



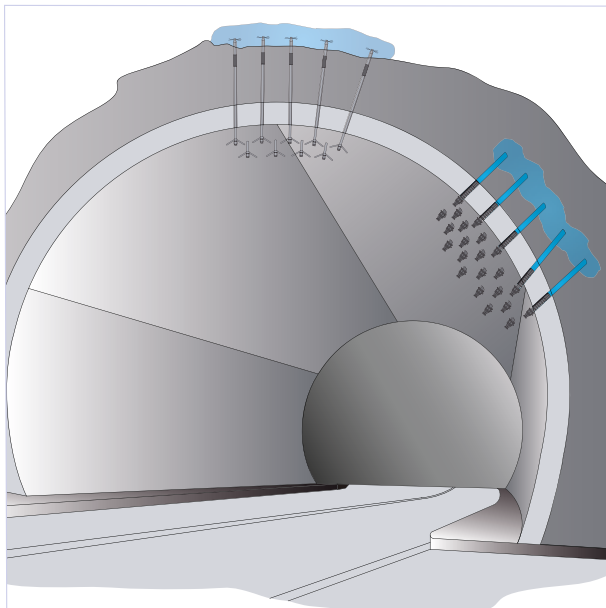
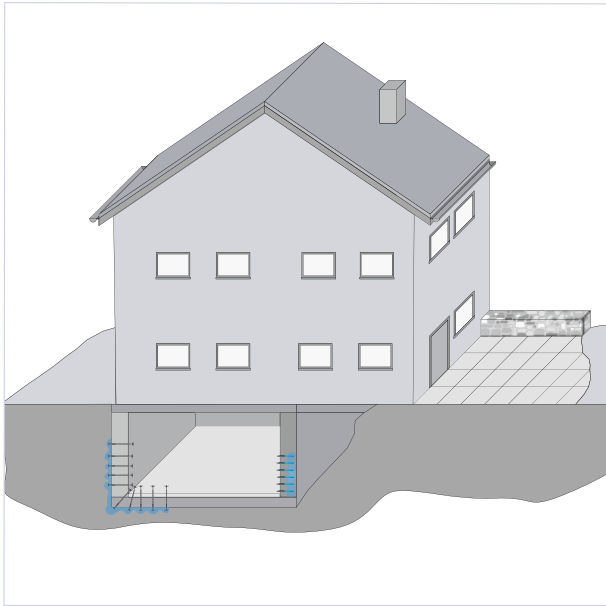
# Curtain injection and masonry injection

Acrylate gel



# Curtain injection and masonry injection

## Application information



### Preliminary remarks

- Waterproofing by injection of gel, e.g. curtain injection or masonry injection, is a highly effective method for subsequent sealing of civil engineering and traffic structures as well as of buildings and houses.
- Important for a successful subsequent sealing is to know the cause of the moisture damage.

### Information on the injection methods

- Injections into the building ground are subject to compulsory notification according to art. 49 of the Water Resources Act (German abbreviation WHG).
- Prior to starting any gel injection work, a corresponding notification should be submitted to the competent Lower Water Authority and the Agency for Environmental Protection.
- Construction chemical products should be accompanied by a suitability certificate according to the principles of the evaluation by the German Institute for Building Technology (German abbreviation DIBt).
- An expert engineer (competent planner) should be entrusted with the planning.

### Curtain injection

#### Aim

Subsequent sealing of an untight structure. The gel curtain formed in front of the building component (gel-soil-mixture) prevents the ingress of water into the structure or expansion joint.

#### Procedure

- Bore holes arranged in a grid-like pattern are drilled through the structure from the inside to the outside (well-trie grid 25 cm x 25 cm).
- The bore hole grid depends on the structure and geometry of the building component, the pore structure and the quality and condition of the building ground on the spot, and on the injection technology which is selected for this purpose.
- The packers through which the injection material (usually acrylate gel) will be injected are inserted in the bore holes.
- The success of the gel injection depends on the selection of a suitable injection method, e.g. single-stage or two-stage injection.

### Masonry injection

#### Aim

Creation of a continuous sealing layer in the building component (masonry). The construction parts can be subsequently provided with a sealing function.

#### Procedure

- Bores are to be drilled into the untight building component from the inside to the outside, up to approximately  $\frac{2}{3}$  of the thickness of the building component, at a slight angle of inclination.
- The bore hole grid depends on the geometry of the structure (well-trie grid 25 cm x 25 cm).
- The packers through which the injection material (usually acrylate gel) will be injected are inserted in the bore holes.

### Support measures

- Provision of technical advice and recommendations with regard to competent planners and specialists for the execution of the work involved
- DESOI recommendation; technical specifications
- DESOI injection ABC – the reference work for construction experts
- DESOI technical brochure: Sealing with injection methods
- WTA information sheet; gel injection 5–20
- STUVA ABI information sheet

# Curtain injection and masonry injection

## Application information

### Material to be used

- Acrylat gel

### Range of application – injection methods

#### Curtain injection

- The untight building component is drilled through from the inside to the outside.
- The low-viscosity, liquid injection material thrusts the existing water aside, and forms an elastic sealing layer and/or an elastic injection body, together with the surrounding building ground.

#### Masonry injection in the building component

- The sealing layer is created in structural parts which initially have not been planned to be sealed.
- The water transporting capillaries are sealed.

#### Masonry injection in cavities

- The sealing layer is created in technologically conditioned parting planes, e.g. in cavities between double walls

#### Crack injection and injection of hollows

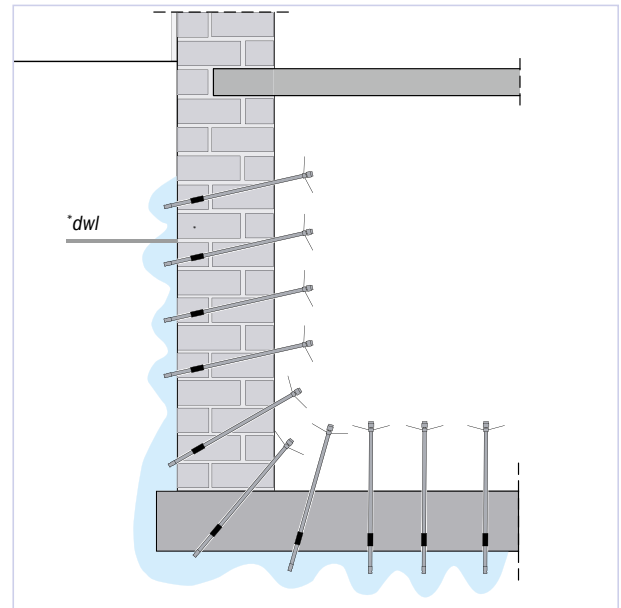
- Very often partial crack injection and injection of limited hollows must be carried out, e.g. raster injection

#### Injection of expansion joints

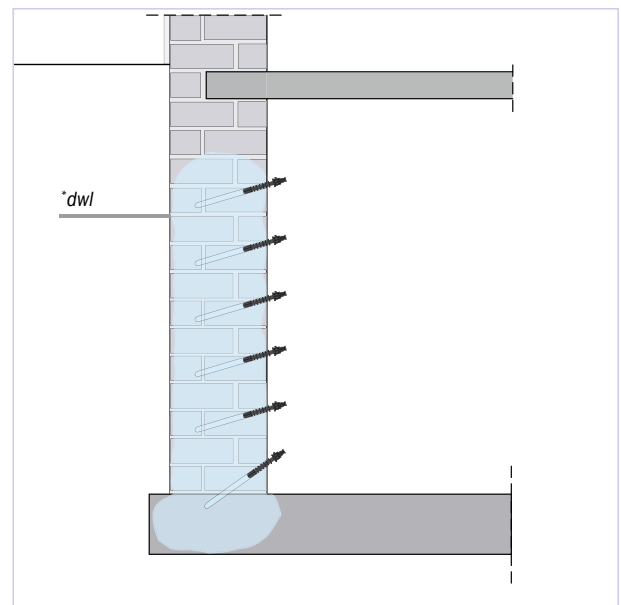
- Untight expansion joints are normally sealed by partial film injection
- Untight construction joints – raster injection

### Demands on injection devices

- Forced delivery of the components at reliably adjustable mixing ratios
- Powerful mixing head for perfect mixing of the components
- Additional rinsing pump with higher maximum pressure
- Measuring technique to monitor pressure and volume flow with signalling or switching off in case of mixing errors (see DESOI Flow Control – please call us for consulting and order our brochure)



Principle of curtain injection



Principle of masonry injection

\*dwl = design water level (see DESOI injection ABC with detailed bibliography)

### Note

The information on the methods are recommendations and not binding.

# Curtain injection and masonry injection

## Application information



### Examples of application

- Sealing from the internal of ground contacting structures or structures covered with earth
- Filling of hollows and voids, cracks, etc.
- Buildings and houses as well as civil engineering structures

### Demands on the injection packers

- Safe retention in the building component during the injection at pressures depending on the injection method
- Corrosion resistance of elements remaining in the building component
- With stop valve
- Cross section adjusted to the required delivery and flow properties of the injection material
- Check valves for low opening pressure

### Suitable objects

- Houses and industrial structures
- Civil engineering structures
- Underground- and canal construction
- Water engineering
- Tunnelling



### Types of packers

- Steel packers
- Plastic drive-in packers

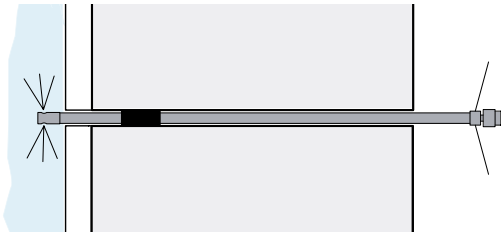
### Types of pumps

- Pneumatic injection pumps

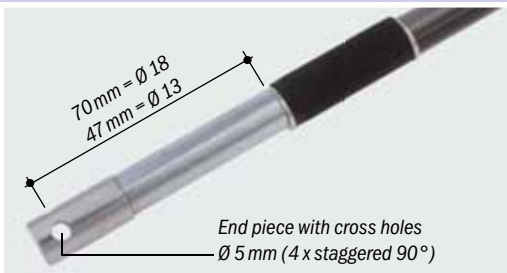


### Note

The information on the methods are recommendations and not binding.



## For homogeneous masonry and concrete



## For hollow block masonry



## Accessories



## Advantage

When gel steel packers are injected the material is distributed laterally along the masonry and not straight into the earth.

## Note

For the gel steel packers the clamping rubber can be placed according to customer's specifications.

### Steel packer gel with distance piece 47 mm

Order number

with external thread M8 and nut

$\varnothing$  13 x 580 mm – for max. 49 cm thick masonry

20391

### Steel packer gel with distance piece 70 mm

with external thread M10x1 and nut

$\varnothing$  18 x 300 mm – for max. 24 cm thick masonry

20394

$\varnothing$  18 x 580 mm – for max. 49 cm thick masonry

20395

$\varnothing$  18 x 800 mm – for max. 74 cm thick masonry

20396

### Steel packer gel

with external thread M8 and nut

$\varnothing$  13 x 580 mm – for max. 49 cm thick masonry

20398

### Steel packer gel

with external thread M10x1 and nut

$\varnothing$  18 x 300 mm – for max. 24 cm thick masonry

20399

$\varnothing$  18 x 580 mm – for max. 49 cm thick masonry

20400

$\varnothing$  18 x 800 mm – for max. 74 cm thick masonry

20401

### Steel packer

with external thread M10x1 and free passage  $\varnothing$  6 mm

$\varnothing$  18 x 170 mm – clamping rubber 70 mm

20380

$\varnothing$  18 x 300 mm – clamping rubber 70 mm

20381

$\varnothing$  18 x 550 mm – clamping rubber 70 mm

20382

$\varnothing$  18 x 800 mm – clamping rubber 70 mm

20383

### Steel combi packer

with thrust piece SW10x60, external thread M10x1, lower part M6 and free passage  $\varnothing$  2,7 mm

$\varnothing$  10 x 100 mm – clamping rubber 40 mm

20040

$\varnothing$  12 x 100 mm – clamping rubber 40 mm

20041

$\varnothing$  13 x 100 mm – clamping rubber 40 mm

20042

### HP pan head nipple

with internal thread and sealing ring, free passage  $\varnothing$  4 mm

M8

20880

M10x1

20881

### Pan head slider

with cross sliding valve and free passage  $\varnothing$  3 mm, pan head nipple  $\varnothing$  16 mm, max. pressure 100 bar

internal thread M8

32032

internal thread M10x1

32034

# Packer technique

## Products & Accessories

Order number	<b>Quick acting tommy nut</b>
	with internal thread
20609	M8
20610	M10x1



Order number	<b>Lamella drive-in packer Ø 18 x 135 mm</b>
31769	with cross sliding valve and moulded HP pan head nipple Ø 16 mm, free passage Ø 3 mm, maximum pressure 50 bar



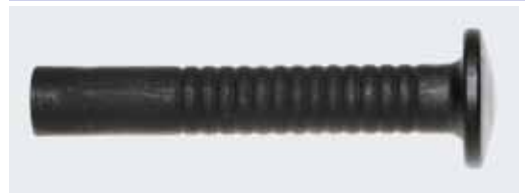
### Advantages

- The cross sliding valve can be opened and closed.
- No opening pressure must be overpowered.
- High tightness is achieved
- No material will drop out of the packer.



	<b>Mounting tool</b>
35103	130 mm long

### Accessories



	<b>Extension tube</b>
	for lamella drive-in packer
31734	300 mm long
31735	500 mm long
31736	800 mm long
31737	1000 mm long
31749	1500 mm long

### Advantages

- Can be cut to required length
- Due to the internal cone in the packer the extension tube can be easily connected by 1 - 2 slight strokes of a hammer
- The sealing lips prevent the material from flowing back into the building component.

	<b>Special cutter</b>
25006	to cut the extension tubes to the required length





## Note

The steel combi packers are also available with check valves.

## Steel combi packer

## Order number

with thrust piece  $\varnothing$  10 mm, free passage  $\varnothing$  4 mm, clamping rubber 40 mm and HP pan head nipple  $\varnothing$  16 mm, opening pressure 1 bar

$\varnothing$ 13 x 170 mm – thrust piece 110 mm	20170
$\varnothing$ 13 x 300 mm – thrust piece 240 mm	20171
$\varnothing$ 13 x 450 mm – thrust piece 390 mm	20172
$\varnothing$ 13 x 600 mm – thrust piece 540 mm	20173
$\varnothing$ 16 x 170 mm – thrust piece 110 mm	20100
$\varnothing$ 16 x 300 mm – thrust piece 240 mm	20101
$\varnothing$ 16 x 450 mm – thrust piece 390 mm	20102
$\varnothing$ 16 x 600 mm – thrust piece 540 mm	20103
$\varnothing$ 18 x 170 mm – thrust piece 110 mm	20175
$\varnothing$ 18 x 300 mm – thrust piece 240 mm	20176
$\varnothing$ 18 x 450 mm – thrust piece 390 mm	20177
$\varnothing$ 18 x 600 mm – thrust piece 540 mm	20178
$\varnothing$ 20 x 170 mm – thrust piece 110 mm	20105
$\varnothing$ 20 x 300 mm – thrust piece 240 mm	20106
$\varnothing$ 20 x 450 mm – thrust piece 390 mm	20107
$\varnothing$ 20 x 600 mm – thrust piece 540 mm	20108
$\varnothing$ 22 x 170 mm – thrust piece 110 mm	20110
$\varnothing$ 22 x 300 mm – thrust piece 240 mm	20111
$\varnothing$ 22 x 450 mm – thrust piece 390 mm	20112
$\varnothing$ 22 x 600 mm – thrust piece 540 mm	20113



## Steel packer

with external thread R  $\frac{1}{4}$ " and free passage  $\varnothing$  9 mm

$\varnothing$ 25 x 200 mm – clamping rubber 80 mm	20470
$\varnothing$ 25 x 300 mm – clamping rubber 80 mm	20471
$\varnothing$ 25 x 550 mm – clamping rubber 80 mm	20472
$\varnothing$ 25 x 800 mm – clamping rubber 80 mm	20473
$\varnothing$ 25 x 1000 mm – clamping rubber 80 mm	20474
$\varnothing$ 30 x 200 mm – clamping rubber 80 mm	20500
$\varnothing$ 30 x 300 mm – clamping rubber 80 mm	20501
$\varnothing$ 30 x 550 mm – clamping rubber 80 mm	20502
$\varnothing$ 30 x 800 mm – clamping rubber 80 mm	20503
$\varnothing$ 30 x 1000 mm – clamping rubber 80 mm	20504



## Quick acting tommy nut

with internal thread R  $\frac{1}{4}$ "

20611



## HP pan head nipple

with internal thread G  $\frac{1}{4}$ ", free passage  $\varnothing$  4 mm and sealing ring

20882-01



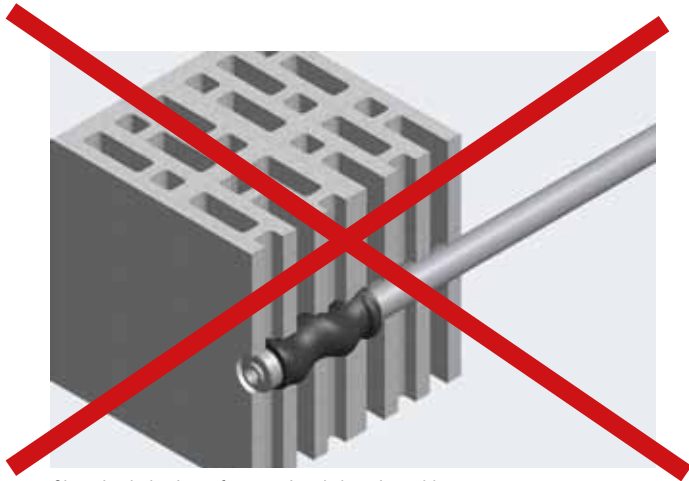
## Pan head slider

with cross sliding valve and free passage  $\varnothing$  3 mm, pan head nipple  $\varnothing$  16 mm, max. pressure 100 bar, G  $\frac{1}{4}$ "

32036

# Injection into hollow bricks using cone packers

## Application information



Clamping behaviour of conventional clamping rubbers

### Clamping behaviour of conventional clamping rubbers

The characteristics of rubber causes the following problem:

- The clamping rubber gets stuck on the cone.
- The clamping rubber does not get back in its initial position.
- The clamping rubber keeps clamped in the drill hole.

### The solution:

The new slotted plastic bushing:

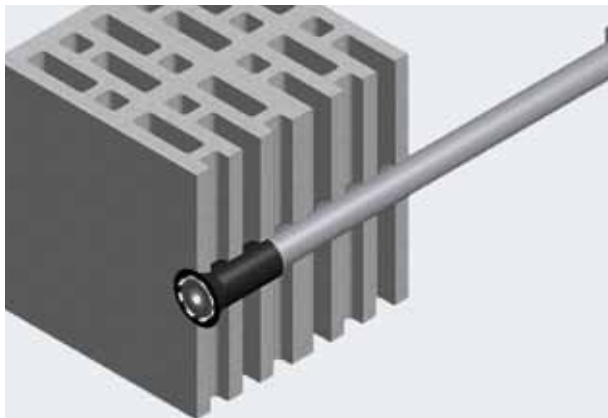
- The thin walled plastic bushing is mounted with the clamping rubber.
- Due to the gliding properties of plastic the clamping rubber can be released to its initial diameter.
- The packer becomes loose and can be removed.

Material to be used:

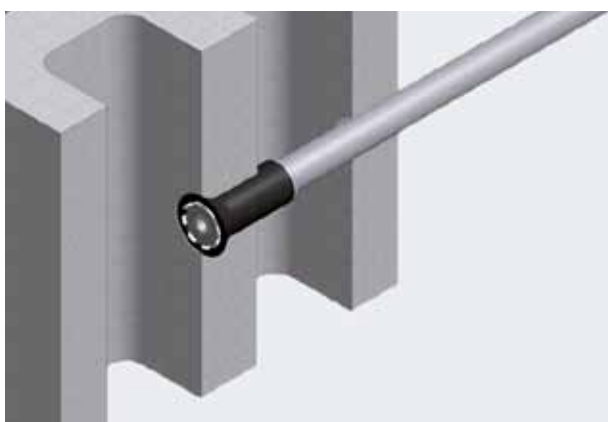
- Gel (acrylate gel)

Other applications and injection materials:

- Targeted injection of hollows
- Horizontal barrier
- Masonry stabilization
- Mineral injection material
- Injection resin
- PUR gel



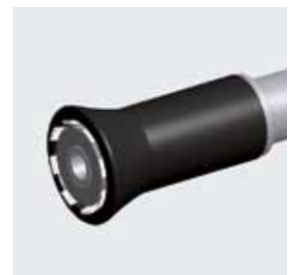
Injection packer clamped in the hollow brick



Injection packer clamped in the hollow brick



unclamped



clamped



Injection packer unclamped



Injection packer clamped



Clamping rubber



Clamping rubber with plastic bushing, cutted



Thread

## Steel cone packer

with external thread M10x1, screw nut SW 17 and clamping rubber with plastic busting multiple sitted

Ø 18 x 300 mm, clamping rubber 40 mm

Ø 18 x 550 mm, clamping rubber 40 mm

Ø 18 x 800 mm, clamping rubber 40 mm

Order number

20405

20406

20407

## Accessories



### Socket wrench SW 17

for cordless screwdriver

Order number

25014



### Socket wrench SW 17

for manual operation

25026



### Locking tappet

with internal thread M10x1 and free passage Ø 7 mm

33010



### HP pan head nipple

with internal thread M10x1 and sealing ring  
free passage Ø 4 mm

20881

# Reciprocating pump PN-314-3K Compact

## Pneumatic reciprocating pump

Order number: 17524



Manometers at pressure reducer for the components A + B and the rinsing pump



Pressure gauge units at machine outlet for component A and component B



Lubrication of the packing sets



### Description

The reciprocating pump PN-314-3K Compact achieves a delivery of max. 12.5l/min at a forcecontrolled mixing ratio of 1 : 1. The pump is equipped with a separate rinsing pump. Due to the big valves and pistons also highly viscous material can be used without any problems. The packing sets inside are tensioned by an integrated spring so that there is no need to tension them manually.

### Technical data

Working pressure - infinitely variable	5 - 120 bar
Delivery	
- at compressor output 0.7 m <sup>3</sup> /min*	max. 10.5 l/min
- at compressor output 1.3 m <sup>3</sup> /min	max. 12.5 l/min
Compressor output	min. 500 l/min
Mixing ratio	1 : 1
Air pressure	max. 8 bar
Weight	45 kg
Height/width/length - working position	(cm) 75/45/50

### Rinsing Pump Type PN-12

Working pressure - infinitely variable	20 - 250 bar
Delivery	3 l/min
Pressure ratio	1 : 31

### Delivery range

moving device, suction system, 2 x pressure gauge unit with manometer 0 - 250 bar and rinsing pump type PN-12

### Advantages

- Pressure gauge units with manometers at machine outlet for pressure control of each component
- Big material passage - suitable also for highly viscous material
- All material contacting parts of stainless steel (INOX)
- Can be equipped with DESOI flow control (electronic recording system)

### Material to be used

- 2-component injection resin
- Acrylate gel

\* 2 x compressor V-Meko 400

# Reciprocating pump PN-1412-3K Compact

## Pneumatic reciprocating pump

Order number: 17522



Manometers at pressure reducer for the components A + B and the rinsing pump



Pressure gauge units at machine outlet for component A and component B



Lubrication of packing sets

### Description

The reciprocating pump PN-1412-3K Compact is equipped with a forced mixing control and a separate rinsing pump. The material is delivered at a mixing ratio of 1 : 1. The big and exactly operating valves provide both high flow rate and high mixing accuracy. The packing sets inside are tensioned by an integrated spring so that there is no need to tension them manually. The pump is very easy to maintain and low wearing.

### Technical data

Working pressure–infinitely variable	10 – 200 bar
Delivery	
- at compressor output of 0.7 m <sup>3</sup> /min*	max. 7.0 l/min
- at compressor output of 1.3 m <sup>3</sup> /min	max. 8.5 l/min
Compressor output	min. 500 l/min
Mixing ratio	1 : 1
Air pressure	max. 8 bar
Weight	45 kg
Height/width/length–working position	(cm) 75/45/50

### Rinsing pump type PN-12

Working pressure–infinitely variable	20 – 250 bar
Delivery	3 l/min
Pressure ratio	1 : 31

### Delivery range

moving device, suction system, 2x pressure gauge unit with manometer 0 – 250 bar and rinsing pump type PN-12

### Advantages

- Pressure gauge units with manometers at machine outlet for pressure control of each component
- Big material passage–suitable also for highly viscous material
- All material contacting parts of stainless steel (INOX)
- Can be equipped with DESOR flow control (electronic recording system)

### Material to be used

- 2-component injection resin
- Acrylate gel

\* 2 x compressor V-Meko 400

# Injection technique

## Accessories



Order number

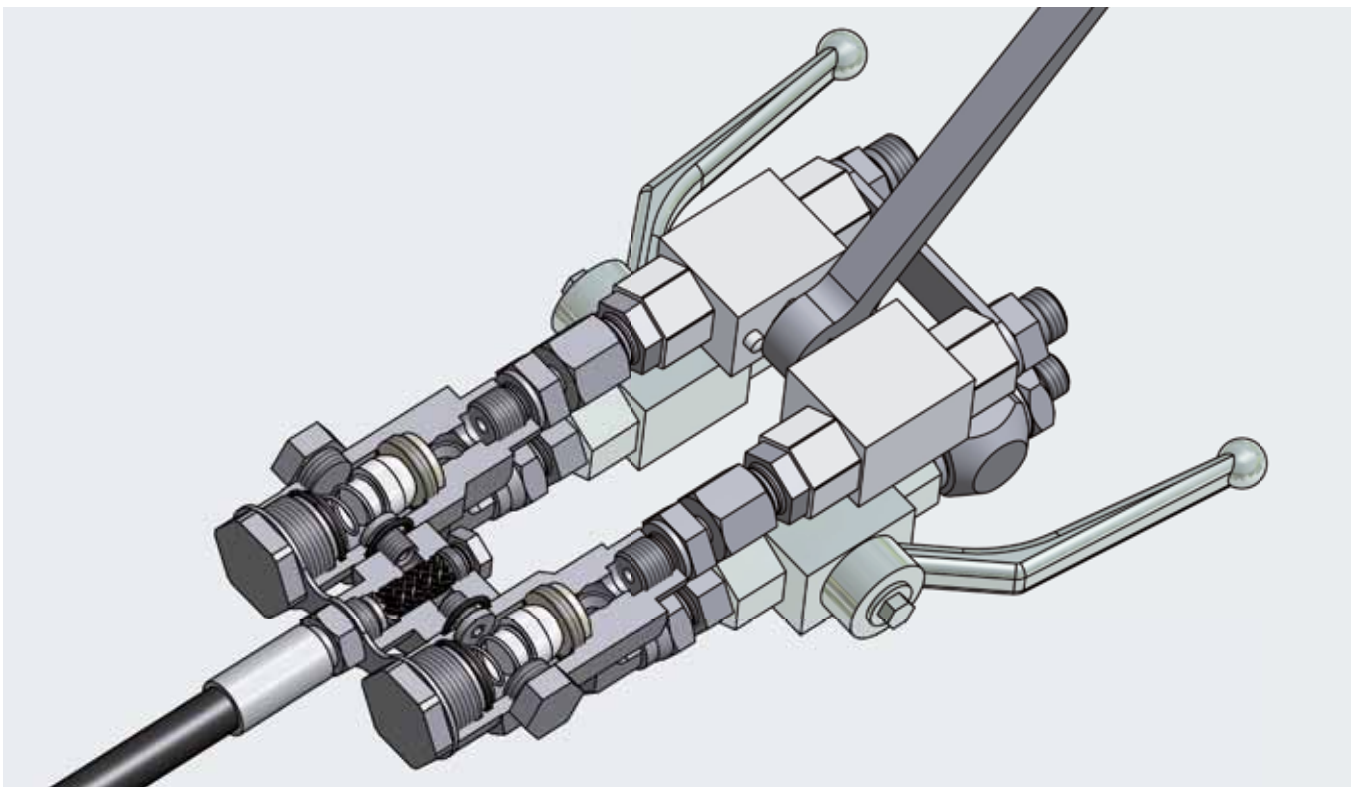
17726

### 3K mixing head – stainless steel (INOX)

with 2 x inline static mixer, flexible whip, sliding coupling

#### Advantages

- The components are mixed perfectly.
- Each component can be rinsed separately.
- No material rests can remain in the mixing head to react there.
- With different mixing tubes low viscous to viscous material can be used.
- All material contacting parts are of stainless steel (INOX).
- High pressure resistant up to 250 bar





### Mixing tube, stainless steel (INOX)

Order number

with internal thread G 1/4" on both sides  
for 4 inline static mixers, 63 mm long  
for 12 inline static mixers, 140 mm long

17770

17771



### Inline static mixer

made of plastic, as spare part for 3K mixing head  
Ø 9.4 mm, length 9.5 mm

17716



### Sliding coupling, straight

with internal thread M10x1, blue joint rubber  
passage Ø 2,5 mm  
passage Ø 4,0 mm

16821

16831



### Sliding coupling, lateral

with internal thread M10x1, blue joint rubber  
passage Ø 2,5 mm  
passage Ø 4,0 mm

16822

16837



### Sliding coupling Ø 16 mm, lateral

with internal thread M10x1 and steel seal  
passage Ø 1,5 mm

16838



### Coupling Steck-0

DN 10 to internal thread M10x1, with safety clamp,  
free passage Ø 7 mm

23007

### Safety clamp Steck-0

23012



### Steel reducing nipple, galvanized

SW14x15 mm, M10x1 internal thread to  
R 1/4" external thread

22079

# Injection technique

## Accessories

Order number	HP material hose, stainless steel (INOX) Ø 6 mm
16813	with union nuts M12x1,5; Length 10 m, solvent resistant (rinsing pump)
17755-1	with union nuts M14x1,5; Length 10 m, solvent resistant (B component)
17755-2	with union nuts M16x1,5; Length 10 m, solvent resistant (A component)

### Note:

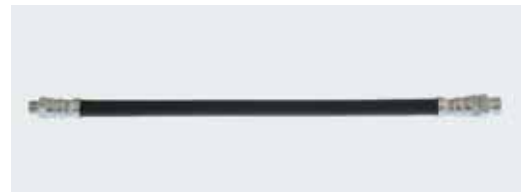
More lengths on request!



	Stainless steel double nipple (INOX)
	operational pressure up to 250 bar
22110	M12x1,5
22108	M14x1,5
22096	M16x1,5



	Flexible whip 0,3 m long
17726-099	with external thread M10x1 and 1/4", with steel core, free passage Ø 4 mm for 3K mixing head



	Measuring cup, transparent
25002	0,5 litre
25001	1 litre
25003	2 litre
25000	5 litre



	Hydraulic oil Mobil type HLP-68
	for cleaning and preservation of the machines
25067	1 litre
25069	5 litre



	Special antifreezing agent
	for the antifreeze system of pneumatic injection devices
25056	1 litre
25057	5 litre



## Recording and documentation of injection and dosing processes

### DESOI FLOW CONTROL

This injection system consists of the compressed air-driven 2K-injection device and the electronic dosing and control system. For the quality assurance during the manufacture of subsequent sealings, e. g. by means of acrylate gels, the injection success crucially depends on the following:

- the adherence to the required mixture ratio of the building chemicals
- the limitation of the injection pressure, depending on the application
- the ruling out of operating errors

A 1K-recording apparatus is available for the use of mineral injection materials. The system allows the automatic recording of injection quantity and injection pressure per packer, the registration of injection time and any subsequent injections, the real-time display of parameters as well as the monitoring of the preset limiting values. The software documents the evaluation of the data in tabular form or as graphical representation.

### DESOI Flow Control documents

- Actual material consumption per component and packer
- Injection pressure per packer
- Injection time per packer
- Order of injection
- Re-injections
- Date and time for injection

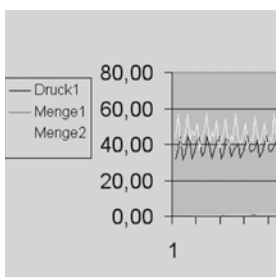
### Certified system

DESOI Flow Control has been tested and certified by the MFPA Leipzig. The system meets the demands of the following regulations:

- ZTV ING
- Reparation Guidelines
- ABI Technical Bulletin of the STUVA
- WTA Technical Bulletin E-5-20-07
- ZTV W
- DB Guideline 804.6102



With the DESOI injection technique and the coordinated system DESOI Flow Control the injection and dosing processes are electronically recorded. The data can be inspected directly during the injection works and digitally processed further later on.



The injection pressure, the mixing ratio, and the material volumes are permanently monitored. In case of deviations or if the set pressure limits or the material volumes have been reached an alarm tone is activated and the injection device can be switched off automatically.



On the basis of the documentation the course of injection becomes traceable. A sound documentation on the course of the works performed can be presented to the customer.

### Note

Please ask for our technical brochure or visit us at [www.desoi.de](http://www.desoi.de) for further information about DESOI FLOW CONTROL. We will be pleased to give you technical expert advice so that all questions will be answered. Please call +49 6655 9636-0.



# DESOI®

Injection technique  
Mixing technique  
Spraying technique



**Qualitätsmanagement**

**Wir sind zertifiziert**

Regelmäßige freiwillige  
Überwachung nach ISO 9001:2008

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