



**SPESAN**<sup>®</sup>

**Injection systems  
for sealing and  
consolidation.**

**With DIBt-  
Certification!**



# ABOUT US

**SPESAN Handels-GmbH** is an internationally active company that offers a complete injection system based on high-quality injection materials and customised processing technology.

Our injection system has been used successfully for over 20 years on countless construction sites to seal, consolidate and anchor in the most diverse areas of application, from ground engineering to structural engineering.

We are happy to offer our support for complicated tasks through our competent consultation and can also train your staff in injection technology. If that is not required, we can also recommend a qualified subcontractor.

**SPESAN Handels-GmbH** was founded on December 1, 1995. It is currently headquartered in Linz (Austria). We coordinate all construction sites from that location and supply the sites from the nearest distribution centre. This concentration of our sales system enables us to guarantee the shortest delivery times.



Peter Binder  
Managing Partner

Studied municipal civil engineering in Weimar; specialist in injection resins since 1990

# GROUND ENGINEERING

Ground engineering, particularly in urban sites, has become increasingly important, since groundwater-related subsidence is often not permitted. Geological inhomogeneities, errors in design or unknown residual foundations can lead to defects during the installation of excavation pit enclosures of all types.



Leaking connection between the sheet pile wall and slurry wall

The **SPESAN WV - SPESAN B** injection resins can seal defects very successfully, even at high water pressures and with large quantities of water, without the water mixing with the resin. In the process, the injection resins reinforce the weak points and provide a durable seal.



Leaking shotcrete shell during the drilling of a shaft



Plating and sealing a high-pressure soil cementation

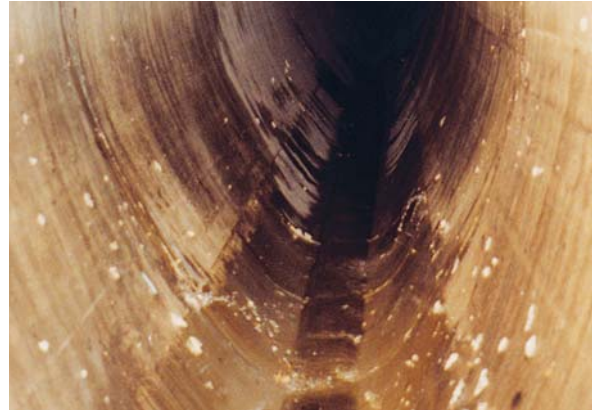
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Leaking anchor head

# CANAL REHABILITATION

Canal rehabilitation contributes significantly to the conservation of our sewage systems and the protection of the environment. This is particularly true in cities, where excavation work is rarely possible. Damage to shafts and accessible tunnels can be repaired without excavation. The inflow of groundwater places a burden on sewage treatment plants and reduces their efficiency. In addition, the performance of the canal system is restricted.



Shaft sealing before (left) and after (right) the injection



Sealing of infiltrations in the walkable sewer tunnel

With a simple injection, **SPESAN WS – SPESAN B** injection resin systems seal infiltrations permanently without groundwater drainage.



Sealing a coupling in the walkable tunnel

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Leaky pipe coupling before injection

# STRUCTURAL ENGINEERING

Structural engineering offers countless potential applications for injections. SPESAN injection resins can be injected into masonry as well as concrete. Application possibilities include the sealing and strengthening of masonry of different materials, crack injection, construction joint sealing, the sealing and consolidation of porous concrete and the binding of expansion joint tape. It is injected through drill packers and injection hoses.



Water penetration through the wall



Crack injection

The low viscosity and slow-reaction **SPESAN WL – SPESAN B** is most commonly used. Despite its high compressive and flexural strength, the injection resin can absorb deformations in a certain tolerance zone without failing.



Improving the load capacity of an arch

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Masonry stabilization

# HYDRO ENGINEERING

Hydro engineering offers diverse structures which are generally meant to separate different water levels. Examples for the sealing of hydraulic structures include ship locks, which need to be drained during their restoration, and dams that have leaking inspection walkways, extraction towers, bottom outlets or grout curtains. Using two-component pumps enables the extension of hose sections and injections by divers at great depths.



Leaky joint in the inspection walkway



Leaky concrete in the inspection walkway



Joint after sealing

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Leaky joint in a fish ladder

# UNDERGROUND PIPE JACKING

Underground pipe jacking can cause water ingress through the ring gap in the area of the start and end pit. Targeted injections with **SPESAN WS - SPESAN B** can seal these permanently. The injection is possible either in the flooded state or against the current of flowing water. If, when using an open-end cutting shoe, unstable ground leads to a failure in the working face, this can be stabilised with foaming **SPESAN WN - SPESAN B**.



Leaky ring gap before injection



Ring gap after injection



Advance consolidation of loose gravels

< Water leak into the start pit

# TUNNELLING

There are two basic areas of application for SPESAN injection resins in tunnel construction:

1. The sealing of water ingresses and the stabilisation of unstable rock masses (fault zones) in the tunnels with **SPESAN WS- SPESAN B** or **SPESAN WV - SPESAN B**.
2. The permanent sealing of cracks, gravel cavities and construction joints in the tunnel inner shell with the slow-reacting **SPESAN WL- SPESAN B**. Both injection packers and injection hoses can be used for injection.



Injection against water under pressure during the curtain injection



Leaking tunnel inner shell

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Sealing joints



# THE INJECTION RESIN SYSTEMS

The bases for the injection resin are polyurethanes, which consist of two components. One of the components is called **SPESAN-B** and is used in all SPESAN injection resin systems. The extensive reaction characteristics result from different A-components, which can be processed at the construction site without prior mixing.

The liquid components are packaged in 20 litre disposable cans.

Our injection resins have the following special properties:

- Excellent adhesive properties, even on wet surfaces
- Very high strength (e.g. up to 60 N/mm<sup>2</sup> compressive and flexural strength in unfoamed resin)
- Exceptional penetration into the smallest cracks and fissures through the low viscosity and self-injection (volume increase via foaming)
- High reliability of the products: in the event of an overload of the resin body, deformation reduces the stress and the force-fitted adhesion remains
- Very environmentally friendly: free of CFCs, halogen and solvents.  
**SPESAN was the first to obtain approval for polyurethane systems for environmental protection (injection grouting) from the German Institute for Construction Technology (Deutschen Institut für Bautechnik, DIBt)**
- High degree of chemical resistance
- Exceptional penetration, even when the structure is 100% watersaturated
- Foamed resin does not shrink
- Lasting injection success with over 20 years of experience
- Very high application certainty due to the volume-dependent mixing ratio of 1:1
- Not a hazardous substance



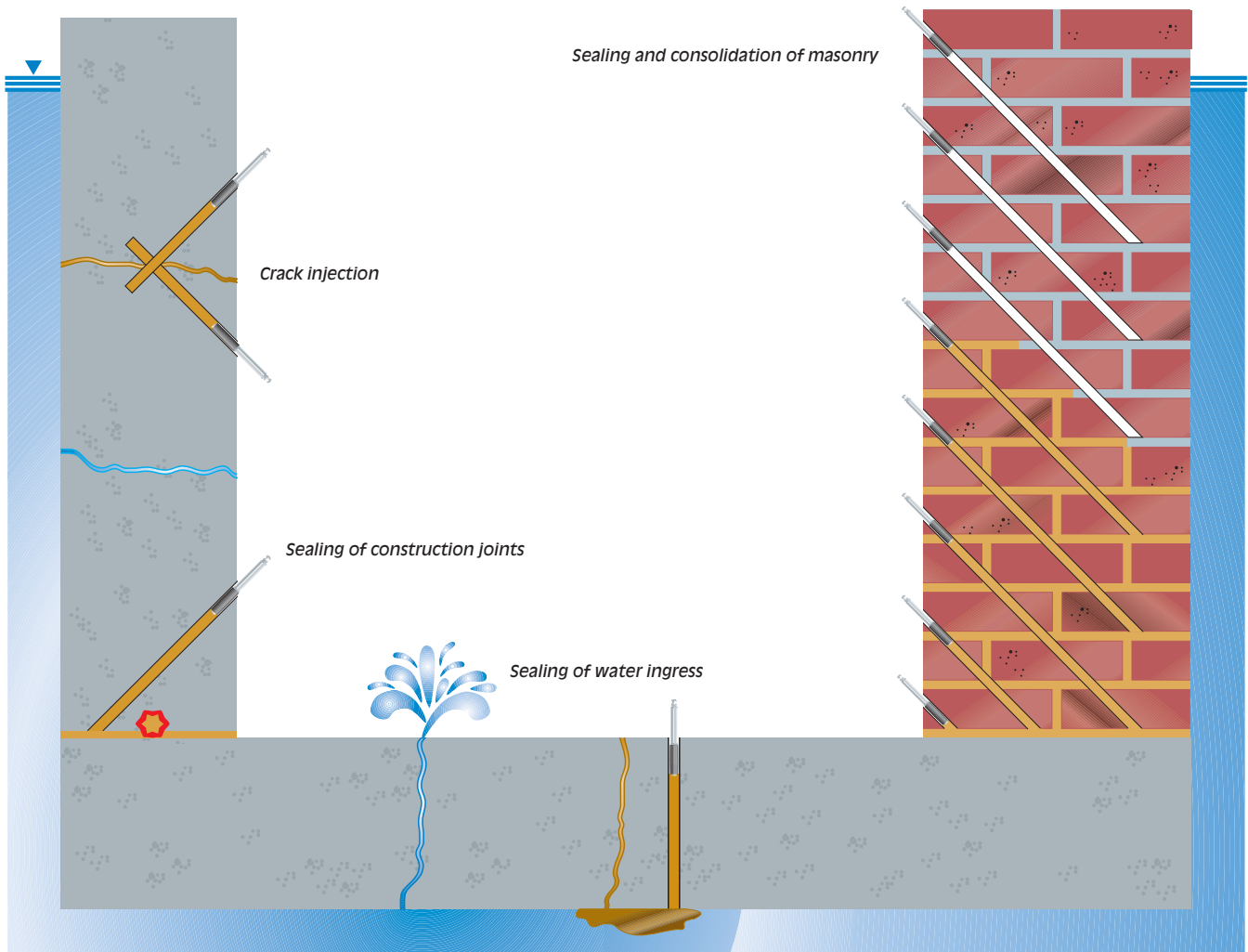
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Specimen for the study of environmental impact

# INJECTION RESINS AND THEIR APPLICATIONS

Injection systems	Reaction characteristics	Example applications
<p><b>SPESAN WL – SPESAN B</b></p> <p>For the permanent sealing of moisture penetration and very slowly running water with simultaneous consolidation</p>	<p><b>Setting time: 1 hour at 20° C</b></p> <ul style="list-style-type: none"> <li>• Low viscosity after mixing</li> <li>• Solid hardening without water contact</li> <li>• Foamed hardening with water contact</li> </ul>	<ul style="list-style-type: none"> <li>• Sealing and consolidation of masonry and porous concrete</li> <li>• Injection with injection hoses</li> <li>• Crack injection</li> <li>• Sealing of structural joints</li> <li>• Sealing of joint tape binding</li> </ul>
<p><b>SPESAN WN – SPESAN B</b></p> <p>For the permanent sealing of running water under pressure with simultaneous consolidation</p>	<p><b>Setting time: 55-75s at 25° C</b></p> <ul style="list-style-type: none"> <li>• Low viscosity after mixing</li> <li>• Solid hardening without water contact</li> <li>• Foamed hardening with water contact</li> </ul>	<ul style="list-style-type: none"> <li>• Sealing of water penetration in construction pits</li> <li>• Sealing of leaking anchor heads</li> <li>• Sealing of underwater concrete slabs</li> <li>• Sealing of canals and shafts</li> <li>• Sealing and consolidation of fixed and loose rock in tunnel construction, mining and the underground pipe jacking</li> </ul>
<p><b>SPESAN WS – SPESAN B</b></p> <p>For permanent sealing of heavy water flow under pressure with simultaneous consolidation</p>	<p><b>Setting time: 38-57s at 25° C</b></p> <ul style="list-style-type: none"> <li>• Low viscosity after mixing</li> <li>• Solid hardening without water contact</li> <li>• Foamed hardening with water contact</li> </ul>	<ul style="list-style-type: none"> <li>• Sealing of hydraulic structures</li> <li>• Rapid reinforcement of fissured rock in tunnel excavation</li> <li>• Rapid reinforcement of loose rock when there is a risk of landslides or during clean-up after landslides</li> </ul>
<p><b>SPESAN WV – SPESAN B</b></p> <p>For the permanent sealing of very heavy water flow under pressure with simultaneous consolidation</p>	<p><b>Setting time: 40-60s at 25° C</b></p> <ul style="list-style-type: none"> <li>• Extreme reduction in the response time to approx. 5-10s by adding SPESAN-CAT+.</li> <li>• High viscosity after mixing</li> <li>• Solid hardening without water contact</li> <li>• Solid to lightly foamed hardening with water contact</li> </ul>	<ul style="list-style-type: none"> <li>• Consolidation of foundations</li> </ul>

# INJECTION RESINS AND THEIR APPLICATION

SPESAN injection resins can be injected directly into the structure as well as behind it. We recommend penetration injection when the material is dry, wet or saturated with water flowing at low speed. If you are dealing with a leak, however, the resin must be injected behind the structure.



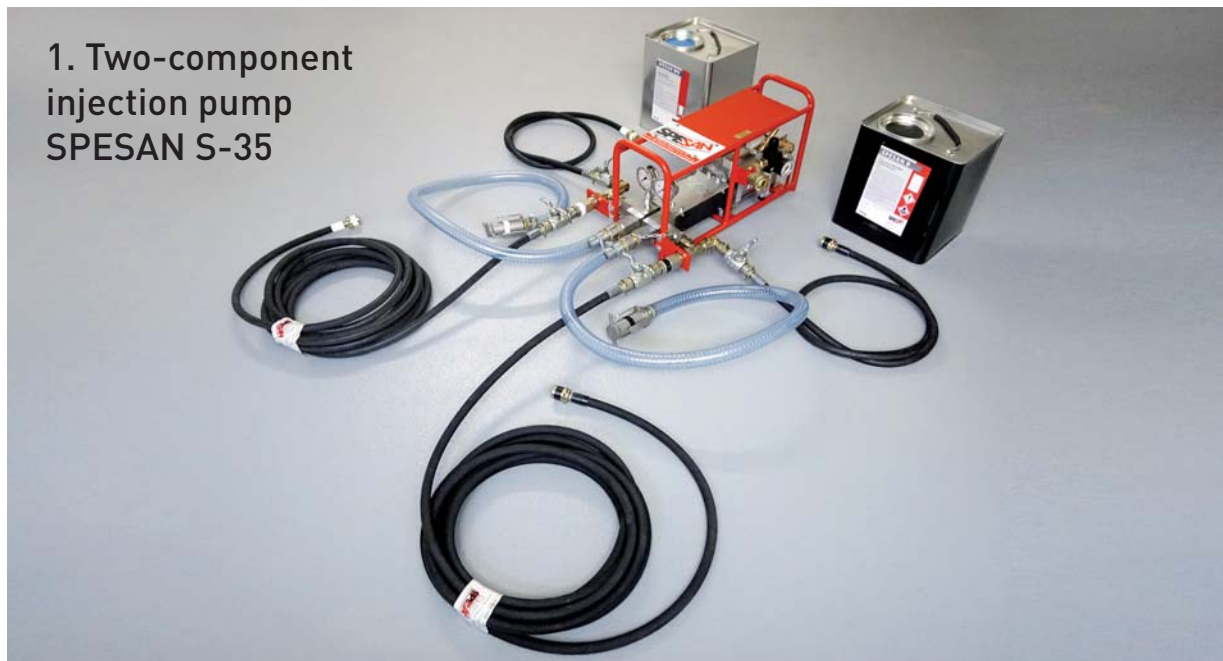
Injection diagram

Our injection resins are generally processed in a volume-related mixing ratio of 1:1. To do so, we recommend SPESAN Handels-GmbH's two-component injection equipment – which is also available for rent – since it is especially tailored to the injection resins.

Two different pumps are available. (see Page 12)  
Both units are equipped with a pneumatic engine.  
The differential pressure and flow rate are adjustable.

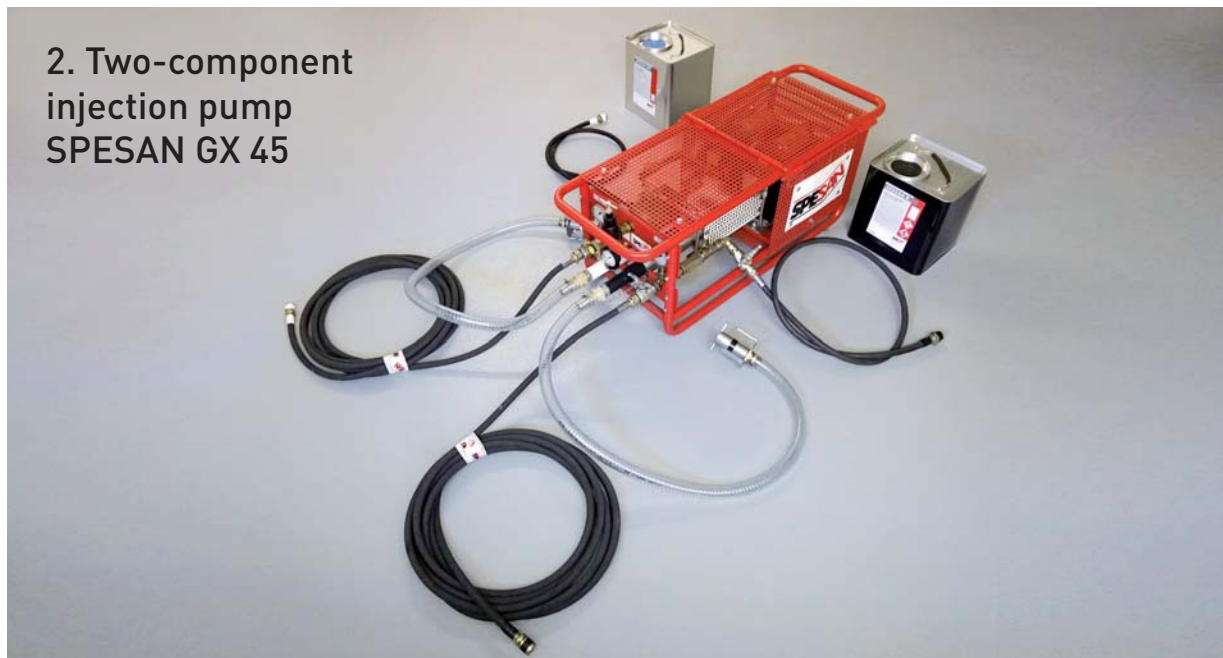
# INJECTION PUMPS

## 1. Two-component injection pump SPESAN S-35



- Maximum flow rate 2x2.75 l/min
- Maximum pressure 170 bar
- Suitable for crack injection, sealing construction joints, consolidation of masonry, concrete, fixed and loose rock and for the sealing of water ingress up to approx. 10 l/s

## 2. Two-component injection pump SPESAN GX 45



- Maximum flow rate 24 l/min
- Maximum pressure approx. 200 bar
- Suitable for very long conveying paths, consolidation of fixed and loose rock and for the sealing of very large water ingress

# THE INJECTION ACCESSORIES

The two components of the injection resin system are pumped separately in high-pressure hoses that can be extended by 10 m sections. The hoses end with ball valves, which in turn connect to a T-coupling. The mixing pipe with the mixed elements for the production of the polyurethane resin forms the heart of the injection accessory. A variety of different injection systems for a number of applications can be connected to the mixing pipe. The following table summarizes a number of example applications.

Find out more about the individual components here:  
<http://spesan.eu/main.php?lan=en&cont=produktinjektionszubehoer>



direct-link



The injection accessories are based on a modular design.

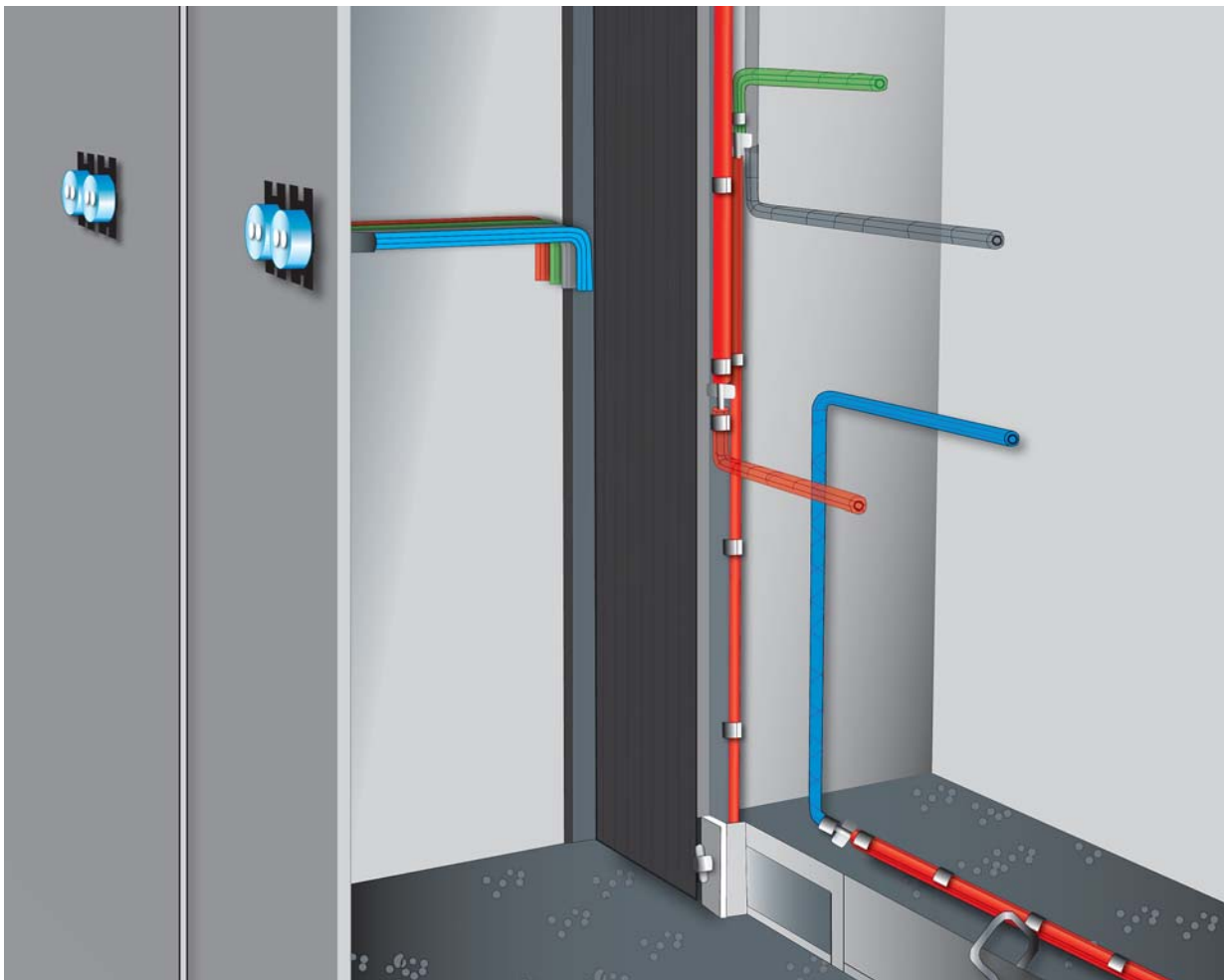
Supply systems	Application characteristics	Application examples
Spesan masonry packer Ø 10 mm - Ø 25 mm	Short stable bore holes with small diameter	Sealing and consolidation of masonry and concrete. Sealing of sheet pile walls, bored pile walls, slurry walls, anchor heads, shafts and walk-in tunnels
SK packer BVS Ø 40mm - Ø 54 mm	Long stable bore holes with large diameter	Sealing and consolidation of rock mass, underwater concrete, bored pile and slurry walls
SK supply pipe	Short unstable holes with small diameter	Sealing and consolidation of sand and gravel
IBO injection drilling anchor	Long unstable bore holes with large diameter	Sealing, consolidation and anchoring of rock mass and loose rock

# THE INJECTION HOSE SYSTEM

The SPESAN injection hose is an addition to the comprehensive list of injection accessories. MFPA Leipzig GmbH tested the hose with **SPESAN WL - SPESAN B** injection resin and awarded the product the general technical approval certificate. Our injection hoses can be fitted in joint tapes and joint plates in construction joints. Most conventional injection hoses have a circular cross section, which means they can only lie tangentially. Our hose has a hexagonal shape. This increases significantly the contact surface, which ensures better penetration for the injection material.



SPESAN injection hose



Installation in a block joint

# EXPANSION SEALANTS AND THEIR APPLICATIONS

SPESAN expansion sealants are based on silane-modified polymers, which are distinguished by their ability to be applied on damp surfaces. High-viscosity systems can even be used under water. The systems develop excellent adhesive strength on load-bearing, grease- and dustfree surfaces.

**SPESAN expansion sealants have the following special properties:**

- Hardening under the influence of moisture
- Single-component processing
- Solvent-free
- Odourless
- Paintable
- High degree of chemical resistance
- Excellent resistance to weathering and aging
- Low shrinkage

The systems are available in two resin variations, which correspond to an expansion of 10% for the final hardness of Shore A55 and 25% for a final hardness of Shore A25.

Integration of pipe into the shaft >

Sealing of the shaft ring joints



# REFERENCES

## GROUND ENGINEERING

- Major construction site Potsdamer Platz to Lehrter Station, Berlin, Germany, sealing of underwater concrete slabs, sheet pile and slurry walls
- Underground parking in Tirol, Austria, sealing of transitions between sheet pile and slurry walls

## CANAL REHABILITATION

- Oil port, Lobau, Vienna, Austria, crack sealing in the walkable sewer
- Town of Bebra, Germany, shaft renovation

## STRUCTURAL ENGINEERING

- Technical University, Vienna, Austria, masonry consolidation
- Designer Outlet Center, Wals/Salzburg, Austria, injection sealing, underground garage

## HYDRO ENGINEERING

- Power station in Traun-Pucking, Austria, sealing of water leak
- Lock in Malliß, Germany, sealing the invert arch during repairs

## UNDERGROUND PIPE JACKING

- Simmering reservoir, Vienna, Austria, sealing of ring groove, end pit
- Starting pit, Stuttgart, Germany, sealing of shotcrete shell

## TUNNELLING

- Traffic junction, Linz on the Danube, Austria, sealing of construction joints via injection hoses
- Tunnel, Brixlegg, Austria, curtain injection behind existing tunnel inner shell

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