



operating instructions

rehabilitation packers





Our goal is to provide users with practical Training and the use of suitable products, in conjunction with our developed equipment, to enable a renovation result in optimal quality and service life.

Our many years of experience in daily practice constantly inspires us to create obsolete processes optimize and perfect workflows.



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1. Prerequisites

For the safe handling and trouble-free operation of the HD rehabilitation packers, the knowledge and observance of these operating instructions and the safety instructions is crucial.

For long-term use, DIN 7716 must be observed.

The current occupational health and safety rules as well as the accident prevention regulations must always be observed. These operating instructions are part of a safe handling of the product and must be provided in case of passing on the renovation packer.

Intended use

This manual applies to the following HD products:

- **lateral HD packers**
- **HD bendy packers**
- **HD TYger**
- **revision packer**

Our rehabilitation packers have been developed for use in sewer rehabilitation. They are used to repair local damage in the sewer or pipe. They are suitable for repairing damage with the help of ECR GFK laminate or synthetic fibers.

Our range of applications is tailored to pipelines of DN 25-1000.

Any other or further use shall be deemed not to be in accordance with the intended purpose!

Unintended use of HD packers include:

Unintended use of HD sanitation packers includes:

- Improper operation, operation or maintenance of the remediation chippers.
- Operation of the HD rehabilitation packers in case of defective safety devices or not properly installed or non-functional filling fittings.
- Non-observance of the instructions in the operating instructions regarding storage, operation and maintenance of the renovation packers.
- Poor monitoring of accessories subject to wear.
- Improper maintenance.
- Use of the refurbishment packer for other operational purposes.
- Use in animals and humans.



2. Precautions



2.1 General information

- Applying compressed air to the packers outside the pipeline is not possible permissible. (Please use an empty tube!)
- The pipes to be rehabilitated must be cleaned without residue (protruding cullets/nozzles etc. must be levelled with the inner wall of the pipe)
- HD packers must not be kinked during storage.
- HD packers are protected from direct sunlight or UV radiation as well as chemicals to protect.
- In the event of optical damage, the packer can no longer be put into operation.
- HD sewer rehabilitation packers are operated with oil-free, cold compressed air.
- Before commissioning, all connections must be checked for leakage and function.
- The maximum operating pressure varies and is according to the technical product data sheet absolutely to be adhered to!
- Mechanical, chemical or thermal influences must be avoided.
- Choose the right size of the packer with regard to the pipe diameter and check the correct position in the pipe (see Packer label: DN Range)
- The personal protective equipment necessary for the implementation - protective clothing, gloves, helmet, face and/or eye protection - must be worn.

2.2 Hazard statements

Changes and modifications to the packers, filling fittings and filling hoses are not permitted. Rehabilitation packers are made of a highly stretchable material. If these are stretched beyond their maximum permissible range, this can lead to burst failure. No persons may be present in the work area during the renovation work. After positioning the packer, ensure that no one is in the shaft or in front of the pipe during the filling, rehabilitation and emptying process.

2.3 Warnings

Outside pipelines, HD rehabilitation packers may only be filled up to a maximum of 0.5 bar for visual inspection.

3. Preparation of the packer operation

3.1 Check for completeness + security

- Packers and accessories are tested
- The surface of the packer must not be damaged mechanically or chemically have: cracks, blistering, covering of the fabric insert
- The filling coupling and the wheelsets must function properly.
- The control unit and the connecting hoses must not be damaged.
- Clean the packer after each use. Do not use aggressive detergents.

3.2 Packer Size Selection

- Each packer is designed for a specific diameter. This area is available on the label of the packer.
- Before use, measure clear pipe width and check whether it is in the area of the packer.
- The refurbishment packer must not be used outside the specified range.

3.3 Protective workwear

- When working with the renovation packers, work clothes, safety helmet, safety goggles and gloves as well as if necessary, to wear respiratory protection.
- Important! All regulations and instructions regarding access to the sewer shaft are strictly to be observed.

3.4 Previous pipe cleaning

Shards, mud, sand, root ingrowth, stones and other sharp objects must be properly removed before the packer is inserted. In most cases, pressurized water is necessary or the use of mechanical milling work. A check of the pipeline by camera after cleaning is recommended.

3.5 Protecting packers from chemicals

- Before wrapping the packer with the impregnated glass fibre mat, the renovation packer must be provided with a PE film (20my stretch foil) or an appropriate protective hose that prevents the chemical reaction between rubber and resin.
- Insufficient protection of the packer jacket can cause a chemical reaction and damage to the rehabilitation packer. Therefore, no Solvents, hydrocarbons and other aggressive agents can be used as protective coatings.

4. Operation of the rehabilitation packers

4.1 Apply resin to fiberglass mat or synthetic substrate

- Apply the desired resin evenly to the carrier material according to the manufacturer's instructions.

4.2 Wrap or pull carrier material onto packer

- Wrap impregnated ECR laminate mat around packer and fix with suitable fixing material (rubbers). Too rigid fixing material (steel wire) can prevent the packer from expanding evenly.
- alternatively put the felt liner or cuff on packer and fix it as well.

4.3 Blowing and pre-stretching renovation packer

- Blow the packer with approx. 0.2-0.3 bar to prevent the mat from slipping during the insertion process.
- When working in the largest dimension of a lateral rehabilitation packer, the packer must be pre-stretched covered with stretching film in an empty conduit (one dimension smaller is sufficient), in this case the stretch film is wound twice.
- Bendy packers must not be pre-stretched under any circumstances!

4.4 Placement of the packer at the damaged point

- Position the rehabilitation packer at the damaged area by means of traction or pushing aid or chassis by means of TV monitoring, if necessary. Use wheels or brushes to avoid loss of resin in contact with the inner wall of the pipe.

4.5 Applying installation pressure to packers

- Apply installation pressure to the refurbishment packer according to the table and immediately drain the packer completely. This process breaks the resistance between carrier material and expansion behavior and ensures a subsequent lower operating pressure.



4.6 Rehabilitation with lower operating pressure

- Adjust and regulate the working pressure via pressure regulator. Apply working pressure to rehabilitation packers according to the table and observe curing times of the resin according to the manufacturer's instructions.

!! Warning!!

Staying in the danger zone is prohibited.

An accident can have life-threatening consequences.



4.7 Finish rehabilitation

- Drain the packer completely after the curing time has been reached and then remove it from the pipe. Use the Gffls towing eye on the coupling. After renovation, clean, dry and allow the packer to cool. Do not use aggressive cleaning materials, as it is a rubber product.



5. Care, maintenance and storage

5.1 Regeneration of the packer with frequent use

If the rehabilitation packer is used for several applications in the largest dimension in succession, thermal influences occur during the curing process and are transferred to the rubber expanded body. If the packer is used for the next use in the largest dimension, it must be cooled down before the next use (approx. 1-2h) or the pressure on sight via TV camera must be reduced during the subsequent use, as heated rubber expands more easily.

! If the pressure is not reduced, it can lead to overpressure on the end closures of the packer, which can cause the packer to burst!

5.2 Packer Recovery after Use in Dimension Jump/Curvature - Memory Effect

If the rehabilitation packer is used for a dimensional jump (e.g. rehabilitation site between DN 70 and 150), the rehabilitation packer will rise irregularly during the next use, as the rubber remembers the expansion of the previous use. In order to correct this, we recommend applying compressed air to the rehabilitation packer in an empty conduit one dimension lower than in previous renovation (in this case DN125) and leaving it for about 20 minutes. Then drain completely. Now your renovation packer is ready for the next use with regular flatulence.

5.3 Storage

Store renovation packers in a cool and dry place, no permanent direct sunlight, do not kink, long packer gffls. roll up tightly and wrapped with stretch film.



6. Calculation of working length

We generally recommend adhering to the maximum working length, especially the longer the packer gets.

Danger of too short working length: -Trumpet due to compression of the material
- Damage to packer and pipe possible

Risk of excessively long working length: -Working with overpressure around contact surface to extend, thereby damage to packers



Schlauchlänge / length of tube

Arbeitslänge / Laminatlänge
length of application

1/2 C

1/2 C



Packerlänge - Wert C aus der Tabelle = Arbeitslänge

(Wert C nur einmal abziehen, Material dann mittig auf Packer positionieren!)

Length of packer - figure C = length of application

(subtract value of figure C only once, then place the material in the middle of the packer!)

Beispiel/example:

Packer 50-150, 42mm, Länge/length 100 cm -

100 cm - 30 cm = 70 cm Arbeitslänge/length of application

7.1 packer lateral

The HD-Lateral-Pipe-Repair-Packer is inflated inside empty pipe with the initial air-pressure (A) for about 5 seconds in order to press the packer to the inner surface of the Pipe. Immediately after that, the packer must be totally emptied from initial air pressure. The packer is then ready for operation under the pressure of application. For further use strictly hold on to the pressure of application. Expanding parts should be kept inside the pipe in order to avoid damages. Don't buckle the packer while stored.

Air-Pressures according to diameters HD- Lateral-Pipe-Repair-Packer at 20°C / 68°F initial air-pressure (A)*, pressure of application (B)*, maximum length of application in cm (C)** packer Type DN / diameter packersize dimension DN Max

packer type DN / diameter	packer size dimension DN													
		25	30	50	60/70	100	125	150	200	250	300	400	500	1000
25-60 mm / 20 mm	A	3	3,5	3,5	4									
	B	2,5	3	3	3,5									
	C	8	9	10	12									
30-100 mm / 28 mm	A		2,5	2,5	3	3,5	-	-	-	-	-	-	-	-
	B		2	2	2,5	3	-	-	-	-	-	-	-	-
	C		15	15	15	20	-	-	-	-	-	-	-	-
50-150 mm / 42 mm	A		-	2	2	2,5	3	3	-	-	-	-	-	-
	B		-	1	1,5	2	2	2,5	-	-	-	-	-	-
	C		-	20	25	30	30	35	-	-	-	-	-	-
70-200mm / 56 mm	A		-	-	2	2	2	2,5	3	-	-	-	-	-
	B		-	-	1	1	1,5	2	2,5	-	-	-	-	-
	C		-	-	20	25	30	30	35	-	-	-	-	-
100-250mm / 66 mm	A		-	-	-	2	2	2,5	2,5	3	-	-	-	-
	B		-	-	-	1,5	1,5	2	2	2,5	-	-	-	-
	C		-	-	-	25	30	35	40	45	-	-	-	-
125-300mm / 90 mm	A		-	-	-	-	2	2,2	2,5	2,5	3	-	-	-
	B		-	-	-	-	1,5	1,5	1,5	2	2,5	-	-	-
	C		-	-	-	-	30	35	40	45	50	-	-	-
200-500 mm / 150 mm	A		-	-	-	-	-	-	1,5	1,5	1,5	1,5	1,5	-
	B		-	-	-	-	-	-	1	1	1	1	1,3	-
	C		-	-	-	-	-	-	35	40	50	60	80	-
400- 1000 mm / 350 mm	A		-	-	-	-	-	-	-	-	1,5	1,5	1,5	1,5
	B		-	-	-	-	-	-	-	-	1,2	1,2	1,2	1,2
	C		-	-	-	-	-	-	-	-	80	90	115	140

* Air-pressure may differ up to 0.3 bar (30000 Pa) due to thermal influences

** Packer length less figure C equals length of tube

7.2 bendy packer

The HD bendy packer is inflated inside empty pipe with the initial air-pressure (A) for about 5 seconds in order to press the packer to the inner surface of the Pipe. Immediately after that, the packer must be totally emptied from initial air pressure. The packer is then ready for operation under the pressure of application. For further use strictly hold on to the pressure of application. Expanding parts should be kept inside the pipe in order to avoid damages. Don't buckle the packer while stored.

Air-Pressures according to diameters HD- Lateral-Pipe-Repair-Packer at 20°C / 68°F initial air-pressure (A)*, pressure of application (B)*, maximum length of application in cm (C)**

packer type DN / diameter	packer size dimension DN									
		40	50	70	100	125	150	200	250	300
BP 40 40 mm / 22 mm	A	4								
	B	3,5								
	C	10								
BP 50 50 mm / 30 mm	A	-	4	-	-	-	-	-	-	-
	B	-	3,5	-	-	-	-	-	-	-
	C	-	14	-	-	-	-	-	-	-
BP 70 70 mm / 35 mm	A	-	-	4	-	-	-	-	-	-
	B	-	-	3,5	-	-	-	-	-	-
	C	-	-	1	-	-	-	-	-	-
BP 70100 70 mm - 100 mm / 40 mm	A	-	-	3,5	4	-	-	-	-	-
	B	-	-	3	3,2	-	-	-	-	-
	C	-	-	20	25	-	-	-	-	-
BP 100 100 mm / 50 mm	A	-	-	-	3,5	-	-	-	-	-
	B	-	-	-	3	-	-	-	-	-
	C	-	-	-	20	-	-	-	-	-
BP 100125 100 mm - 125mm / 60 mm	A	-	-	-	3	3,5	-	-	-	-
	B	-	-	-	2,5	3	-	-	-	-
	C	-	-	-	18	20	-	-	-	-
BP 100150 100 mm -150 mm / 64 mm	A				3	3,5	4			
	B				2,5	3	3			
	C				18	20	26			
BP 125200 125-mm - 200mm / 78 mm	A	-	-	-	-	3	3	3,5	-	-
	B	-	-	-	-	2,5	2,5	2,5	-	-
	C	-	-	-	-	20	25	30	-	-
BP 150230 150 mm - 230 mm / 95 mm	A						3	3	3,5	
	B						2,5	2,5	2,5	
	C						20	25	30	
BP 250300 250 mm - 300 mm 150 mm	A								2,5	2,5
	B								2	2
	C								50	60

* Air-pressure may differ up to 0.3 bar (30000 Pa) due to thermal influences

** Packer length less figure C equals length of application

packer lateral



bendy packer



HD



Rohrsanierungspacker

- Mechanisch-physikalische Eigenschaften
- Berstdruckprüfung
- Wirkungsweise geprüft

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edition 02/2023