Manual

Information & Instruction Manual

Pipe Doctor Repair

Pipe Doctor
NO-DIG PIPE REPAIR SYSTEM

wrc approved
PT/484/0421
Valid: 01/04/2021 - 01/04/2026

Pipe Doctor
NO-DIG RADIUS REPAIR

Pipe Doctor
RAPID CURE REPAIR SYSTEM

wrc approved
PT/485/0421
Valid: 01/04/2021 - 01/04/2026

V007MAR2025

Specialist Suppliers in Trenchless Technology
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Site health & safety

All tasks must be carried out in accordance with your country's Health and Safety regulations, considering client-driven requirements and site conditions.

Contents of kit

Suitable for a single patch repair

- Disposable Protective Gloves
- Pre-measured Fibreglass Mat x 1
- Disposable Protective Groundsheet x 1
- Plastic Cable Ties
- Wire Ties
- Two-Part Resin Pack
- Packer Protection Hoses x 2 (Straight and Rapid) or Packer Wrap (Radius)
- Resin Spreader

Hardware requirements

Hardware available from S1E

- 240v/25ltr Compressor
- Flexible Air Push Rods
- Flexible Adaptor
- Inflatable Packers
- Pressure Regulator
- Airline (compressor to regulator)

Other Hardware Requirements

- Safety Knife
- Extraction Rope & Carabiner
- Wire Cutters
- Jetting & Vac Equipment
- Duct Tape
- CCTV Surveillance Equipment
- Safety Barriers
- Correct PPE

Packer selection

S1E LTD supplies four types of packers. Radius Packers must be used for the repair of bends. The other three types can be used for the repair of straight pipes. In addition, the Pillow Packer can be used to repair non-circular structures.

Standard packer

Used in 100mm and 150mm diameter pipe systems. Each packer covers a small range of pipe sizes, as identified by the product code. For example the PDSP10/15/15 packer is suitable for DN100 pipes and DN150 pipes. The overall length of the packer is covered by the last two digits of the product code: in this case 1.5metres.

Wheeled packer

Suitable for pipe diameters ranging from 150mm to 1200mm, which have wheels fitted at both ends of the packer. Again they are suitable for a range of pipe sizes, as indicated by the product code, for example PDWP10/15/15. All wheeled packers within this range have an **annular** (flow-through) construction to allow water to flow down the centre of the packer when in use. This allows the main pipe to remain in operation during patch installation. For wheel bolt arrangements, see p.13.

Pillow packer

The pillow packer is a fold-flat, oblong packer for the repair of pipes from 750mm diameter to 2000mm and above. It is lighter in weight than equivalent-sized circular packers and is easier to maneouvre and install. It can be used to repair ovoid pipes or to connect two pipes of different diameter.

The Pillow Packer is used with resin and matting supplied in bulk form, not with Pipe Doctor kits.

Radius packer

Radius packers are available in three sizes: PDRP10/15 is used for DN100 pipelines, PDRP15/15 is used for DN150 pipes and PDRP225/15 is available for DN225 pipes. Radius packers should only be used for repairs on a bend. Not to be used for straight repairs. Only to be used in conjunction with the Pipe Doctor Radius repair kit.

Packer care & use

- Do not coat the packer with any material that may degrade the rubber. **Petroleum based products should never be used.**
- Always ensure that the packer used is suitable for the pipe diameter being repaired. The packer size is usually embossed on the rubber sleeve or indicated on the end plugs.
- The packer length does not indicate the possible length of repair. Generally a 1.0m or 1.5m long packer is suitable for a standard repair length of 500/600mm. If the repair is 1000mm long, a 1.9m packer should be used. Patches should be placed centrally on the packer.
- In order to maximize the life of a packer it is advisable to coat a new packer with acid-free silicone lubricant (available from S1E LTD). This will help to stop contamination of the rubber with the resin and prolong the life expectancy of the packer. (Other substances can be used as long as they are not petroleum based. A suitable alternative would be cow's udder cream).
- It is recommended to use the cardboard tube to store the packer when not in use. This will protect the rubber from surface damage, which could shorten the lifespan of the packer.
- All packers are tested after manufacture. Please note the maximum working pressure of the packer before use. This is normally embossed on the rubber sleeve of the packer. **Never exceed the maximum inflation pressure.**
- It is recommended to determine the pressure that is required to fill each size of pipe. This can be done above ground, by inserting the packer into a pipe and inflating slowly. Make a note of the pressure when the packer has inflated to a reasonably tight and frictional fit. This pressure is the minimum pressure needed to fill the diameter of the pipe. Use the same test for other pipe sizes in order to ascertain the minimum working pressure across the range. It should be noted that the packer material will relax with use. It is important to know what the minimum pressure requirements are in order to avoid putting undue stress on the area around the repair. This procedure can be repeated during the lifespan of the packer. Note the pressure gauges have dual scales: both 'psi' and 'bar'. Ensure these units are not confused.

Resin selection

Resin is available as three formulations. The distinction is only a difference in the working and cure times.

These resins are called Winter (W), Summer (S) and Rapid (R). The 'S' Resin has an extended working time and longer cure time. The 'R' Resin has a reduced working time and reduced cure time.

The approximate working times and cure times are stated on the packaging. Note that these figures are based upon ambient conditions. Cure times will be accelerated in warm conditions and delayed in cold conditions (see table below).

Curing times and temperatures - a guide only

Winter Resin (W):		
Temperature	Working Times (mins)	Curing Time (mins)
8ºC (33 ºF)	20-22	100-120
13ºC (55ºF)	18-20	90-110
18ºC (64 ºF)	16-19	75-100
23ºC (73ºF)	15-17	60-70
28ºC (82 °F)	10-12	45-55
33ºC (91 °F)	7-9	40-45
Summer Resin (S):		
Temperature	Working Times (mins)	Curing Time (mins)
8ºC (33 ºF)	45-48	150-300
13ºC (55ºF)	41-45	130-150
18ºC (64 ºF)	32-35	120-135
23ºC (73ºF)	30-32	90-100
28ºC (82 °F)	20-23	70-85
33ºC (91 °F)	14-16	65-75
Rapid Resin (R):		
Temperature	Working Times (mins)	Curing Time (mins)
20ºC (64 ºF)	6-7	26-30

Rapid resin gives a very fast cure. As with Winter & Summer resins, the working & curing times are affected by ambient temperature. It is not recommended to use Rapid resin when the ambient temperature is higher than 20°C.

Resin care & use

Resin guidance notes

- Resins should be stored in dry conditions at ambient temperature (15 - 25˚C). Both the temperature of the resin and the ambient temperature can affect working and cure times. For example a resin that has achieved an elevated temperature due to poor storage will cure rapidly regardless of the ambient air temperatures.
- The temperature inside a drainage system is likely to be different to above ground conditions. This will affect the cure time for the patch.
- The resin generates heat when curing. This is particularly evident with large amounts of resin. If left in the bag, the mixed resin can generate high temperatures, affecting both working times and curing times.
- To cool the resin, particularly in summer months, it may be necessary to put the resin bag into a portable cooler/freezer.

Resin safety information

- Each resin bag has a label indicating the potential hazards of the contents.
- All sensible precautions should be taken when handling the resin bag and contents.
- Employ good industrial practice with regards to hygiene.
- Do NOT eat, drink or smoke when handling.
- Wear suitable personal protective equipment:
  - **Hand protection** - wear disposable gloves provided.
  - **Eye protection** - wear safety glasses or goggles.
- Uncured resin can be safely removed from unprotected skin and clothing using soap and water or hand wipes, such as Grime Wipes, available from S1E.

First aid measures

- **Inhalation** - remove to fresh air, keep warm, rest; if respiratory effects occur obtain medical aid.
- **Skin contact** - remove by mechanical means, wash off with soap and water.
- **Eye contact** - flush eyes with copious amounts of water whilst holding eyelids apart. Obtain medical assistance.
- **Ingestion** - do NOT induce vomiting. Seek medical aid.

For more detailed Health & Safety information, please see **www.s1e.co.uk**

Before installation

Claims for product failure will not be considered if these guidelines are not followed or if the equipment is mistreated.

If you are not familiar with this process, it is recommended you take part in our WRc approved **Pipe Doctor training course**. This is an independently recognised practical and theory qualification, for the safe and correct method of installing the system.

All preparation work should be carried out prior to mixing the resin. It is the user's responsibility to ensure good housekeeping is employed so that the equipment is working correctly and maintained in a good condition.

- Ensure that the hose, pressure regulator and air compressor function correctly and are free from any damage or contamination. Ensure that all air connections are **functioning correctly** and that there are no air leaks from the system. It is recommended that the full repair run length (from packer to compressor) be pressure tested on a dry run at ground level prior to installing the repair, to ensure an air tight system.
- Check that the repair kit is of the **correct size for the repair** and that the expiry date for the resin has not been exceeded. Also check the ambient temperature and assess the working and cure times for the resin type selected. See previous Curing Times Guide (p.5).
- Prior to installation, **a CCTV survey** will have been carried out to determine the condition of the drain and will have identified locations where the Pipe Doctor Patch Repair is considered suitable. Advice on selection of suitable repair methods is included in the WRc Drain Repair Book.
- The section of pipe work that provides access and the site of repair should be free of any objects that could impede the installation process or affect the quality of the installation and the long term performance of the repair. They should also be clear of fats, oils and greases and root ingress. This **cleansing process** can be achieved through high pressure jetting or the use of chain knockers, brushes, sandpaper etc., and should be confirmed by CCTV inspection.
- The pipe condition should be checked immediately prior to installation. Use this check to **determine the distance** from a datum point on the surface to the repair site.
- During an application, where some of the packer may protrude out of the pipe into open air, such as working close to a manhole, it is important to use a small section of pipe to protect the packer in the open air during inflation.

Packers

- Ensure that the packer is of a type suitable for the installation and that it is the correct diameter and length for the repair being undertaken (p.3-4). If applicable, ensure the packer wheels are attached and adjusted correctly (p.13).
- Check the rubber body of the packer for any damage that might cause failure under pressure.
- Check that the required inflation pressure is known for the diameter of pipe being repaired; this pressure should be sufficient to cause full contact between the packer and the inside surface of the pipe. Ensure that this is below the maximum working pressure of the packer (p.4).

Connections & joints

- The quick release connectors can be lubricated with non-petroleum based lubricant to assist in the efficient operation of these working parts. Ensure none is sprayed on the packer or adaptor rubber.

Push rods

- Prepare all push rods and ensure the locking collar is tightened on each push rod.
- Mark with a band of tape around the final push rod, the previously determined distance to the repair.

Extraction rope

- A rope must be attached to the packer at all times for extraction. The air push rods are designed for pushing the packer into position and the extraction rope is used for the extraction of the packer. Air push rods can be damaged if a flexible adaptor or an extraction rope is not used. Excessive force placed on the push rods when positioning the packer can also damage the push rod connectors.
- A secondary rope can be used to pull the packer into position if required. This reduces stress placed on the air push rods. This method is especially useful for **Radius repairs**, particularly if there is any risk that the packer may catch at the bend, due to the defect being severe.

Installation Process

Packer preparation

1. **Protect the packer** with the polythenes hoses (Straight/Rapid) or polythene wrap (Radius)

1. a For Straight repairs:

The packer should be protected using the two polythene hoses provided. Each kit is supplied with hose lengths suitable for packers 1900mm long. If shorter packers are used, then these protection hoses need to be cut down to a suitable length.

Place the packer on the groundsheet to protect it during preparation. The packer should be inserted into the first sleeve and secured at each end using the plastic cable ties. The excess tie wrap material should be removed.

The packer is now placed into the second protection hose. Care should be taken to ensure that the hose is not damaged by the plastic tie wraps. It is helpful to fold the excess hose down and over the 'cut' plastic tie wrap before fitting the second hose. This hose is secured with the second pair of plastic tie wraps and secured as before. Again, the excess tails are removed. Try to remove the air from the inside of the protection hoses as this will make it easier to wrap the mat at a later stage. A small cut at the opposite end of each protection hose will allow the air to escape.

1. b For Radius repairs:

A dry, trial run of the packer is recommended to ensure that it will go smoothly around the bend. Best results are achieved if the packer is freshly coated with silicone spray/gel prior to use. The allows the packer to move slightly within the bend during inflation.

The packer should be protected using polythene wrap. The wrap should be wound around the packer ensuring a good overlap between each layer. The wrap should generously overlap each end of the packer. Extra protection can be given to the packer by winding the wrap back up the packer and over the first layer. Use gaffer tape to secure the wrap at each end of the packer.

To assist removal of the packer, the outside surface of the polythene wrap can be coated with silicone. This will reduce any adhesion between the wrap and the resin. The coating does not need to be too heavy and should be smoothed into the wrap surface. The coating only needs to be applied in the location of the patch. Please note this may reduce the friction between the mat and the packer. If the repair location is particularly difficult to reach or is a long distance from the point of access then the application of silicone should be at the discretion of the contractor.

Resin impregnation of fibre glass mat

2. **Unfold the disposable protective groundsheet** and lay on a suitable dry, flat and even surface. The groundsheet is to provide a working environment to prevent contamination of the resin and mat during the impregnation process and to provide protection to the chosen work surface.

3. **Open out the fibreglass mat**:

For Straight repairs: Place the mat with the shiny/woven side facing upwards.
For Radius repairs: It does not matter which side is placed facing upward, as both sides of the mat have the same weave pattern.

4. **Put on** the protective gloves, one pair over the other, and the goggles and unwind the two wire ties. Ensure you have the correct tools available to cut open the resin bag and to trim the wire when fitted.

5. Remove the 2 black safety caps from each end of the sealing clip and slide the outer part of the clip away to allow the resin and hardener to flow into each other. **Mix thoroughly** by kneading or shaking the bag for approx. 1 minute. Mixing is complete when all the resin is a uniform colour.

6. Cut off one corner of the bag and pour half of the contents onto the fibre glass mat. Use the spreader provided to **evenly spread the resin** over the surface of the mat. Ensure all edges are coated. Resin that is spread onto the polythene ground sheet can easily be spread back onto the glass fibre mat.

7. **Fold the mat** along the right hand coloured stitch guideline and pour sufficient resin onto the untreated surface. Spread evenly over the mat. Fold along the left hand coloured stitch guideline and apply more resin onto the untreated surface. Spread evenly over this surface.

8. Turn over the folded wetted mat and pour the remaining resin onto this surface. Spread evenly. Note that the resin has to **coat all surfaces** and soak into the matting. If there appears to be excessive resin on this last surface do not remove it. This will be forced

into the mat when the pressure is applied through the packer and will allow a taper to form at each end of the patch.

Attachment of impregnated mat to packer and placement into pipe

9. **Position the packer** onto the edge of this mat. Note that the folds in the mat determine the length of the repair and these folds should be facing the ends of the packer. Also ensure that the mat is positioned centrally on the packer. Place the packer on the mat with the air connection and flexible adaptor facing to the right. This ensures that the open edge of the overlap is facing away from the direction of entry into the pipe, and avoids snagging on any displaced joints or edges during insertion.

10. **Roll the fibreglass mat around the packer**. Take care not to roll the protection hose/wrap into the matting. Two wire ties are positioned 25mm from the end of the fibreglass mat to secure it into position.

For Radius repairs: a third wire tie is placed at the centre of the mat.

Wrap the wire tightly around the matting and secure with three half turns. The wires need to be tensioned tightly around the patch to prevent the patch from moving on the packer during installation.

Trim off the excess wire just above the three half turns. Note that the wire has to break or unwind during inflation of the packer.

11. If the wires have not been tightened sufficiently, the packer can be inflated slightly to tighten onto the wires. Care should be taken to avoid breaking the wires during this operation. Never attempt to install a patch which hasn't been secured to the packer correctly - this may cause the patch to move along the packer.

12. Attach the flexible adaptor, air push rods and extraction rope to the packer. Ensure all the locking rings are secured against the release mechanism of the quick release air connectors and air push rods, to avoid accidental detachment of the packer or push rods.

13. **Introduce the packer assembly** into the pipe, taking care to minimise any contact with other surfaces. Avoid dragging the body of the packer against any sharp edges when inserting the packer. Do not allow any slack in the rope as the packer is pushed into position, particularly when working downstream.

14. **Inflate the packer** to the required pressure. See previous note on p.8 under 'Packers'.

- Always use the minimum pressure required to inflate the packer. This is the pressure that fills the internal bore without putting excessive stress on the pipe body.
- Always use correct installation equipment to inflate packer and never exceed the maximum inflation pressure.
- Under-inflation will produce a poor repair and may cause problems removing the packer from the pipe.
- Keep well away from the pipe end whilst the inflated packer is in the pipe.

15. Monitor the packer pressure at regular intervals during the curing period to ensure that the target pressure is maintained.

Curing

16. Leave the packer in place until the resin is cured. The resin left in the bag and on the ground sheet will give an indication of when the resin has cured. However it should be remembered that the underground temperature is likely to be different to that on the surface. It is better to be cautious and leave the packer in place if there is any doubt about whether or not the resin has cured. Refer to the notes on 'Curing Times and Temperatures' (p.5).

Removal of packer

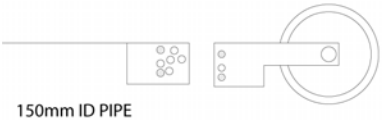
17. On completion of the cure period the packer should be **deflated and removed** from the pipe line using the attached extraction rope.

18. The repair should be **inspected using CCTV** surveillance equipment.

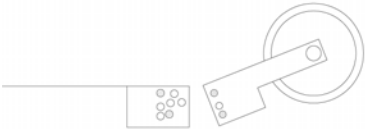
19. **Remove the protection hoses** from the packer. These should not be reused and should be removed from site and disposed of in an appropriate manner.

Bolting arrangement for packer wheels

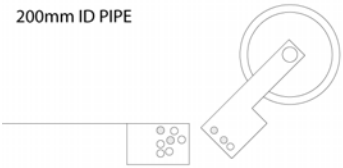
PACKER CODES
15/25/**



150mm ID PIPE

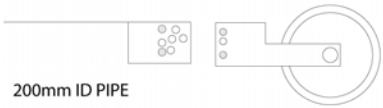


200mm ID PIPE



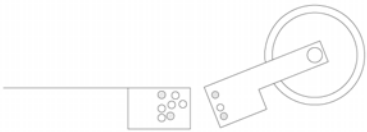
250mm ID PIPE

PACKER CODES
20/30/**



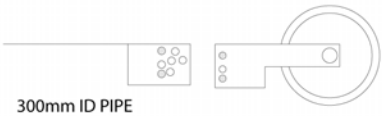
200mm ID PIPE

250mm ID PIPE



300mm ID PIPE

PACKER CODES
30/40/**



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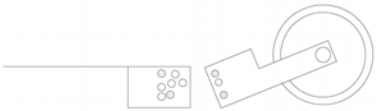
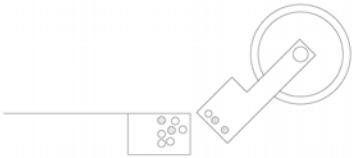
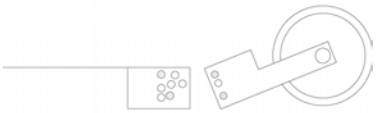


350mm ID PIPE



400mm ID PIPE

PACKER CODES
45/60/**



450mm ID PIPE

510/600mm ID PIPE

PIPE DOCTOR INSTALLATION RECORD

Job Ref No: ……

CONTRACTOR NAME: ……

Address of Installation: ……..
Customer name: ……
Date: ……
Pipe Diameter: ……..
Pipe Material: ……
Nature of defect: ……
Depth of invert: ……
Distance to defect: ……
Size of manhole/access point: ……
Pipe Doctor Kit size: ……550mm/1000mm (*delete as necessary)
W, S or R Resin?: W/S/R (*delete as necessary)
Batch Number?: ……

CCTV Survey carried out by: ……..
Installation carried out by: ……..…

Time of installation: ……..….
Weather conditions: ……
Temperature: ……°C

Due to be extracted at (time): …….……..
Exact time of deflation/extraction: ……

MANHOLE NUMBER/ACCESS POINT NUMBER:……ATTACH THIS CARD TO THE POINT OF ACCESS!
Post CCTV survey carried out by: …….……
Was the repair successful?: YES/NO (*delete as necessary)

Was the customer shown the post CCTV survey?: YES/NO (*delete as necessary)
If 'YES' was the customer satisfied with the repair?: YES/NO (*delete as necessary)
If 'NO' give reasons: ……
……...
……

Any other comments/notes: ……
……..
……..

Signed by: (installer): ……..
Date: DAY:……MONTH:……YEAR:……
Signed by: (customer): ……
Date: DAY:……MONTH:……YEAR:……

Pipe Doctor
NO-DIG PIPE REPAIR SYSTEM

Pipe Doctor
NO-DIG RADIUS REPAIR

Pipe Doctor
RAPID CURE REPAIR SYSTEM

Manufacturer's Warranty

Pipe Doctor
NO-DIG PIPE REPAIR SYSTEM

S1E Limited (The "Manufacturer") hereby warrants the Pipe Doctor materials (both kit form and bulk materials), where installed and utilised in accordance with and for the purposes described in the specifications for the Product shall, subject to the provisions herein, prevent water infiltration, prohibit root intrusion and provide a surface lining resistant to sewer gas penetration for the structure/surface in which it is installed. Manufacturer shall not be liable or responsible under this warranty for any breach caused by fire, war, earthquake or other earth movement, acts of God, negligence, abuse, alteration, or the presence of sewer gasses or chemicals not typically found in sewer collection systems or from any defect in the design of the pump station, lift station, chamber or structure, or from the failure to properly inspect, service and maintain the structure. Furthermore, Manufacturer's warranty is strictly limited to a guarantee that Pipe Doctor materials serve the purposes stated above, when utilised in accordance with Manufacturer's specific instructions and training, and when all appropriate surface and material preparations have taken place. Thus the guarantee does not include or warrant any aspect of contractor/third party usage and/or installation of Pipe Doctor materials, regardless of any failings which may directly result from their involvement. Manufacturer's obligation under this warranty shall further be limited to the repair or replacement of the installed product, which an examination shall disclose to Manufacturer's satisfaction to be defective. Warranty on each system is for the time duration stated herein.

Manufacturer further warrants that the Pipe Doctor system will not deteriorate in sewer manholes to a point of product failure, i.e. crack, peel or delaminate, for a period of TEN years in the sewer environment.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITING THE FOREGOING, ANY AND ALL GUARANTEES OF MERCHANTABILITY AND FITNESS FOR A SPECIFIC PURPOSE. MANUFACTURER SHALL NOT BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES UNDER ANY CIRCUMSTANCES. THIS WARRANTY SHALL NOT BE EXTENDED, ALTERED OR VARIED EXCEPT BY A WRITTEN INSTRUMENT SIGNED BY THE MANUFACTURER.

S1E Limited
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Project: _____ **Officer:** _____

Issue Date: _____ **Title:** _____

Pipe Doctor

NO-DIG PIPE REPAIR SYSTEM

The Pipe Doctor system was created for the permanent and watertight repair of below ground pipes, without the need for excavation.
This trenchless repair method saves time and cost on-site and reduces disruption to the surrounding area.

Please see **www.s1e.co.uk** for more information

V007MAR2025

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