QuickLock is NSF/ANSI 61 Certified for use in potable water.
QuickLock meets ASTM Standard F3110-14.
IMPORTANT DISCLAIMER:

This manual is subject to change without notice. Updates can be obtained online at www.rauschusa.com/quicklock. This manual does not guarantee the product will work properly. The manual cannot take the place of your own experience or practical instruction by the manufacturer. Contact a RAUSCH Certified Installer to ensure proper installation. The following are important disclaimers to consider before using the QuickLock system.

1. QuickLock installations are to be performed only by trained and qualified personnel, using adequate and safe equipment.

2. Read and follow the instructions, as described in this manual before attempting installation.

3. Prior to beginning the installation, verify that all the equipment and components involved are undamaged and in proper working condition.

4. The use of equipment other than a certified Rausch packer and components will void the functionality warranty. Using a Rausch QuickLock packer for non-OEM installations/sleeves risks damages to the device or potentially injuring the operator, and voids all product warranties.

5. **Pressure gauge** must have the proper range setting (0 – 70psi).

6. **NEVER** exceed the maximum packer pressure as indicated in the manual.

7. **NEVER** inflate the packer outside of a pipe – serious bodily injury or death may occur!

8. QuickLock is designed for and must only be used in municipal sewer, storm sewer and potable water environment. For use in potable water, a special rubber gasket is required. For all other applications, please consult Rausch prior to use.

9. **Do not** use QuickLock in broken pipes with protruding objects.

10. Verification of lines **inner diameter / I.D. must be known** as accurate as possible in order to ensure the correct sleeve is used. Refer to the Data Sheet at the end of this manual.

11. If after reading this manual you have any questions or concerns, please contact **Rausch USA**.
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1. **Description of the QuickLock System**

1.1. **Intended Use**

QuickLock is an entirely mechanical, seamless assembly system for patch repairs inside pipes ranging from 6” to 32” pipe diameter in any common wastewater, well, or drinking water pipe system.

- A perforated version is available for stabilizing drainage pipes.

1.2. **Regulations**

The basis and general specification for pipe repairs using the Quick-Lock system is:

- DWA data sheet M143 Part 5
  
  “Repairing wastewater pipes and sewers with internal sleeves”

1.3. **Certifications**

The QuickLock system for pipe diameters 6” – 28”:

- Has been certified under building law by the German Institute for Civil Engineering (DIBt) since 2005.
- The system is also certified as resistant to jetting in accordance with DIN 19523.
- Meets ASTM F3110-14 Standard Practice for Proper Use of Mechanical Trenchless Point Repair Sleeve with Locking Gear Mechanism for Pipes of Varying Inner Diameter and Offset Joints
- NSF/ANSI 61 certified for use in potable water.

For pipe diameters from 6” to 24”, there is a structural standard for host pipe state II, based on a hydrostatic water pressure of 7.25 psi (0.5 bar) and twofold structural safety.
1.4. Components and functions

1.4.1. Stainless steel sleeve

1- Beveled End
The beveled end faces the direction of flow and improves the hydrodynamics, prevents solids from depositing, and increases jetting resistance.

2- Metal Overlap
The steel sleeve is rolled up smaller than its nominal diameter. The overlap is what is left over for expanding to the pipe wall.

3- Toothed Strip
The locks that keep the sleeve expanded run along the toothed strip.

4- Lock
The lock is a small set of gears that only moves in one direction, thus keeping the sleeve expanded.

5- Adhesive Tape
The tapes are put on at the factory to protect the sleeve during the transport and prevent it from unrolling.

6- Plastic Rivet
The plastic rivet prevents the sleeve from unrolling and is sheared off during inflation.

1.4.2. Rubber gasket

7- Circumferential seals
The actual seal is formed by the circumferential seals compressed against the host pipe. The damaged section must always be between these seals.

8- Trimming Line
There is a trimming line marked in the rubber gasket. It shows you where to cut off the projecting rubber end (when a single sleeve is installed).

9- Projecting Rubber End
The projecting rubber end acts as a seals between sleeves installed in a series.

Cross section of steel sleeve and rubber gasket.
1.5. **Description of the system and installation procedure**

QuickLock consists of:

- A rolled up 316L stainless steel sleeve
- A rubber gasket
- The damaged section is repaired and sealed by permanently clamping the steel sleeve in place.
- This exerts a pressing force which compresses the rubber gasket against the inside of the pipe.
- The area between the circumferential seals (1) is completely sealed.

When the steel sleeve is manufactured, it is rolled tighter than the diameter of the pipe to be repaired.

Two toothed strips are punched into the sleeve, on the left and right.

- In each toothed strip there is a lock.
- The lock is for clamping the steel sleeve.
- The lock can only move in one direction and stops the sleeve from contracting once it has been expanded.

The lock moves along the toothed strip (to the left as shown here).

This means that the steel sleeve can only expand in one direction.

The lock prevents it from contracting again.

The increments are only 0.65 mm (.025"), which means that the sleeve is almost infinitely adjustable.

How it works: The middle gear wheel is on a spring and acts as a ratchet for the others.
1.6. **Suitability and materials used**

### 1.6.1. Properties of the pipe to be repaired

QuickLock can be used to repair all common types of pipe:

- Vitrified clay pipes
- Concrete pipes
- Plastic pipes (see section 2.6.5)
- Glass-reinforced plastic pipes
- Cast iron pipes
- Steel pipes

QuickLock is only suitable with restrictions in the following cases:

- Pipes with bends and fittings
- Pipes with damage near the building connections (sockets, branches)
- Pipes with joint misalignments of more than 2.5 cm (0.98”)

In such cases, please contact us.

### 1.6.2. 316L Stainless Steel

The QuickLock sleeve is made of 316L stainless steel of grade 1.4404. This grade of stainless steel is characterized by its high corrosion resistance.

- Quick-Lock is designed for use in municipal wastewater systems.
- For use with industrial wastewater or where the wastewater contains high levels of chloride salts, the required corrosion resistance must be ascertained.
- 316L stainless steel of grade 1.4404 may be used up to a chloride concentration of 600 mg/l.

### 1.6.3. EPDM Rubber

Like the steel sleeve, the thermoset polymer EPDM gasket is designed for municipal wastewater systems. EPDM is characterized by its excellent physical properties and its resistance to aging, ozone, weathering and environmental effects, alkalis, and various chemicals.

EPDM is unsuitable, or only suitable with restrictions for:

- Solvents
- Ethers, esters, ketones, methylene chloride
- Animal and vegetable fats, oils, fuels
- Concentrated fruit juice, oxidizing acids

**Special version for oils, greases and hydrocarbons**

An NBR rubber gasket is available on request for use with oils, greases, and hydrocarbons. (NBR: nitrile butadiene rubber)

**Special version for potable water.**

A special NSF61 certified rubber gasket is required for potable water installations. Available on request.

### 1.6.4. Industrial Use

QuickLock is also suitable, with certain restrictions, for industrial use, depending on the properties of the fluids.

**Note:** Before using QuickLock in industrial, non-municipal wastewater systems, the corrosion resistance of the 316L stainless steel and the EPDM gasket must be verified.
1.6.5. Types of Pipe Damages

- Crack formation (longitudinal, radial and transverse)
- Fragmentation
- Leaking joints
- Displacement / joint offset
- Closing/sealing dormant unused laterals
- Corrosion/ bursting / wear (reinforced concrete pipes with exposed reinforcement)
- Leaks (ground-water infiltration and exfiltration)
- Improvement of the structural strength of pipes (cracks and fragmentation, deformations)
- Root penetration

Length of damage

When installed individually, QuickLock can be used for instances of damage up to the following lengths:

- 6” – 16”: maximum damage length 10.62” - 11.81” (see Technical Data Sheet, sealed area)
- 18” – 32”: maximum damage length 11.02” – 13.38” (see Technical Data Sheet, sealed area)

Instances of damage that are longer than this can be repaired by installing multiple sleeves in a series.

1.6.6. Durability

QuickLock repairs are extremely durable.

The materials used – stainless steel and EPDM – have proven their worth in municipal wastewater systems for decades. A service life of more than 50 years can be expected.
2. How to Install QuickLock

2.1. Preparation

2.1.1. Pipe Inspection

Before using QuickLock, the pipe must be inspected to ascertain whether it can be repaired with the system.

There must be at least one access via a manhole or inspection chamber.

The accessible manhole should have a diameter of at least 24 inch, in order to properly ensure setting up the camera/tractor system and the QuickLock installation packer.

2.1.2. Pipe Preparation

- Prior to installing the QuickLock system, the pipe must be cleaned by using a high-pressure jetter.
- Hardened deposits, root infiltration, connection sockets protruding into the pipe must be removed by means of suitable milling or cutting tools.
- The pipe must be free of obstacles that could prevent the packer from traveling through.
- The section of pipe to be repaired must be free of all solids such as sand and gravel, hardened deposits, or wastewater solids.
- Joint offsets larger than 0.39 inches must be milled off, if only a single sleeve is to be installed. If (2) sleeves are available, a different installation method can be chosen. (See 2.3.3)
- As a general rule, the QuickLock repair work can be completed during normal sewer operation, however, the flow-level should be no more than approx. 20% of the sewer’s cross section. If too many foreign objects are washed-in during the repair process, this pipe will need closed off and by-passed - just to play it safe.

Notes for Nominal Diameter 28” & 32”

When using the QuickLock 28” sleeve, the top rungs in the manhole have to be removed.

The QuickLock 32” sleeve will not fit through a 24.5” manhole entrance – rolled up, its diameter is 27.36”.

- The cone section of the manhole must be removed.
- Depending on the type of damage, the QuickLock BIG 32” sleeve, which comes in two sections, can be used.
2.1.3. Space required by the packer

Example for the space required by the packer + sleeve in a pipe:

![Diagram showing space required by the packer + sleeve in a pipe]

The center line of the packer is approximately 0.5 cm below that of the pipe. This means the distances above and below the sleeve are slightly different.

*Example calculation for space requirements:*

*Pipe diameter:* 300 mm

*Diameter of Q.L. rolled up, including rubber gasket:* 250 mm (see technical data sheet)

300 mm – 250 mm = 50 mm above and below in total

**Above:** 50 mm / 2 = 25 mm + 5 mm (pipe/packer offset) = 30 mm

**Below:** 50 mm / 2 = 25 mm – 5 mm (pipe/packer offset) = 20 mm

**The packer can pass through sleeves that have already been installed**

The sleeves are designed so that once they have been installed, the packer can pass through them with another rolled-up sleeve, except for the 6” version.
2.2. Equipment, Material and Preparations for the QuickLock Installation

2.2.1. Equipment

For a reliable installation of the QuickLock system, the following equipment should be available:

- Inspection camera, adjusted to the correct nominal diameter of the pipe. Ideally, the camera is equipped with a pan & tilt and zoom feature.
- QuickLock packer for correct diameter
- QuickLock transfer bar to connect camera and packer
- Quick air-vent valve (see 2.3.11)
- An air compressor and tank with a minimum output of 80 psi and pressure regulator ranging from 5 – 60 psi.
- An air-hose on a reel with a minimum hose length of 350ft.
- A milling robot for preparatory jobs

2.2.2. Material

The following materials and tools are necessary for the preparation of the QuickLock sleeve

- Sharp knife
- Talcum powder
- Superglue
- Biodegradable penetrating oil or food-grade lubricant
- Hydrophilic waterstop (for groundwater infiltration and exfiltration only)
- Mineral-based flexible mortar (root penetration, corrosion on reinforced concrete pipes)
2.3. Selecting the QuickLock Sleeve

Beveled and non-beveled versions of each QuickLock sleeve are available.

2.3.1. With beveled end

The beveled QuickLock sleeve improves flow, increases jetting resistances, and makes a better looking fit. It closes the gap between the QuickLock sleeve and the host pipe wall with a beveled end.

The beveled end of the stainless steel sleeve corresponds to the thickness at which the rubber can no longer be compressed, so that it does not exert pressure on the damaged host pipe.

When installed individually, a sleeve with a beveled end is always used.

When installed in series, the first sleeve in the direction of flow always has a beveled end.

2.3.2. Without beveled end

Sleeves without beveled ends are mainly used for installation in series (except for the first sleeve used in direction of flow).
2.4. Preparing the QuickLock sleeve

2.4.1. Setup & Inspection

- Check the QuickLock sleeve and rubber gasket for visible damage.
- Set up the QuickLock sleeve so that the lettering on the adhesive tape is upside down.

2.4.2. Lubricating the sleeve

- Use biodegradable lubricant.
- Pry apart the metal overlap with a screwdriver.
- Lubricate the metal overlap so that the sleeve will slide apart evenly.
- Lubricate both of the two locking gears.
- Wipe off excess lubricant from the inside and outside of the sleeve.
- **Note:** The lubricant must not get on the inner or outer side of the EPDM rubber gasket.

2.4.3. Cutting the transportation tapes

Around the sleeve there are at least two strips of tape to stop it from unrolling during transport.

- **The plastic rivet (1) must remain in the sleeve!** It will be automatically sheared off during expansion.
- **Cut half-way through the tapes on the metal overlap.**
- **Note:** If you cut right through the tapes, there is a risk that the sleeve might unroll when entering the pipe, thus restricting its movement and causing the sleeve to become unusable.
- **Note:** If you do not cut the tapes at all there is a risk that the sleeve might unroll too suddenly during installation when the tape tears, and destroy the locking gears.
- **Note:** Once you have cut the transportation tapes on a QuickLock sleeve, the sleeve is considered used and cannot be returned.
2.4.4. Apply talcum powder to the rubber gasket

- For easier handling, sprinkle talcum powder on the inside of the rubber gasket.
- Completely coat the inside surface.
- **Note:** We also recommend applying some powder directly to the stainless steel sleeve body, but this is not required.
- This makes it easier to slide the rubber gasket over the sleeve.
- It also reduces the friction between the rubber and the steel sleeve during expansion.

2.4.5. Slipping on the rubber gasket

- If the sleeve is beveled on one side, make sure you slip the projecting rubber end over the straight edge.
- Slide the EPDM over the sleeve with the rubber extension located at the top.
- Slide the rubber gasket over the steel sleeve so that the marking seam is flush with the edge of the sleeve.

2.4.6. Trimming (if necessary)

When installing a single sleeve, always trim the projecting rubber end from the sleeve.

Make sure beforehand that the distance between the circumferential seals is enough to seal the damaged area.

**Single Installation**

- Use a sharp carpet knife or industrial scissors.
- Cut along the marking seam.

**Serial Installation**

- When installed in a series, the projecting rubber end is left on so that the join between the sleeves is sealed, **except** on the last sleeve to be installed.
2.4.7. Centering the rubber gasket

- Center the gasket on the sleeve so that the edge of the rubber is at least 0.2-0.4" (5–10 mm) behind the edge of the sleeve, or on beveled sleeves behind the edge of the beveled end.
  1) 0.2-0.4" (5-10 mm)
  2) 0.2-0.4" (5-10 mm)

2.4.8. Affixing the rubber gasket

- To stop the rubber gasket from shifting on the steel sleeve during transportation to the damaged area, affix the gasket to the sleeve with a spot of superglue above the locks on both ends (@ 12 o’clock), as well as opposite both sides of the stainless steel sleeve (@ 6 o’clock) using superglue.
- Glue at four locations with approx. ½ inch strip of glue at each spot.
- Note: Do not allow glue to drip onto the metal overlap, because it will stick and prevent the sleeve from opening.
- Note: If the rubber gasket is not properly affixed, there is a risk that it might unfold and bunch up at a constricted point in the pipe without you noticing.
2.5. QuickLock Installation
2.5.1. The Packer

The QuickLock sleeves are installed using a special OEM trolley called a packer.

- Each packer can be used for at least two different nominal pipe diameters (and the special intermediate sizes in between – see Section 3 – “Technical Data Sheets”).
- For each nominal pipe diameter, there is a suitable set of wheels, or a set of wheels with a wider track. (See Section 4 – “QuickLock Wheel Set Charts”)
- Special diameter sleeves usually require special sets of wheels, which are available upon request.

The packer is usually connected to the camera or robot using a transfer bar and two ball joints.

Using a camera

The QuickLock system can be installed most efficiently when the packer is positioning using a camera. Push rods or other insertion apparatus can also be used. However, a camera must be used during installation.

Adjustable packer with sliding chassis

As of 07/2015, two offset packers with adjustable sliding chassis are available:

- Packer I: 8”-12” packer
- Packer II: 14”-20” packer

See “Adjustable Packer” Section 5.2 – “Operation” for further instructions on Page 48 and 49.
2.5.2. Positioning the QuickLock sleeve on the packer

2.5.2.1. Standard Packer - Putting on the wheels

- Select the correct set of wheels for the pipe diameter (see Section 4 – “QuickLock Wheel Set Charts”)
- Attach the front wheels before placing the sleeve.
- Attach the rear wheels after placing the sleeve on the packer.

OR

2.5.2.2. Adjustable Packer – set to nominal diameter

- Set the sliding chassis of the packer to the nominal diameter of the host pipe
- See “Adjustable Packer” Section 5.2 – “Operation” for further instructions.

2.5.2.3. Aligning the sleeve on the packer

- The sleeve is usually positioned on the packer (while in the manhole / before placing the packer in the manhole).
- When installing beveled sleeves, the beveled end should face against the direction of the flow.
- Slide the sleeve over the end of the packer without wheels.
- Position the QuickLock sleeve forward so that it is flush with the front edge of the packer.

2.5.2.4. Laser alignment

- If you are using a packer equipped with a laser, position the sleeve so that the laser beam is reflected both on the edge of the sleeve and the host pipe.
- In both cases, the camera gives you a good view of the edge of the sleeve.
2.5.2.5. **Aligning the locking gear strip**

It is a good habit to always position the sleeve on the packer with the ends of the toothed strips facing the same direction.

The sleeves would be regularly aligned in the pipe, especially when multiple sleeves are installed.

**Turning the toothed strip upwards, to the 11:00 or 1:00 position**

- Turn the QuickLock sleeve so that the middle of the toothed strip is in the 12:00 position.
- Depending on which way you look at it, the **locking gear** will be in the 11:00 or 1:00 position.
- After installation, the locking gear will always end at the top, in the 12:00 position.

**Turning the locking gear to the 12:00 position**

- Depending on the design of the camera or the transfer bar, it may be necessary to position the sleeve on the packer with the locking gear in the 12:00 position, especially when installing in a series and where movement is restricted. This prevents the transfer bar from catching in a previously installed sleeve.
- It can also be preferable during serial installation if the view through the transfer bar is impaired by the locks on a sleeve that has already been installed.
- After installation, the locking gears will be in the 11:00 or 1:00 position.
- If the QuickLock sleeve is positioned on the packer with the lock in the 12:00 position, the weight is balanced.
- This makes it easier to transport, especially in narrow pipes. It also reduces the risk of the packer tipping over in the pipe.

2.5.2.6. **Charging Device to hold position in place**

The charging device is used to inflate the packer to a holding pressure which keeps the sleeve from shifting. **To be done outside of the manhole.**

- Attach the charging device to the air hose.
- Position the sleeve on the front of the packer.
- Connect the charging device directly to the packer with the sleeve and wheels already in place.
- Inflate the packer to a holding pressure of approx. 8 psi, or enough to hold the sleeve in place on the packer securely. This holding pressure may vary from packer to packer, therefore it is the user’s responsibility to safely secure onto packer.
- The holding pressure is correct when the sleeve is firmly held on the packer but does not start to open.
- **When not using a camera/tractor:** Proceed to next step with the charging device still attached.
- **When using a camera/tractor:** Close the valve on the packer and disconnect/remove the charging device.
2.5.3. Single Installation Procedure

QuickLock sleeves can be installed individually to repair areas of damage smaller than the distance between the circumferential seals. See Appendix 1, Technical Data Sheet, Sealed Length.

Serial installations are used to install larger areas of damage. 

*It is advisable to install individual QuickLock sleeves from the downstream manhole so the flow does not block the view of the camera.*

The most efficient and reliable way to install a QuickLock sleeve is by pushing the packer with a camera tractor system. However, other means are possible, too: Telescopic rods or pulling the packer through the pipe. Nevertheless, a camera should always monitor and record the installation process.

- When access to two manholes is possible, it is a lot easier to set up the camera with the packer in one manhole, run the tractor through the pipe to the second manhole, fetch the sleeve and then go back. It is easier to “load” the packer that way.

For single installations, always use beveled sleeves.

- The beveled end must always face against the direction of the flow.

2.5.3.1. In the manhole

- Connect the packer to the camera and the mounting bracket using the transfer bar.
- **If using a charging device:** Connect the air hose to the bracket and open the valve on the packer. **IMPORTANT:** if you fail to perform this step, the packer cannot install the device; no air flows in or out of the packer.
- **If not using a charging device:** Connect the air hose to the bracket and inflate the packer to a holding pressure of approx. 8 psi, or enough to hold the sleeve on the packer securely. This keeps the sleeve from shifting during transportation.
### 2.5.3.2. Positioning the packer & sleeve

Positioning the packer with the QuickLock sleeve over the center of the damaged area can be done by three different ways:

1) By sight
   - Position the sleeve using only the image from the camera.

2) By measuring
   - Use the tractor’s distance counter to measure the distance.
   - Or use other reliably means.
   - Position the middle of the sleeve over the center of the damaged area.

3) By laser (preferable)
   - Align the sleeve with the laser on the front of the packer beforehand.
   - (1) Position the laser on the center of the damage.
   - (2) Move the packer forward by half the length of the sleeve.

### 2.5.3.3. Positioning Pressure

**Caution Notes for Positioning Pressure:**

- For longitudinal cracks and fragmentation, particularly in glazed clay pipes, do not expand the packer outside the sleeve, because this can damage the host pipe.
- When expanding, make sure the sleeve opens easily. The sleeve opens more easily if the metal overlap is lubricated.
- **Particularly in 18”-32” pipes**, the sleeve needs plenty of time to open the full distance. Increase the pressure to the sleeve in stages and let it expand to the fullest extent for each stage.
- If you notice that the sleeve is obstructed or not opening smoothly, reduce the application pressure and reposition the packer so that the middle of the balloon is in line with the middle of the sleeve.
- If the sleeve is expanding eccentrically (off center), it can produce torsion which may damage the locking gear or the toothed strips.

Start pressing the QuickLock sleeve to the wall of the pipe with a **positioning (or set) pressure** of approximately 29 - 36 psi. Do not inflate to installation pressure so that you can reposition the packer.
2.5.3.4. **Deflating & Aligning in Center**

- Deflate the packer balloon slightly so that you can reposition it in the middle of the sleeve.

![Deflating & Aligning in Center](image1)

2.5.3.5. **Align in Middle**

- Align the packer so that the middle of the balloon is in line with the middle of the sleeve.

![Align in Middle](image2)

2.5.3.6. **Application Pressure**

- Now apply application pressure of 50 - 72 psi (depending on the damage and type of pipe).

![Application Pressure](image3)

- Repeat the same procedure – reduce pressure, re-apply the application pressure.

- The rubber seal is now sufficiently compressed.

2.5.3.7. **Inspection**

- Using the camera, check that the sleeve is correctly fitted. The sleeve should now be fully compressed against the pipe wall.

![Inspection](image4)

- If there is any misalignment or displacement, one side of the sleeve may have to have the application pressure applied again.

- **Note:** In coated clay pipes, a reflection at the sleeve’s edge is visible on the pipe wall due to a glare from the camera’s lights. The customer might think that the sleeve is not properly set – however, this is just an optical illusion that will disappear by changing the camera head position.
2.5.4. Serial Installation (Standard Procedure)

Sleeves are installed in series when the damage extends longer than the distance between the circumferential seals of a single sleeve.

- During preparation, the projecting part of the rubber gasket is only trimmed off on the last sleeve to be installed.
- The installation procedure and installation pressures are the same as when installing single sleeves.
- The first sleeve facing against the direction of the flow must always have a beveled end – all the others are straight edge.

2.5.4.1. Procedure Overview

Ideally, you should work against the direction of flow when installing the sleeves. The small offset occurring in the area of the sleeve overlap will therefore not obstruct the flow.

Caution – Special Scenarios

*Extreme fragmentation & Longitudinal cracks*

- In these scenarios, reduce the installation pressure by (7.25 – 14.5 psi).
- First place all the sleeves with the reduced installation pressure.
- Only then apply the full installation pressure, in the same order that they were installed.
- This can prevent fragments from coming loose or the pipe from collapsing, particularly if the pipe bedding is damaged.

*Incipient longitudinal crack*

- Where there is an incipient longitudinal crack, the entire length of the host pipe must be repaired because the crack will continue to the end of the pipe, regardless of the repair.

*6” QuickLock sleeves cannot currently be installed in a series.*
Two sleeve serial install

If you want to install two sleeves, it can be done with two beveled sleeves as follows:

Ideally, you should work against the direction of flow when installing the sleeves.

2.5.4.2. Installation

Preparing and layout of the sleeves

- (1) First sleeve, straight edge, with projecting rubber end
- (2) Second and any additional sleeves, straight edge, with projecting rubber end
- (3) Last sleeve, beveled end, without projecting rubber end

Using the projecting rubber end

- Slip the rubber gasket over the steel sleeve so that the distance between the circumferential seal and the edge of the sleeve (1) is at least equal to the distance between the locking gar and the edge of the sleeve (2).

  \[(1) \geq (2)\]

- This ensures that the two circumferential seals form a tight seal within the projecting rubber end.
Installing the first sleeve

- Straight edge sleeve
- With projecting rubber end
- Make sure that the first sleeve is installed with one pair of circumferential seals in an intact (not damaged) section of the pipe.

With one manhole

If you operate the packer and camera from one manhole, work against the direction of the flow, as illustrated.

With two manholes

If you can use two manholes, the camera can come from the second (downstream) manhole to meet the packer with the sleeve.

Installing the second sleeve (and others)

- Straight edge sleeve
- With projecting rubber end

Note: When the packer passes through the projecting rubber end, it is folded inwards. Follow the instructions in section 2.5.4.3 below to correct this.

Positioning the sleeves in series

- Position the metal of the new sleeve to leave a space of approximately 0.5 cm between the locking gear & the sleeve edge.
- The new sleeve must not touch the lock.
- If possible, use the laser as described in section 2.5.6 “Using the Laser Marker”
Installing the last sleeve

- Beveled sleeve (the beveled end faces against the direction of the flow)
- Without projecting rubber end

*Note:* When the packer passes through the projecting rubber end, it is folded inwards. Follow the instructions in section 2.5.4.3 below to correct this.

---

**Installation finished.**

The sleeves installed have a uniform, consistent appearance.
2.5.4.3. **Passing through the projecting rubber end**

When the packer passes through the projecting rubber end, the new sleeve catches it and pulls it inwards.

- Move the new sleeve into the previously fitted sleeve up to the first lock.
- Move the sleeve back out.
- The projecting rubber end will fold back outwards.
- **Note:** If you move it too far out, you must repeat the procedure.
- Position the sleeve and proceed as above.

- **Note:** When moving back and forth to position the sleeve, there is a risk of catching the projecting rubber end and creasing it. A tight seal is no longer possible.

2.5.4.4. **The correct metal overlap**

The metal overlap between sleeves installed in series is correct when the following conditions are met:

- The edge of the new steel sleeve is 3/16-5/8” (0.5-1.5 cm) in front of the locking gear of the previous sleeve.
- The circumferential seals of the new sleeve form a tight seal with the projecting rubber end of the previous sleeve.
2.5.5. Serial Installation (Alternative Procedure)

In exceptional cases, sleeves can be installed in series in the direction of flow.

- When shaft structures are inaccessible
- When the manhole flumes are at too tight an angle

However, this method has serious drawbacks and should only be considered when absolutely necessary.

**Do not use this method without permission from the customer.**

**Drawbacks:**

- Reduced pipe diameter cross section.
- Step in metal overlap faces against the direction of flow (impaired pipe flow).
- Smaller cross section of installed sleeves are less accessible for cameras and tractors.

When installing sleeves in series in the direction of flow, either beveled or straight edge sleeves can be used, but the first sleeve facing against the direction of flow must have a beveled end (no. 1 in the illustration).

![Diagram of sleeves installation](image)

1st QL sleeve, beveled end  2nd QL sleeve, beveled end  3rd QL sleeve, beveled end

Beveled end and metal

*The 2nd and 3rd sleeves can also have straight edges.*

When installing a series of sleeves all with beveled ends, you must always work in the direction of the flow.

When sleeves are installed in the direction of flow, the steps where the metal overlaps face against the flow. This has drawbacks in terms of both appearance and hydraulic properties compared to the standard method.

**Reduced pipe diameter**

Because of the beveled end, the diameter of the pipe is 2 to 4 mm less than with the standard method. In narrow pipes and/or if there is any deformation, it may be difficult or impossible for the packer to pass through installed sleeves with the next ones.
Preparing and laying out the sleeves

- (1) First sleeve, with projecting rubber end and with beveled end.
- (2) Second and additional sleeves, with projecting rubber end, with or without beveled end.
- (3) Last sleeve, without projecting rubber end, with or without beveled end.

Installing the first sleeve

- Make sure that the first sleeve (1) is installed with one pair of circumferential seals in an intact (not damaged) section of the pipe.

Installing the second sleeve (and others)

- Move the new sleeve through the previously installed sleeve(s) (1).
- **Note:** Watch out for the projecting rubber end. See section 2.5.4.3.
- Install the sleeve (2) with the correct metal overlap as described in 2.5.4.4.

Installing the last sleeve

- Move the new sleeve through the previously installed sleeves (1) and (2).
- **Note:** Watch out for the projecting rubber end. See section 2.5.4.3.
- Install the sleeve (2) with the correct metal overlap as described in 2.5.4.4.
2.5.6. Using the Laser Marker

If the packer is equipped with a laser marker, the sleeves can be installed in series much more quickly and precisely.

Observe the safety instructions in the operating manual for the laser marker.

Note:

With the method described here, the packer is not in the middle of the sleeve during expansion. To prevent the sleeve from expanding eccentrically, it is essential to lubricate the overlap of the stainless steel plates beforehand.

You can make a mark on the sleeves to help you before installing the sleeves in series.

- 0.5–1.0 cm (3/16 – 3/8 inch) in front of the toothed strip.
  Flush with the edge of the cover plate.
- The laser beam will be aligned to this mark.
- The edge of the next sleeve will be directly behind it.

Positioning on the Packer

- Position the QuickLock sleeve on the packer so that the laser beam can be seen on both the edge of the sleeve and on the host pipe.

Use

- The laser is mounted on the front of the packer.
- It is level with the edge of the sleeve.
- Position the packer with the new sleeve in the pipe so that the laser beam strikes the rear edge of the locking gear or the marking line drawn on the previously installed sleeve.

After

- After installation, the edge of the new sleeve is 0.5–1.0 cm (3/16 – 3/8 inch) behind the locking gear of the previously installed sleeve.

Installing a retrofitted laser to the packer

- The laser marker is attached to the front plate of the packer, either next to the air connection or directly at the top.
- The laser may not protrude over the front plate.
- If your packer does not come with a hole for mounting the laser, then drill a 4 mm hole into the front plate no more than ½ inch deep.
2.6. Special Scenarios
2.6.1. Repairing joint offsets

Joint offsets of up to 3/8" (1.0 cm) can be repaired with a single sleeve.

**Repairing joint offsets with two sleeves**

Never install a single sleeve centered directly over the joint.

1/3 of the sleeve should be positioned to one side of the joint, and 2/3 of the sleeve to the other side.

- Joint offsets of 3/8" to 1" (1 cm to 2.5 cm) must be milled out first. Only after can they be repaired with a single sleeve.

**Repairing joint offsets with two sleeves**

If the joint cannot be milled, offsets between 3/8" and 1" (1 cm and 2.5 cm) can be repaired using two sleeves installed in a series.

- The procedure for installing the sleeves is the same as the standard serial installation, except that the sleeves are positioned slightly differently.
- Where the two sleeves overlap, they form an angled joint that compensates for the offset and ensures that the pair of circumferential seals are sufficiently compressed.

![Diagram of QuickLock sleeves](image)

**Installing the first QuickLock sleeve**

- Straight edged
- With projecting rubber end
- Placed approx. 12" or 16" (30 or 40 cm) into the offset joint, depending on the pipe diameter.

**Installing the second QuickLock sleeve**

- Beveled end
- Without projecting rubber end
- Approx. 5/8" (1.5 cm) metal overlap with the first sleeve.
2.6.2. Groundwater infiltration

Where there is heavy groundwater infiltration and the pipe has a rough surface structure, we recommend always using an additional hydrophilic waterstop affixed to the rubber gasket to ensure a tight seal.

- Always use a hydrophilic waterstop if you are not certain that the circumferential seal is sufficiently thick for sealing.
- On badly corroded surfaces of host pipes, especially concrete pipes, a hydrophilic waterstop must always be used.

Attaching a hydrophilic waterstop

- Only use a waterstop recommended by the manufacturer.
- Stretch the waterstop to tear the layer that protects it against premature expansion.
- Cut the waterstop to length so that it will form a tight seal around the gasket.
- Glue the ends of the waterstop together with superglue.
- Pull the waterstop seal rings you have made over each pair of circumferential seals, making sure they fit snugly.
- Pull the waterstop seal rings up to the inside of the pairs of circumferential seals.
- Glue the waterstop to the rubber gasket all the way round.

Note: The waterstop seals add to the amount of material to be compressed. Increase the application pressure by approx. 7 psi (0.5 bar)
2.6.3. Root penetration

When there is existing root penetration, a special method can be used.

- This prevents the root from growing along the QuickLock sleeve and breaking through the circumferential seals.

However, although this method has had positive long-term results, we cannot guarantee its success.

- Use highly alkaline mineral-based flexible mortar.
- You must use a product with adhesive properties so that the material applied is not lost in the pipe during transportation of the sleeve.
- You must use a product which is flexible - this means the material will stretch along with the rubber gasket and prevent it from cracking in the process.

Before installing the QuickLock sleeve, remove all protruding roots.

- Apply a band of mortar to the rubber gasket
- The entire way around the sleeve circumference
- In an approx. 6 inches (15 cm) wide spread
- Layer it on up to the maximum height of the circumferential seals.
2.6.4. Corroded steel in reinforced concrete

Flexible mortar can also be used for reinforced concrete pipes where the steel has become exposed.

- In this case, the highly alkaline coating ensures that the alkaline area around the exposed reinforcement is restored.
- Alkalinity is used in concrete manufacturing to protect the steel reinforcements from corrosion.

Remove any protruding reinforcements

- Remove any protruding reinforcements with a miller or cutter.

Apply a patch of mortar

- Apply a patch or mortar large enough to cover the damage area.

Note: Never completely coat the rubber gasket with mortar. This would impair the compression of the circumferential seals.
2.6.5. Repairing plastic pipes

Plastic pipes (PVC) can be repaired by using QuickLock in accordance with the single and serial offset methods. However, the following issues are to be observed:

- In many cases, a given diameter for a plastic pipe does not refer to its ID, but rather to its OD. Please verify proper sleeve size and pipe diameter before installing a sleeve.
- In plastic pipes, pipe deformations are common, which might restrict equipment passage.
- If the equipment and the sleeve can be properly positioned at the damaged spot with the packer, then the sleeve will adjust to the pipe deformation and stabilizes or restores the pipe’s structural strength.
- If there are any questions about pipe sizes and/or QuickLock’s capability, please contact us PRIOR to trying to install a questionable sleeve size. It is advisable to measure the exact pipe diameter before installing a sleeve. We offer intermediate sleeve sizes in addition to the nominal pipe diameter sleeves.
- Circular perforated drain pipes can also be repaired with QuickLock, while maintaining their seepage capability. We can offer support and advice for this installation.

Example
This example shows a perforated pipe before and after repair.
2.6.6. QuickLock in non-permeable pipe systems

The QuickLock sleeve is tightly sealed with the rubber gasket by means of compression. This achieves excellent sealing results.

- If QuickLock is used in non-permeable pipe systems or in **undamaged and air tight** pipes, there is a risk of excess pressure arising in the space between the two pairs of circumferential seals and the host pipe wall.
- This effect occurs mainly in pipes that have smooth walls and are made of material that is non-permeable to gas (PVC pipes, GRP pipes, and glazed clay pipes).
- The trapped air cushion can impair jetting resistance. The QuickLock sleeve might be displaced and shift when the high-pressure jet strikes the edge of it, or the jet might penetrate between the sleeve and the host pipe and further increase the pressure already present there.
- Tests have shown that the pressure gradually decreases as a result of diffusion.

**Preventing excess pressure**

The following method can be used to prevent excess pressure.

- Make a leak in the rubber gasket between the circumferential seals.
- To do this, make a small incision in the gasket along the circumference of the sleeve

Or

- Cut away the rubber between the circumferential seals so that only the rings of the circumferential seals are left.
2.6.7. Using QuickLock to repair holes longer than single sleeve

If the damaged section is larger than the width between the circumferential seals, the pipe can be repaired with the aid of a protector tube.

- The QuickLock system is based on compressing the circumferential seals against the inner wall of the pipe.
- If the pipe wall is missing in the area to be sealed, it must first be restored using a protector tube.
- For longer holes, several tubes can be installed in succession (not overlapping).

The protector tube should have the following properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>1.4404 or 1.4571</td>
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<tr>
<td>Plate thickness</td>
<td>0.5–1.0 mm</td>
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<td>Length</td>
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<tr>
<td>Diameter</td>
<td>nominal diameter of the host pipe</td>
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<tr>
<td>Metal overlap</td>
<td>approx. 50 mm</td>
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</table>

- Roll the protector tube up to the next smallest nominal diameter.
- Use a ratchet strap if necessary.
- Secure the rolled up tube with several strips of tape.

- Extend the wheelbase of the packer accordingly.

- Use the packer or a camera/tractor to position the tube.
- Inflate the packer to expand the tube.
- Increase the pressure slowly until the protector tube springs open (the tapes break).
- The protector tube presses against the inside of the pipe.

- Install the QuickLock sleeves in a series.
- The outermost circumferential seals must be outside the protector tube, pressing against the host pipe wall.
2.6.8. Removing installed QuickLock sleeves

It is possible to remove Quick-Lock sleeves after they have been installed. This is necessary when QuickLock sleeves have been installed incorrectly. Also, many customers use QuickLock to abandon unused laterals. Sometimes they ask for a temporary solution which can be removed at a later date.

How

- To remove the sleeve, the lock must be broken.
- After this, the sleeve cannot be used again

The robot cutter

- To remove an installed QuickLock sleeve, you need a robot cutter with a standard commercially available metal cutting disk.
- Often you may need to have a custom mount made to use the cutting disc on the robot.

Make two cuts on each lock

- The first cut (1) removes the cover plate rivets. The cover plate will fall off.

- The second cut (2) goes through the locking gear.

The sleeve collapses

- The QuickLock sleeve collapses under its own tension and that of the stretched rubber gasket.
- The sleeve can then be picked up on the holder head of the robot cutter and taken out of the pipe.
2.6.9. Deflating the packer using a vent valve

To deflate the packer more quickly, a quick-release vent valve can be mounted on the camera between the air pressure hose and the transfer bar.

When the pressure is removed via the vent valve, the packer balloon deflates more quickly. This is much faster than deflation via the compressed air unit.

Vent valve
(1) Air hose connection
(2) Vent outlet
(3) Packer connection

Example installation
(1) From the compressed air unit
(3) To the packer
### QuickLock Technical Data Sheet

<table>
<thead>
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<th>Nominal Diameter</th>
<th>Overall Length</th>
<th>Total Rolled Diameter</th>
<th>Min Pipe Diameter</th>
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<td>12.8</td>
<td>AS15130</td>
<td>RS350</td>
<td>0.05</td>
<td>11.41</td>
<td>13.97</td>
<td>0.07</td>
<td>0.28</td>
<td>DN350</td>
</tr>
<tr>
<td>15</td>
<td>380</td>
<td>16</td>
<td>12.52</td>
<td>14.37</td>
<td>15.11</td>
<td>12.8</td>
<td>AS15130</td>
<td>RS380</td>
<td>0.05</td>
<td>11.81</td>
<td>14.84</td>
<td>0.07</td>
<td>0.28</td>
<td>DN350</td>
</tr>
<tr>
<td>16</td>
<td>400</td>
<td>16</td>
<td>13.74</td>
<td>15.23</td>
<td>16.22</td>
<td>12.2</td>
<td>AS15130</td>
<td>RS400</td>
<td>0.05</td>
<td>12.87</td>
<td>15.98</td>
<td>0.07</td>
<td>0.31</td>
<td>DN400</td>
</tr>
<tr>
<td>18</td>
<td>450</td>
<td>20</td>
<td>14.88</td>
<td>17.12</td>
<td>18.14</td>
<td>15.6</td>
<td>AS15130</td>
<td>RS400+SPV450</td>
<td>0.07</td>
<td>14.25</td>
<td>17.91</td>
<td>0.07</td>
<td>0.31</td>
<td>DN450</td>
</tr>
<tr>
<td>(18.89)</td>
<td>480</td>
<td>20</td>
<td>16.14</td>
<td>18.30</td>
<td>19.21</td>
<td>15.6</td>
<td>AS15130</td>
<td>RS480+SPV500</td>
<td>0.07</td>
<td>15.27</td>
<td>18.89</td>
<td>0.07</td>
<td>0.31</td>
<td>DN450</td>
</tr>
<tr>
<td>20</td>
<td>500</td>
<td>20</td>
<td>17.55</td>
<td>19.09</td>
<td>20.19</td>
<td>15.2</td>
<td>AS15130, AS15131</td>
<td>RS400+SPV500, RS500</td>
<td>0.07</td>
<td>16.69</td>
<td>19.88</td>
<td>0.07</td>
<td>0.35</td>
<td>DN500</td>
</tr>
<tr>
<td>(20.62)</td>
<td>524</td>
<td>20</td>
<td>17.63</td>
<td>19.48</td>
<td>20.94</td>
<td>15.2</td>
<td>AS15131</td>
<td>RS500</td>
<td>0.07</td>
<td>16.77</td>
<td>20.62</td>
<td>0.07</td>
<td>0.35</td>
<td>DN500</td>
</tr>
<tr>
<td>(22.04)</td>
<td>560</td>
<td>20</td>
<td>18.78</td>
<td>21.26</td>
<td>22.36</td>
<td>15.2</td>
<td>AS15131</td>
<td>RS600</td>
<td>0.07</td>
<td>17.91</td>
<td>22.04</td>
<td>0.07</td>
<td>0.35</td>
<td>DN500</td>
</tr>
<tr>
<td>24</td>
<td>600</td>
<td>20</td>
<td>21.18</td>
<td>22.83</td>
<td>24.21</td>
<td>15.4</td>
<td>AS15131, AS15133</td>
<td>RS500+SPV600, RS600</td>
<td>0.07</td>
<td>20.27</td>
<td>23.89</td>
<td>0.09</td>
<td>0.31</td>
<td>DN600</td>
</tr>
<tr>
<td>(25.59)</td>
<td>650</td>
<td>20</td>
<td>23.07</td>
<td>24.8</td>
<td>26.18</td>
<td>15.4</td>
<td>AS15133</td>
<td>RS650</td>
<td>0.07</td>
<td>22.24</td>
<td>25.91</td>
<td>0.09</td>
<td>0.31</td>
<td>DN600</td>
</tr>
<tr>
<td>28</td>
<td>700</td>
<td>19</td>
<td>23.46</td>
<td>26.57</td>
<td>28.54</td>
<td>11.5</td>
<td>AS15133, VP 700800</td>
<td>RS600+SPV700, RS700</td>
<td>0.07</td>
<td>22.44</td>
<td>28.07</td>
<td>0.11</td>
<td>0.39</td>
<td>DN700</td>
</tr>
<tr>
<td>30</td>
<td>750</td>
<td>19</td>
<td>24.45</td>
<td>28.31</td>
<td>30</td>
<td>14.8</td>
<td>VP 700-800</td>
<td>SPV750</td>
<td>0.07</td>
<td>23.42</td>
<td>29.52</td>
<td>0.11</td>
<td>0.39</td>
<td>DN700</td>
</tr>
<tr>
<td>32**</td>
<td>800</td>
<td>19</td>
<td>28.39</td>
<td>30.7</td>
<td>32.55</td>
<td>14.8</td>
<td>VP 700-800</td>
<td>RS700+SPV800</td>
<td>0.07</td>
<td>27.36**</td>
<td>32.08</td>
<td>0.11</td>
<td>0.39</td>
<td>DN800</td>
</tr>
</tbody>
</table>

**Special sleeve. Size compressed is 27.36 inches; normally the manhole reduction cone needs to be removed before installation.**
4. **QuickLock Wheel Set Charts**

4.1. **6-8” QuickLock Packer Wheel/Axel Set Overview (AS1528 / VP 150-200)**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Wheel Set + Extender</th>
<th>For Packer</th>
<th>Item No.</th>
<th>Image</th>
<th>Drawing</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>6”</td>
<td>RS150</td>
<td>AS1528</td>
<td>RS150-Q1</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="drawing1.png" alt="Drawing" /></td>
<td>Type – Delrin&lt;br&gt;  * a = Ø58.0 mm&lt;br&gt;  * b = 40.50 mm&lt;br&gt;  * c = Ø10.0 mm</td>
</tr>
<tr>
<td>8”</td>
<td>RS200</td>
<td>AS1528</td>
<td>RS200-Q1</td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="drawing2.png" alt="Drawing" /></td>
<td>Type – Delrin ball bearings&lt;br&gt;  * a = Ø93.5 mm&lt;br&gt;  * b = 58.20 mm&lt;br&gt;  * c = Ø10.0 mm</td>
</tr>
</tbody>
</table>

Transfer Bar AS1546  
Bracket:<br>Rausch, Cues, or Aries  
Laser US9000
### 4.2. 8-12” QuickLock Packer Wheel/Extender Overview (AS1537 / VP 200-300)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Wheel Set + Extender</th>
<th>For Packer</th>
<th>Item No.</th>
<th>Image</th>
<th>Drawing</th>
<th>Dimensions</th>
</tr>
</thead>
</table>
| 8”        | RS200                | AS1537     | RS200-Q1.2A | ![Image](image1.png) | ![Drawing](drawing1.png) | * a = Φ75.0 mm  
* b = 53.55 mm  
* c = Φ10.0 mm  |
| 10”       | RS250                | AS1537     | RS250-Q1.2A | ![Image](image2.png) | ![Drawing](drawing2.png) | * a = Φ125.0 mm  
* b = 68.80 mm  
* c = Φ10.0 mm  |
| 12”       | RS250 + SPV300       | AS1537     | RS250-Q1.2A SPV300-Q1 | ![Image](image3.png) | ![Drawing](drawing3.png) | * a = Φ125.0 mm  
* b = 68.80 mm  
* c = Φ10.0 mm  |

Transfer Bar AS1546  
Bracket: Rausch, Cues, or Aries  
Laser US9000
### 4.3. 10-12” QuickLock Packer Wheel/Axel Set Overview (AS1552 / VP 250-300)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Wheel Set + Extender</th>
<th>For Packer</th>
<th>Item No.</th>
<th>Image</th>
<th>Drawing</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>10”</td>
<td>RS250</td>
<td>AS1552</td>
<td>RS250-Q2</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td>Type – Tente 75x25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* a = Ø75.0 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* b = 53.55 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* c = Ø10.0 mm</td>
</tr>
<tr>
<td>12”</td>
<td>RS300</td>
<td>AS1552</td>
<td>RS300-Q2</td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
<td>Type – Spoked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* a = Ø125.0 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* b = 68.80 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* c = Ø10.0 mm</td>
</tr>
</tbody>
</table>

Transfer Bar AS1546  
Bracket:  
Rausch, Cues, or Aries  
Laser US9000
### 14-20” QuickLock Packer Wheel/Axel Set Overview (AS1563 / VP 350-500)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Wheel Set + Extender</th>
<th>For Packer</th>
<th>Item No.</th>
<th>Image</th>
<th>Drawing</th>
<th>Dimensions</th>
</tr>
</thead>
</table>
| 14”       | RS350                | AS1563     | RS350-Q3 | ![Image](image1.png) | ![Image](image2.png) | Type – Tente 75x25  
* a = Ø75.0 mm  
* b = 79.1 mm  
* c = Ø12.0 mm |
| 15”       | RS380                | AS1563     | RS380-Q3 | ![Image](image1.png) | ![Image](image2.png) | Type – Tente 100x32  
* a = Ø100.0 mm  
* b = 88.70 mm  
* c = Ø12.0 mm |
| 16”       | RS400                | AS1563     | RS400-Q3 | ![Image](image1.png) | ![Image](image2.png) | Type – Spoked  
* a = Ø125.0 mm  
* b = 81.50 mm  
* c = Ø12.0 mm |
| 18”       | RS400 + SPV450       | AS1563     | RS400-Q3 | ![Image](image1.png) | ![Image](image2.png) | Type – Spoked  
* a = Ø125.0 mm  
* b = 81.50 mm  
* c = Ø12.0 mm |
| 20”       | RS400 + SPV500       | AS1563     | RS400-Q3 | ![Image](image1.png) | ![Image](image2.png) | Type – Spoked  
* a = Ø125.0 mm  
* b = 81.50 mm  
* c = Ø12.0 mm |

Transfer Bar AS1546  
Bracket:  
Rausch, Cues, or Aries  
Laser US9000
4.5. 20-24” QuickLock Packer Wheel/Axle Set Overview (AS1531 / VP 500-600)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Wheel Set + Extender</th>
<th>For Packer</th>
<th>Item No.</th>
<th>Image</th>
<th>Drawing</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>20”</td>
<td>RS500</td>
<td>AS1531</td>
<td>RS500-Q4</td>
<td></td>
<td></td>
<td>Type – Spoked&lt;br&gt;* a = Ø125.0 mm&lt;br&gt;* b = 73.2 mm&lt;br&gt;* c = Ø12.0 mm</td>
</tr>
<tr>
<td>24”</td>
<td>RS500 + SPV600</td>
<td>AS1531</td>
<td>RS500-Q4 SPV600-Q4</td>
<td></td>
<td></td>
<td>Type – Spoked&lt;br&gt;* a = Ø125.0 mm&lt;br&gt;* b = 73.2 mm&lt;br&gt;* c = Ø12.0 mm</td>
</tr>
</tbody>
</table>

Transfer Bar AS1546  
Bracket:  
Rausch, Cues, or Aries  
Laser US9000
### 4.6. 24-28” QuickLock Packer Wheel/Axel Set Overview (AS1553 / VP 600-700)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Wheel Set + Extender</th>
<th>For Packer</th>
<th>Item No.</th>
<th>Image</th>
<th>Drawing</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>24”</td>
<td>RS600</td>
<td>AS1553</td>
<td>RS600-Q5</td>
<td></td>
<td></td>
<td>Type – Spoked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* a = Ø150.0 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* b = 73.20 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* c = Ø12.0 mm</td>
</tr>
<tr>
<td>28”</td>
<td>RS600 + SPV700</td>
<td>AS1553</td>
<td>RS600-Q5</td>
<td></td>
<td></td>
<td>Type – Spoked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SPV700-Q5</td>
<td></td>
<td></td>
<td>* a = Ø150.0 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* b = 73.20 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* c = Ø12.0 mm</td>
</tr>
</tbody>
</table>

Transfer Bar AS1546  
Bracket:  
Rausch, Cues, or Aries  
Laser US9000
## 4.7. 28-32” QuickLock Packer Wheel/Axel Set Overview (VP 700-800)

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Wheel Set + Extender</th>
<th>For Packer</th>
<th>Item No.</th>
<th>Image</th>
<th>Drawing</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>28”</td>
<td>RS700</td>
<td>VP 700-800</td>
<td>RS700-Q6</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Type – Spoked</td>
<td></td>
</tr>
</tbody>
</table>
|           |                      |            |          |        | ![Image](image2.png) | * a = Ø150.0 mm  
|           |                      |            |          |        | ![Image](image3.png) | * b = 86.40 mm  
|           |                      |            |          |        | ![Image](image4.png) | * c = Ø12.0 mm  |
| 30”       | RS700 + SPV750       | VP 700-800 | RS750Q6  | ![Image](image5.png) | Type – Spoked |
|           |                      |            |          |        | ![Image](image6.png) | * a = Ø150.0 mm  
|           |                      |            |          |        | ![Image](image7.png) | * b = 86.40 mm  
|           |                      |            |          |        | ![Image](image8.png) | * c = Ø12.0 mm  |
| 32”       | RS700 + SPV800       | VP 700-800 | R700-Q6  | ![Image](image9.png) | Type – Spoked |
|           |                      |            | R700-Q6  |        | ![Image](image10.png) | * a = Ø150.0 mm  
|           |                      |            |          |        | ![Image](image11.png) | * b = 86.40 mm  
|           |                      |            |          |        | ![Image](image12.png) | * c = Ø12.0 mm  |

Transfer Bar AS1546  
Bracket: Rausch, Cues, or Aries  
Laser US9000
5. **QuickLock Adjustable Packer**

5.1. **Description**
The new 8-12” QuickLock Adjustable Packer uses a single set of wheels and adjustable sliding chassis for application in every Inner Diameter (ID) from 7.48” (190 mm) to 12.60” (320 mm). There are two wheel rod slots to insert the wheel.

The nominal ID sizes are:
- 8” / 200 mm (line 2, upper rod slot)
- 10” / 250 mm (line 2, lower rod slot / line 7, upper rod slot)
- 12” / 300 mm (line 7, lower rod slot)

The Adjustable Packer enables the user to adapt the packer wheels to the pipe ID.

There are two sliding axles on each end of the packer. All 4 slides need adjusted to sleeve size.

5.2. **Operation**

5.2.1. **Setting compressed air supply**

There are two ball heads available for the compressed air supply. Both lines have a stop valve.

Only open the stop valve of the ball head that will be used.

Close the other stop valve.

5.2.2. **Remove the wheel**

Press the spring-loaded button to release the wheel from the sliding chassis.

5.2.3. **Adjust the sliding chassis**

5.2.2.1. **Loosen the bolts**

On the side of the sliding chassis are two bolts which fasten the slide into place. Loosen the bolts to free the slide.
5.2.2.2. Choosing a marker

Align the arrows on the slide with the line directly above the ID of the pipe to be repaired, as in the photo. This example is lining up for the 200/250 application.

*See the below chart for metric to inch conversion.*

<table>
<thead>
<tr>
<th>Upper Slot (Inches)</th>
<th>Upper Slot (metric)</th>
<th>Lower Slot (metric)</th>
<th>Lower Slot (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.48”</td>
<td>190</td>
<td>240</td>
<td>9.44”</td>
</tr>
<tr>
<td>8”</td>
<td>200</td>
<td>250</td>
<td>10”</td>
</tr>
<tr>
<td>8.27”</td>
<td>210</td>
<td>260</td>
<td>10.24”</td>
</tr>
<tr>
<td>8.66”</td>
<td>220</td>
<td>270</td>
<td>10.63”</td>
</tr>
<tr>
<td>9.06”</td>
<td>230</td>
<td>280</td>
<td>11.02”</td>
</tr>
<tr>
<td>9.44”</td>
<td>240</td>
<td>290</td>
<td>11.42”</td>
</tr>
<tr>
<td>10”</td>
<td>250</td>
<td>300</td>
<td>12”</td>
</tr>
<tr>
<td>10.24”</td>
<td>260</td>
<td>310</td>
<td>12.20”</td>
</tr>
<tr>
<td>10.63”</td>
<td>270</td>
<td>320</td>
<td>12.60”</td>
</tr>
</tbody>
</table>

5.2.2.3. Fasten the bolts

Tighten the two bolts to lock the chassis into place for the two pipe ID available at that level.

5.2.4. Insert the wheel.

To use the smaller of the two pipe ID, insert the wheel into the upper slot by pressing the spring-loaded button to open the latch.

To use the larger of the two pipe ID, use the lower slot by pressing the spring-loaded button to open the latch.

5.2.5. Repeat for other 3 wheels

All 4 sliding chassis need to be adjusted to match the QuickLock sleeve size.
6. Table of Application Pressures

<table>
<thead>
<tr>
<th>Pipe Type</th>
<th>Type of damage</th>
<th>Pipe Diameter</th>
<th>Application Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitrified clay, asbestos cement, PVC, and</td>
<td>Fragmentation and longitudinal cracks</td>
<td>6” (150 mm)</td>
<td>65.25 – 72.5 psi</td>
</tr>
<tr>
<td>concrete pipes</td>
<td></td>
<td>8” (200 mm)</td>
<td>50.75 – 58 psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-32” (250-800 mm)</td>
<td>43.5 – 50 psi</td>
</tr>
<tr>
<td></td>
<td>Transverse cracks, leaking joints</td>
<td>6” (150 mm)</td>
<td>65.25 – 72.5 psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8” (200 mm)</td>
<td>58 – 65.25 psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-32” (250-800 mm)</td>
<td>50.75 – 58 psi</td>
</tr>
<tr>
<td>Reinforced concrete, GRP, plastic (PE, PP),</td>
<td>All types of damage</td>
<td>6” (150 mm)</td>
<td>65.25 – 72.5 psi</td>
</tr>
<tr>
<td>and cast iron pipes</td>
<td></td>
<td>8” (200 mm)</td>
<td>50.75 – 58 psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-32” (250-800 mm)</td>
<td>50.75 – 58 psi</td>
</tr>
</tbody>
</table>

- The application pressures listed here are merely approximate values.
- The actual pressures depend on the compressed air unit, the accuracy of the indicators and the precise nature of the damage.
- Give the compressed air unit enough time until the pressure shown on the pressure gauge reaches the packer and no longer drops.
- When using hydrophilic waterstops, you must increase the pressure by 0.5 bar.
- Increase the application pressure gradually, especially when repairing longitudinal cracks and fragmentation.

When you notice that despite the gradually increasing pressure, the locks have stopped moving along the toothed strips, the maximum compression pressure has been reached.