

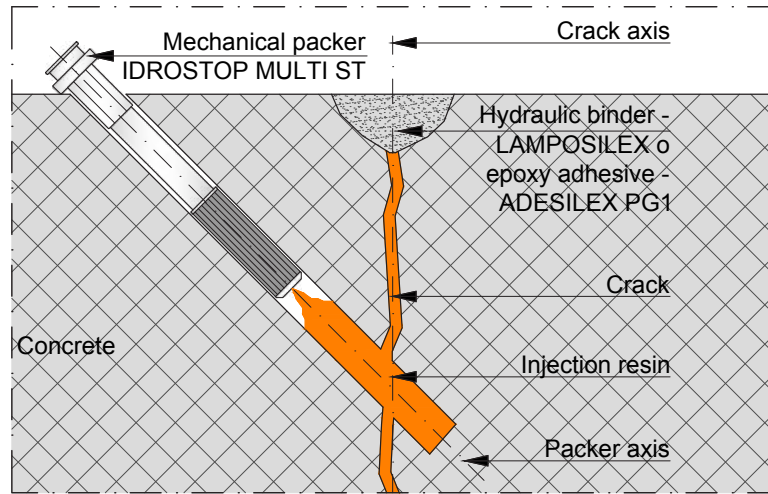


# INJECTION SYSTEMS



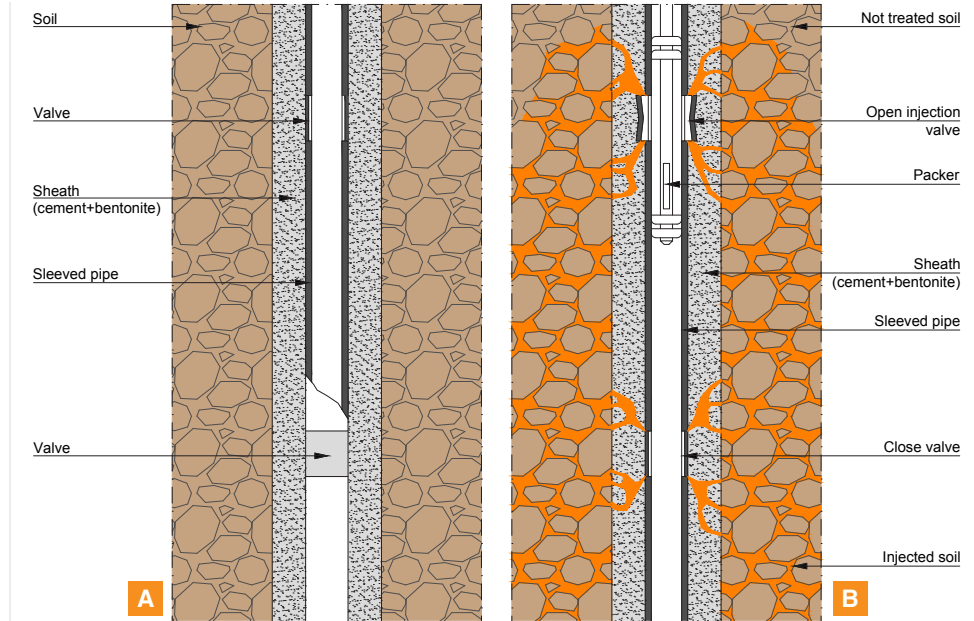
MECHANICAL PACKER INJECTION

Phase 4  
INJECTION



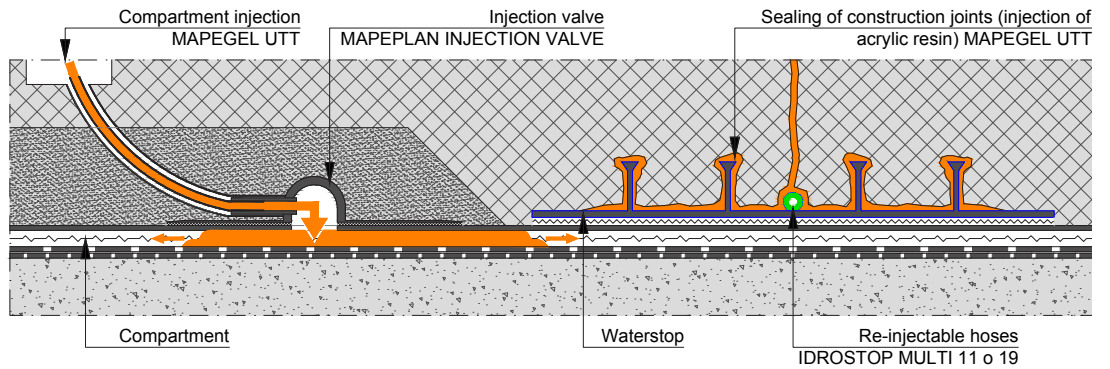
SLEEVED PIPE INJECTION

Injection phases  
A - BOREHOLE DRILLING, POSITIONING OF SLEEVED PIPE, REALIZATION OF SHEATH  
B - INJECTION



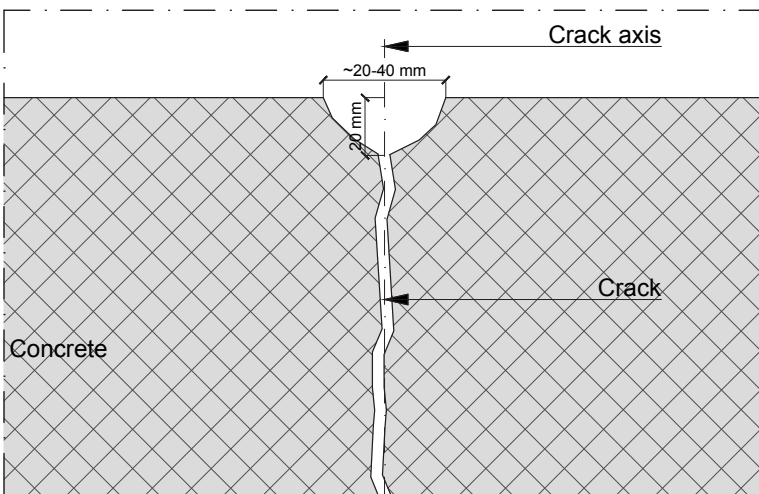
Acrylic resin injection (with valve) inside compartments realized with synthetic waterproofing membrane; replacing waterstop and sealing joints with acrylic resins injection (using re-injectable hoses).

WATERPROOFING ELEMENTS  
REPLACING AND JOINTS SEALING



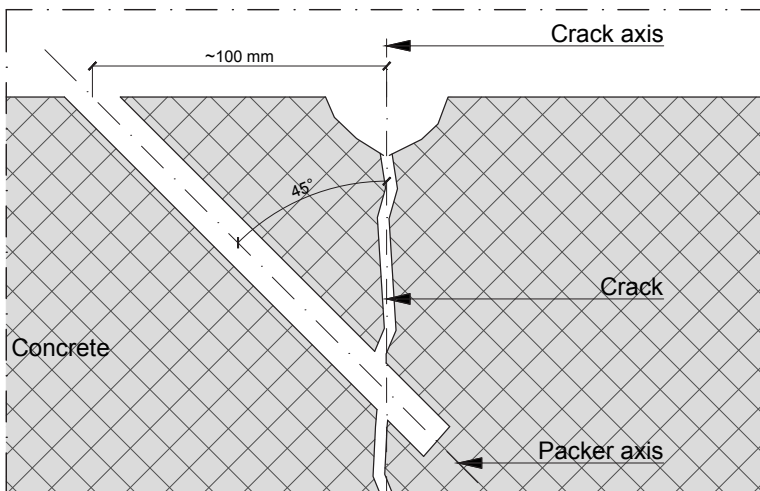
MECHANICAL PACKER INJECTION

Phase 1  
OPENING OF CRACK



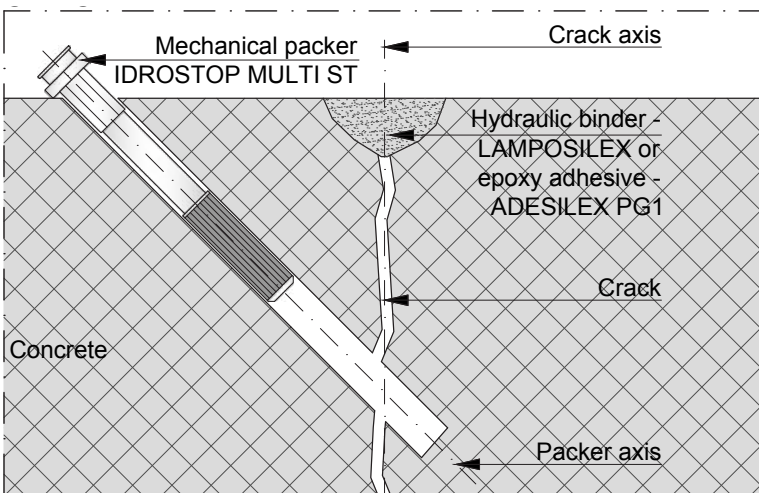
MECHANICAL PACKER INJECTION

Phase 2  
DRILLING OF HOLE,  
CLEANING OF HOLE AND  
CRACK SURFACE



MECHANICAL PACKER INJECTION

Phase 3  
POSITIONING OF PACKER  
AND SEALING OF CRACK



**WATER CONDITION**
**SOIL INJECTION**

clay	silt	sand		gravel	rock
		fine-grained (low permeability)	coarse-grained (high permeability)		
10 <sup>-8</sup>	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-3</sup>	10 <sup>-2</sup>	10
 Permeability					

INJECTION RESINS	polyurethane	RESFOAM 1KM	RESFOAM 1KM FLEX	FOAMJET F	FOAMJET F ST	FOAMJET T	FOAMJET 260 LV	organo-mineral	SILICAJET EXP	SILICAJET EXP/4	SILICAJET ST	SILICAJET ST HP	SILICAJET ST FLEX	acrylic	MAPEGEL UTT	epoxy	EPOJET LV
		<p>Water Condition:    Soil Injection: <input type="checkbox"/> clay, <input type="checkbox"/> silt, <input type="checkbox"/> fine-grained sand, <input type="checkbox"/> coarse-grained sand, <input type="checkbox"/> gravel, <input type="checkbox"/> rock</p>															
CHEMICAL INJECTION	MAPEJET SYSTEM N		<input type="checkbox"/>														
	MAPEJET SYSTEM C40		<input type="checkbox"/>														
	MAPEJET SYSTEM LP		<input type="checkbox"/>														
	MAPEJET SYSTEM NS 15		<input type="checkbox"/>														
MICRO-FINE CEMENTS	MICROCEM 8000		<input type="checkbox"/>														
	MICROCEM 12000		<input type="checkbox"/>														
CEMENT GROUT/MORTAR	cementitious grout with wash-out resistance	MAPEGROUT COMPACT	<input type="checkbox"/>														
		MAPEGROUT COMPACT AWM	<input type="checkbox"/>														
		MAPEGROUT COMPACT VV	<input type="checkbox"/>														
		MAPEGROUT COMPACT HP	<input type="checkbox"/>														
		MAPEGROUT COMPACT PS	<input type="checkbox"/>														
	expanding	EXPANJET	<input checked="" type="checkbox"/> M	<input checked="" type="checkbox"/> M	<input type="checkbox"/>												
extended workability	MAPEQUICK CBS SYSTEM		<input type="checkbox"/>														





**EQUIPMENT**

- IDROSTOP MULTI 11** (PVC re-injectable hoses)
- IDROSTOP MULTI 19** (PVC re-injectable hoses)
- IDROSTOP MULTI ST** (mechanical packer, different size available)

**COMPATIBILITY**

- injection resins
- micro-fine cements
- injection resins, chemical injection

FILLING OF CAVITY	CONCRETE INJECTION			TBM INJECTION		COMPARTMENT INJECTION	RE-INJECTABLE HOSES INJECTION
	STRUCTURAL	WATERPROOFING	CERTIFICATION	PRE-GROUTING	OVERLEAF SEGMENTS		
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LEGEND			
X	dry condition		pressurized water inflow
	surface damp, water leakage		water saturated soils
	water inflow	M	soil mechanical re-compression



## MAPEI UTT Underground Technology Team

### UTT TECHNICAL ASSISTANCE PROVIDES:

- Great technical skills according to deep knowledge of products, production phases and construction systems;
- Assistance during construction and design phases, in order to focus on the correct products and technical solutions;
- Global intervention, 24 hours per day and 365 days per year;
- Production optimization and costs reduction.

### THE WORLD OF UTT

- SHOTCRETE TECHNOLOGY
- MECHANIZED TUNNELING PRODUCTS
- DRILLING AND GROUND CONSOLIDATION PRODUCTS
- INJECTION SYSTEMS
- WATERPROOFING SYSTEMS
- PAVEMENT PRODUCTS
- TUNNEL MAINTENANCE, REHEABILITATION AND COATING PRODUCTS

HEAD OFFICE  
MAPEI S.p.A.  
Via Cafiero, 22 - 20158 Milan  
Tel. +39-02-37673.1  
Fax +39-02-37673.214  
Internet: [www.mapei.com](http://www.mapei.com)  
E-mail: [mapei@mapei.it](mailto:mapei@mapei.it)

