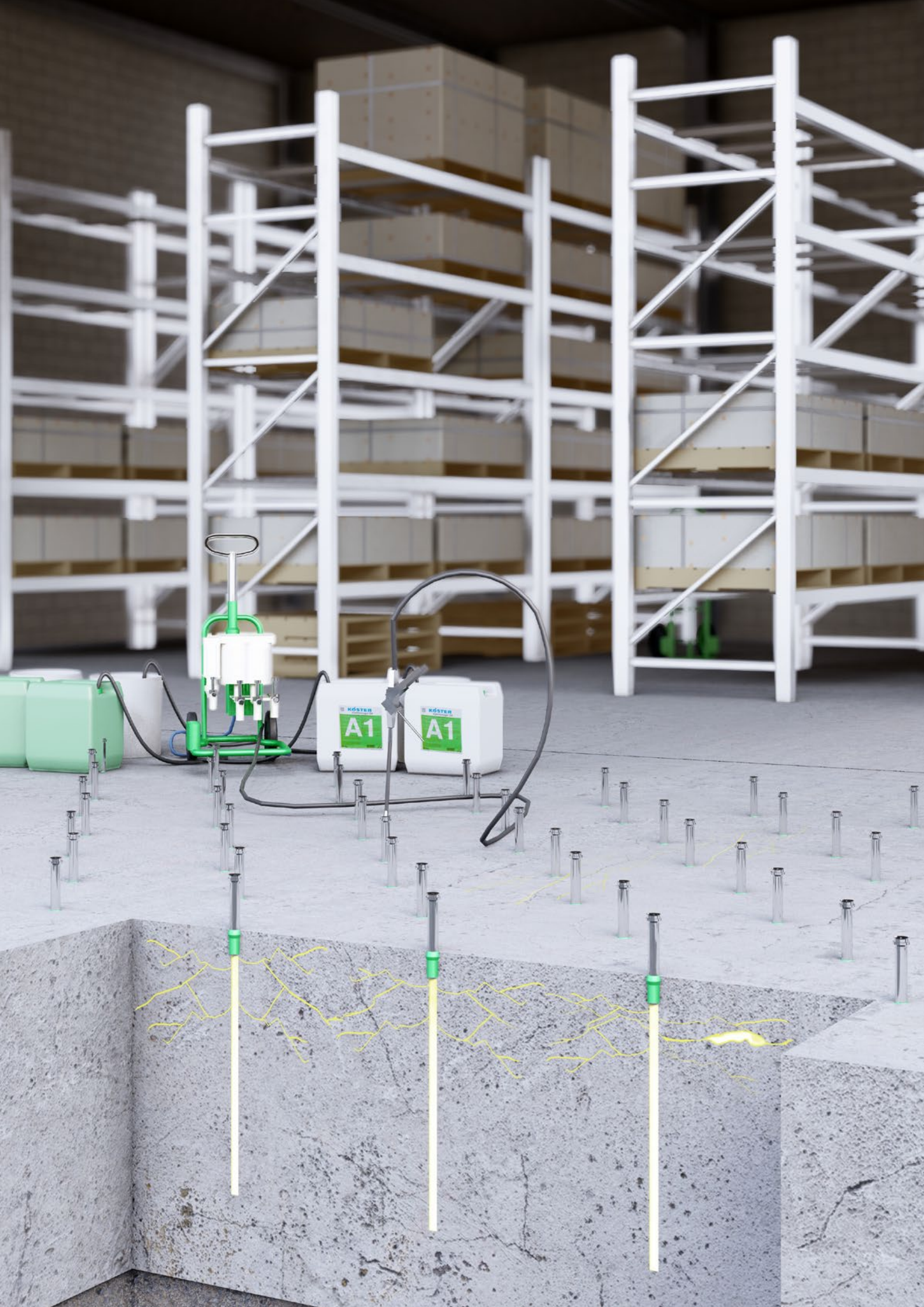
Soil stabilization is carried out by injecting KÖSTER Injection Gel G4 through special injection lances, which are placed in a specific pattern according to the characteristics of the project. The extremely low viscosity of the gel allows deep penetration and distribution of the material between the grain matrix, binding the soil and water into an elastic gel-soil body. The result is a more stable, bonded, waterproof soil composition with a reduced risk of fine particles leaching out.

All applications require specific planning and must be individually considered to determine the most appropriate process. The effect of soil stabilization must be tested and measured on a case-by-case basis.

Elegant and minimally invasive solution with reference cases worldwide

Concrete injection

The low viscosity of the material and the safe curing without affecting the steel reinforcement make concrete injection a special field of application for KÖSTER Injection Gels. Old concrete, which has lost its integrity due to external factors, or bad concrete due to poor vibration or segregation, can be injected with KÖSTER Injection Gels. Cracks in the concrete as well as water transporting pores are closed, preventing water ingress and further damage to the structure.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Packers

KÖSTER Superpacker

The KÖSTER Superpacker is particularly suitable for pressure injection.

The KÖSTER Superpacker provides a very high contact pressure to the borehole of the tightening mechanism. Four fins and two ridges on the rubber gasket prevent rotation during tightening and facilitate the optimal fixation of the packer in the borehole. It has a firmly mounted cone-head fitting for pressure injection.

KÖSTER Gel Packer

The KÖSTER Gel Packer is an impact packer for gel injection composed of a base, an extension, and an end piece with pan-head fitting and non-return valve. The base and end piece have connection threads for assembling the extension pipe. The patented end piece has four sideways facing outlets for curtain injection (German patent 599 10 808.8, European patent No. 0 980 935).

Soil Injection Lances

These special injection laces are inserted into the ground and injected with KÖSTER Injection Gel G4 to stabilize the soil. They are available from specific suppliers depending on the length required.

KÖSTER Packer

The KÖSTER Packer is particularly suitable for pressure injection works.
The arrangement of the split packer grommets results in excellent contact pressure to the borehole. The surface of the clamping grommet easily seals the borehole, adapts to the borehole wall and thus increases its tightness. It has a firmly mounted cone-head fitting for pressure injection.

The choice of the packers or injection ports play an important role in the injection process. Parameters such as field of application, injection pressure, substrate type, pumping equipment, etc. must be considered when selecting the right packer.

Associated products

KÖSTER KB-Fix 5

Waterproof, weatherproof, fast curing mortar with high compressive strength (sets after approx. 5 minutes) for fast installations as well as for small repairs of masonry and concrete. Free of soda and chlorides.

KÖSTER KD 2 Blitz Powder

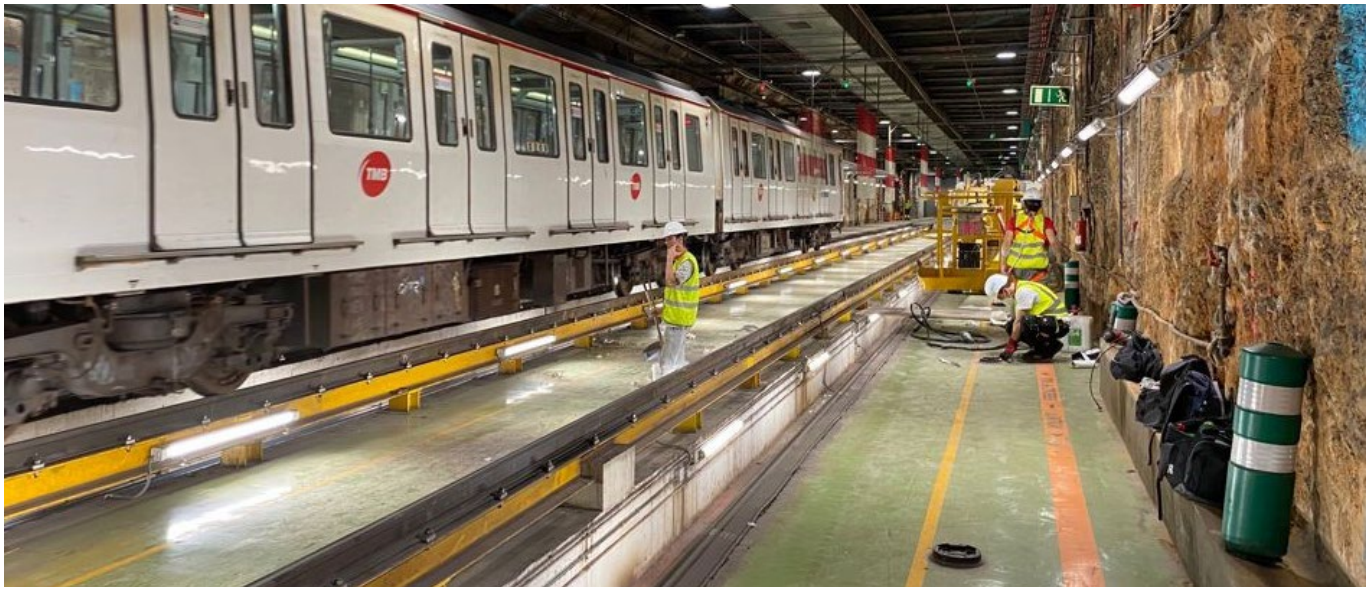
Highly reactive powder with an extremely short setting time. Active leaks can be stopped within a few seconds simply by using the dry powder. Used in combination with KÖSTER KD 1 Base and KÖSTER KD 3 Sealer for the negative side waterproofing of mineral surfaces such as for internal basement waterproofing. The KÖSTER KD System stops flowing water and forms a permanent waterproofing layer on masonry and concrete.

KÖSTER Waterstop

Fast setting, slightly expanding plug and repair mortar. A strong-bond between the existing substrate and the mortar is achieved. Suitable to permanently plug active water leaks.

KÖSTER Injection Barrier

Mortar for a full area injection barrier when injecting KÖSTER Injection Gel G4. Mixed with KÖSTER Mortar Boost.



We are there for you – worldwide.

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