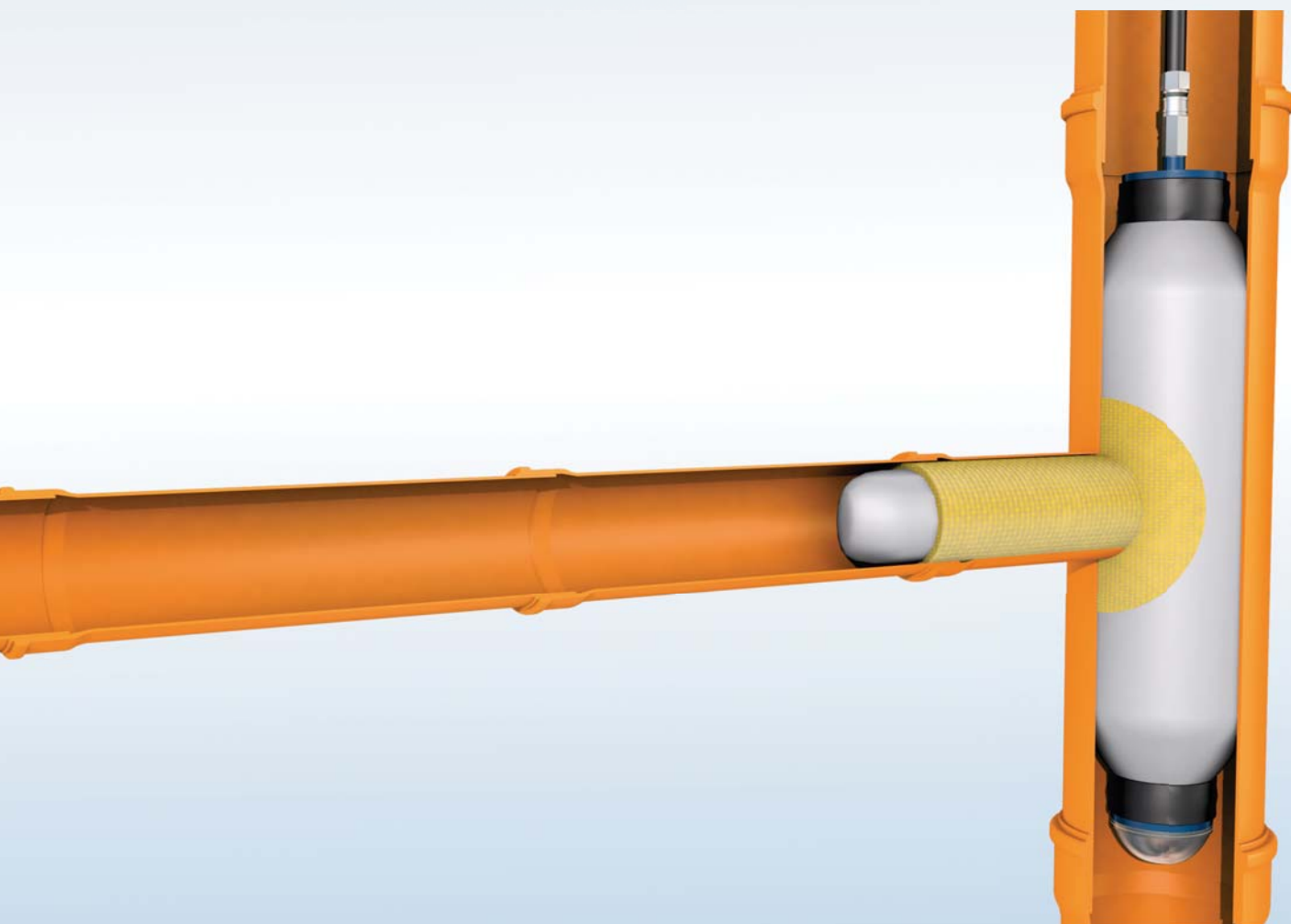


Lateral Connection Repair

OF UNDERGROUND HOUSE SEWERS AND DOWNPIPES IN BUILDINGS



1 How does the epros[®] DrainLCR-B work?

Leaking downpipes and sewers in buildings still typically mean bad smells for the residents and can, in the worst case, result in structural damage and moist walls or even mouldiness. Conventional repair methods – breaking up of walls and/or grounds – then make people suffer noise, dirt and service disruption.

epros[®]DrainSystems by Trelleborg Pipe Seals Duisburg have a remedy for this problem: The new epros[®]DrainLCR-B repair method repairs laterals without breaking out walls or excavations, and thus means much less annoyance of residents.

Trelleborg Pipe Seals Duisburg, one of the worlds' leading specialists in innovative technologies for the upkeep of water and sewage systems, has been developing and selling efficient systems for trenchless repair and rehabilitation of infrastructures for more than 20 years.

epros[®]DrainLCR-B is a pipe repair device or method for the rehabilitation of in-house downpipes and underground sewers.

In this novel method, the repair unit is inserted in the existing access holes, chambers or eyes of the rainwater or wastewater downpipe and sewer and pushed to the point of repair by means of compressed-air push rods.

In the past, repairs from the inside of a vertical pipe were limited to either patch repairs or to the installation of full-length liners. Now, the epros[®]DrainLCR-B allows lateral branch connections to be repaired without the need to break out walls.

For this purpose, the LCR-B packer is introduced in existing openings of rain or foul water pipes. As the LCR-B packer is highly flexible, it will smoothly negotiate 45° elbows in a DN 100 main pipe and even 90° elbows in lines of DN 125 or more.

An inspection camera is placed into the branch line and pushed up to the main/branch interface. The function of the camera is to monitor the positioning process. Once the LCR-B packer has reached the junction, the mouth piece of the LCR-B hat profile or LCR-B liner can be turned by means of the locked air push rods for proper alignment with the branch.

Then the LCR-B packer is slightly inflated via the LCR-B control box and the hat profile or liner is brought into its final position. After a brief time lag, the LCR-B packer will be inflated to start the inversion process of the LCR hat profile. After complete inversion of the LCR-B hat profile or LCR-B liner, the LCR control box is set to cure pressure to be maintained until final cure.

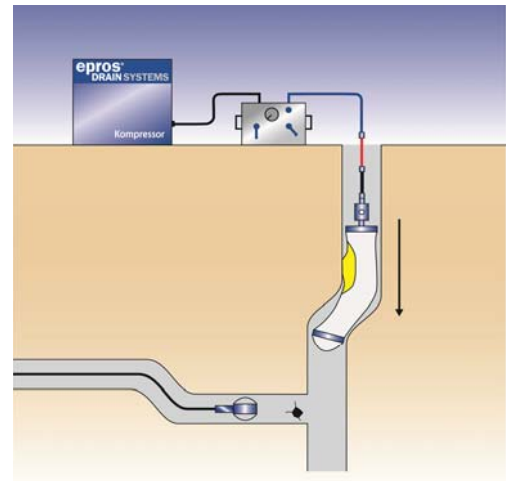
After cure, a vacuum pump integrated in the LCR-B control box removes all air from the DrainLCR-B packer. Then the deflated packer can be removed with the help of the air push rods.

2. Installation Process

- 2.1 Introduce and push the LCR-B packer into the downpipe.

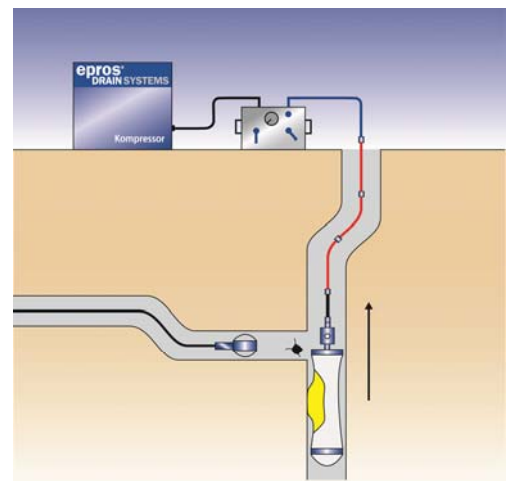
The flexible LCR-B packer can be pushed through 45° bends (DN 100 or higher), or 90° bends (DN 125 or higher) down to the point of repair.

A monitoring camera installed in the branch pipe helps the positioning process.



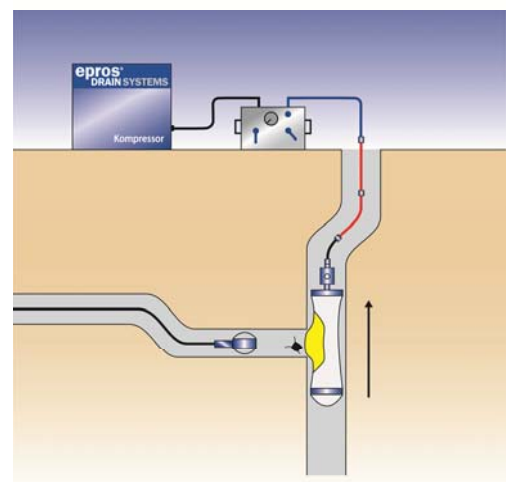
- 2.2 Position the LCR-B packer

For easier positioning, the installer pushes the LCR-B packer beyond the main/lateral interface while aligning the LCR-B hat profile with the lateral.



- 2.3 Bring the LCR-B packer into its final position

Pull back and turn the LCR-B packer to ensure the mouth piece of the LCR-B hat profile is centred to the branch opening

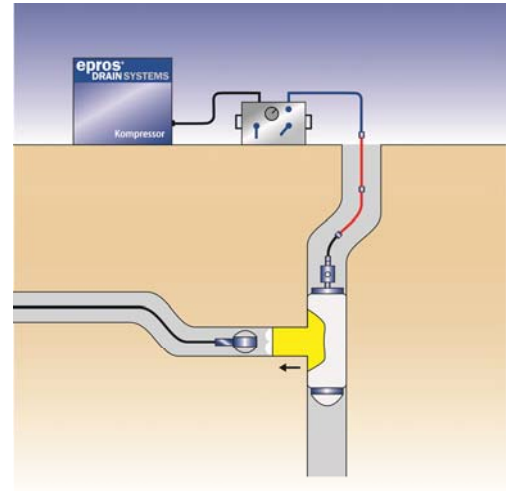


2.4 Install the LCR-B hat profile

The inversion process is initiated as monitored by the camera placed in the lateral connection.

The inversion process is complete when the LCR-B hat profile has been fully inverted.

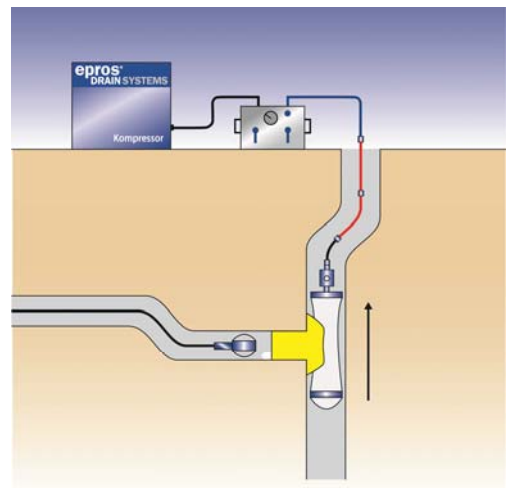
Set the LCR-B control box to the desired cure pressure.







2.5 Remove the LCR-B packer





Remove the air from the LCR-B packer using the vacuum pump integrated in the LCR-B control box. This deflation process separates the LCR-B packer entirely from the LCR-B hat profile and allows the packer to be safely removed from the line.

After use, clean the packer and check it for damages.



3. Technical Components




3.1 Basic Equipment for Rehabilitation		
Art. No.	Description (subject to change)	Product illustration (actual appearance may vary)
152200 230891 230794	<p>LCR-B Control Box with Hexagon adapter with nipple fitting for transition to LCR air push rod, and</p> <p>T-handle Allen wrench 10 mm for operating the LCR winding box</p> <p>The LCR-B control box controls the compressed air and the vacuum for the LCR-B packer.</p>	
refer to price catalogue	<p>LCR-B STEAM Packer Type 300 LCR-B STEAM Packer Type 1200</p> <p>(usable for both hot water or steam cure – for details about supplementary equipment for steam cure see chapter 3.3)</p> <p><u>Packer information required:</u></p> <ul style="list-style-type: none"> a) Main pipe diameter b) Lateral pipe diameter c) Connection angle 	
231274	<p>LCR-B Flex adapter for packer (ambient cure only)</p> <p>1/4" external thread</p>	
140500 232201	<p>1 kit LCR-B tripods for packer with holding rail for packer</p>	

3.1	Basic Equipment for Rehabilitation	
Art. No.	Description (subject to change)	Product illustration (actual appearance may vary)
123900	Compressed-air hose	
142000	LCR-B turning handle	
137201 137202 137203	LCR-B air push rods with safety coupler and lock 0,7 m 1,5 m 3,0 m	
121216	LCR-B Air Coupling SVS (hexagon nipple) for air push rod or compressed-air hose	

3.2		Packer-upgrading articles
Art. No.	Description (subject to change)	Product illustration (actual appearance may vary)
154200 <u>Sp. part no.</u> 231453 230948 231454 231370 231116	LCR-B repair kit for calibration hose in plastic systainer case comprising: <ul style="list-style-type: none"> • rag (380 x 380 mm) • instant glue (tube) • multipurpose cleaner (bottle) • LCR-B silicone patch (190 x 280 mm) • Silicone glue (tube with roll-up aid and spout) 	
Ref. To price catalogue	LCR-B Calibration Hose "DrainCali 300" Lateral Connection Length 280 mm DN 100/50 ... 200/200 mm; 45° or 90° Lateral connection length up to 1300 mm upon request (requires packer conversion)	
230755 230757 230759	LCR-B Packer Baskets DN*) 50 / 75 / 100 (for 45°and 90°) DN*) 125 (for 45°and 90°) DN*) 150 / 200 (for 45°and 90°) *) DN Lateral Connection	
231313 231378 231377	LCR-B spacer bushings with bolts and nuts: 22,5 mm for DN 100 35,0 mm for DN 125 47,5 mm for DN 150	
231379	LCR-B fixing plate set of 2 pieces.	

3.3	Supplements for the Steam Cure Method	
Art. No.:	Description (subject to change)	Product illustration (actual appearance may vary)
146910	LCR-B SteamPacker Adapter for Steam Cure	
231923 232175	Safety Relief Valve with wrench in 2 sizes (according to packer size) 1.0 bar 1.5 bar	
231922 231924	<p>epros®SteamGen V3/V6</p> <p>Electrically driven steam generators for portable use. Continuous vapour of 3 kg/h (240 V) resp. 6 kg/h (400 V).</p> <p>Made of Stainless steel; detachable boiler tank with automatic control of water level. Temperature and pressure gauges, over pressure safety valve, safety thermostat, system failure shut-off of boiler.</p> <p>For further details see Technical Data Sheet.</p>	 <p>illustration with – delivery without controll box (comp. 3.1)</p>
146993	Steam Hose Trellvast DN 9,5 Length 10 m	
231894 231895 231899 231900 231892 231893 231897 231898	<p>Two-component Epoxy Resin Systems, appropriate for steam cure method. Pot time 60 or 120 minutes / cure time at 80°C approx. 30 or 45 minutes</p> <p>15 kg epros®EPROPOX HC60 A (Harz) und 4,95 kg epros®EPROPOX HC60B (Härter)</p> <p>15 kg epros®EPROPOX HC120 A (Harz) 4,95 kg epros®EPROPOX HC120B (Härter)</p> <p>220 kg epros®EPROPOX HC60 A (Harz) 190 kg epros®EPROPOX HC60B (Härter)</p> <p>220 kg epros®EPROPOX HC120 A (Harz) 200 kg epros®EPROPOX HC120B (Härter)</p>	 <p>Cans prepared for the correct mixing ratio Barrels - mixing ratio to be calculated by the user</p> <p>(for more details see Tech. Data)</p>

4. Expendable items for rehabilitation

4.1 LCR self-sealing rings (hat profiles) and LCR- Liner		
Art. No.:	Description	Product illustration (actual appearance may vary)
See price-catalogue	<p>LCR-B hat profile 300 LCR-B hat profile 1200</p> <p>The material of the hat profile consists of a mixture of glass fibre (85%) and plastic fibre mat (15%).</p> <p>LCR-hat profiles are covered with PVC foil, the rim is reinforced.</p> <p>DN 50¹⁾, 70²⁾, 100, 125, 150 45° or 90°</p> <p>Wall thickness 3 – 5 mm according to version</p> <p>Standard length 280 mm (type 300)</p> <p>For types 1200 (lateral length 1200 mm) packer retrofitting is necessary</p> <p>¹⁾ NW = 44 – 50 mm ²⁾ NW = 63 – 71 mm</p>	
<p>Save storage space and money.</p> <p>See price-catalogue</p>	<p>LCR-Liner - multidimensional!</p> <p>Only 3 sizes for main sewer diameter (DN 100/200 – DN 100/300 – DN 350/600)</p> <p>Lateral connection DN 50 – DN 250 /45° or 90°.</p> <p>High quality material as described above.</p>	
Upon request	<p>Prepared LCR hat profiles and liners, packed in vacuum bag for quick, bubble-free and high-quality impregnation.</p> <p>Why not to use your existing LCR control unit for high-quality impregnation of LCR-liner and LCR hat profiles?</p> <p>Please use the vacuum function of the LCR control unit for this purpose!</p>	

4.2

epros[®] Resin Systems (ambient Cure) for the Rehabilitation of T-joints and Branches



Silicate Resin Systems

epros[®] SilicateResin Type W1 epros[®] SilicateResin Type S1

Comp. A (hardener) + B (resin)
Mixing ratio 1:2

Type W1: Pot life 15 min. (20 °C)
Cure time 115 min. (15 °C)

Type S1: Pot life 32 min (20 °C)
Cure time 260 min (15 °C)

Epoxy Resin Systems

epros[®] EPROPOX FC 15 epros[®] EPROPOX HC 30

Comp. A (Harz) + B (Härter)
Mixing ratio 100 : 33

FC15: Pot time 15 min (20°C)
Cure time 150 min (15°C)

FC30: Pot time 30 min (20°C)
Cure time 360 min (15°C)

Art. No.:	Description	Product illustration (actual appearance may vary)
116901 116903	Resin Cans epros[®] SilicateResin type W1 epros[®] SilicateResin type S1 26 kg (=Comp. B)	
116700	epros[®] Hardener for Silicate Resins 16 kg (=Comp. A)	
232256	epros[®] EPROPOX FC15 resin 6,0 kg (=Comp. A)	
231953	epros[®] EPROPOX FC15 hardener 2,0 kg (=Comp. B)	
231899 231954	epros[®] EPROPOX FC30 resin 15 kg (=Comp. A) epros[®] EPROPOX FC30 Hardener 4,95 kg (=Comp. B)	
116801 116803	Resin Drums epros[®] SilicateResin type W1 epros[®] SilicateResin type S1 250 kg (=Comp. B)	
116600	epros[®] Hardener 300 kg (=Comp. A)	

5.0

LCR tool boxes for rehabilitation and repair




Easy Service for you!

Now even easier: With only one basic toolbox or a basic integration box for both epros® LCR systems you are have the best equipment and the right supplementary system set. You can have on hand everything you need on the work site!

5.1	LCR basic toolbox	Article No. 5350 31372 All items can be also ordered separately
Individual Art. No.:	Description (subject to change)	Product illustration (actual appearance may vary)
231637	<p>Basic equipment for rehabilitation with epros®LCR-S or epros®LCR-B system used in connection with a particular supplementary kit Plastic box (Systainer type IV)</p> <p>Dimensions approx. 600 x 400 x 240 mm</p>	
5.1.1	LCR-B Supplementary kit for LCR Basic Tool Box	
	This kit contains LCR-S specific small spare parts, e.g. couplings, screws, seals, air hoses etc. For details and article numbers pl. refer to sales support.	
5.2	Integration box for LCR packer conversion	Article No. 5350 31374 All items can be also ordered separately
Individual art. No.:	Description (subject to change)	Product illustration (actual appearance may vary)
231637	<p>LCR basic integration box *)</p> <p>(Basic equipment for packer conversion from epros®LCR-S and epros®LCR-B system used in connection with respective supplementary kit)</p> <p>Plastic box (Systainer type IV)</p> <p>Dimensions ca.: 600 x 400 x 240 mm</p>	
5.2.1	LCR-B supplementary kit for LCR integration box	
	Spare parts especially for the LCR-B Packer conversion requirements For details and article numbers pl. refer to sales support	

6.0 Additional Material to be recommended

Art. No.:	Description (subject to change)	Product illustration (actual appearance may vary)
132302	Construction foil / Protection foil to put under - on spool Layer thickness 120 μ W = 4 m / L = 50 m folded 4 times (1 m)	

Summary conclusion

The LCR-B system is used to repair and permanently seal main/lateral interfaces and laterals of downpipes or underground house sewers up to 1300 mm down into the lateral (standard = 280 mm). This is possible also by steam curing (epros® SteamGen V3/V6).

The system can use either an LCR-B hat profile or an LCR liner.

The LCR-B hat profile in the main pipe seals the interface between the two pipe systems with its rim only, whereas the LCR liner is designed as a part liner in the downpipe or house sewer.

Application

Main pipe: DN 100 to DN 200
Lateral: DN 50 to 200 at 30° to 90°

Behaviour in bends

Depending on the actual host pipe run or on wrinkles formed in the installed liner:
45° for DN 100 main line
90° for DN 125 or larger main line
Wall thickness of 2 to 3 mm

Result:

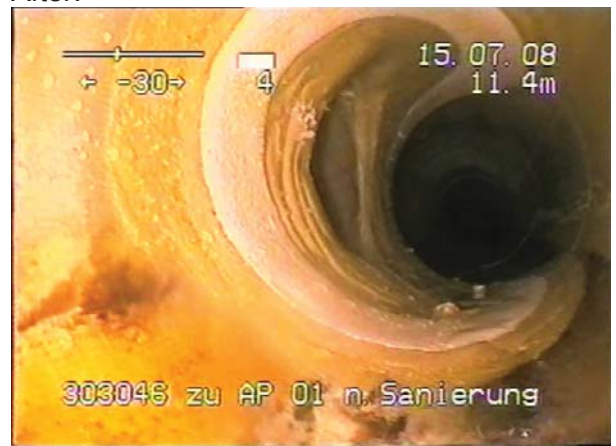
Before



Benefits

- Meets practical needs:
Successful repairs with little equipment needs only, even in the presence of bends.
- Price advantage:
Low investment cost, because you need to buy just the packers actually required.
- Practical:
The low-weight mobile unit with low space requirements can be placed even in a small car.
- Flexibility:
The job can be done with air push rods; no carriage needed.
- Accessibility:
The LCR-B packers can be folded as required.
- No risk of fire:
The resin system used for the liner system is self-extinguishing.

After:



DN 100 LCR-B hat profile installed in a clay pipe DN 125, 45° (example)

NOTES:



Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative engineered solutions accelerate performance for customers in a sustainable way. The Trelleborg Group has local presence in over 40 countries around the world.

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