



## Information Pack

**Presented by: Fernco Australia Pty Ltd**

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Suitable for internal pipe diameters of 100 – 600mm

*Fernco Pipe Doctor provides a cost effective, easy to use solution for the permanent and watertight repair of damaged sewer and stormwater pipes with minimal disruption and without the need for major excavation.*

#### **Introduction:**

Fernco Pipe Doctor is a high performance, no dig, pipe repair solution that provides a permanent, quick and easy method of repairing damaged sewer and stormwater pipes.

Pipe Doctor is installed internally and eradicates the need for costly, disruptive and time consuming excavation work. This provides both vehicle and pedestrian traffic free access whilst sewer and drainage repairs are carried out underground.

Fernco Pipe Doctor is supplied in a range of self contained patch kits that provide all the necessary equipment to carry out an efficient pipe repair. Each kit is fully self contained and includes:

- 2 part, ready to mix resin bag,
- 2 packer protection sleeves,
- 2 sets of protective gloves,
- Fibreglass mat,
- Protective ground sheet,
- Spreader,
- Tie secures (cable ties and wire ties) and instruction manual

#### **The Resin:**

The Globally recognised resin is supplied in a double sealed bag and represents a unique concept in the marketplace as it replaces separate ingredient bottles, measuring containers or mixing buckets traditionally used in no dig pipe repairs. The Pipe Doctor system reduces waste, mess and spillage plus it also ensures an accurate and consistent mix without contacting any potentially hazardous un-mixed resin or catalyst.

The resin consists of two components which are separated by a sealing clip and are mixed by simply removing the clip and kneading the two parts together. The transparent bag provides a visual confirmation the resin and catalyst are thoroughly mixed when a consistent caramel colour is achieved.

Excellent absorption properties between the resin and fibreglass mat allow total saturation and provides the strength and flexibility to permanently repair any cracks or voids.

Following extensive water leak testing, the performance of the silicate resin successfully achieved the WRc Standard. Independent research performed on the resin earns the Fernco Pipe Doctor system a projected life span of 50 years.



### Benefits:

The Fernco Pipe Doctor is an innovative system that offers considerable benefits to the user:

- Quick and easy to use no dig application, (Little or No disruption)
- Cures in the presence of water
- No need for resin mixing buckets or measuring containers,
- Permanent and watertight pipe repair,
- Convenient kit format,
- Environmentally and ecologically friendly,
- Cured resin is Non-Flamable, Non-Hazardous and odourless.
- Tested to WRc and international standards, ( <http://www.wrplc.co.uk> )
- Cured product has been water jet tested to 8000kpa, (May 2003 Germany IKT)
- Excellent chemical resistance
- Negligible shrinkage to a maximum of only 0.06%
- Complements YOUR business with existing drain cleaning and CCTV inspection equipment,
- Reduces site wastage.
- Waste product is non-hazardous and may be disposed of in normal household rubbish.
- Suitable for use in confined spaces.

### Applications:

- Repair damaged pipes with a bore diameter of between 100 - 600mm,
- Excellent bonding to most pipe materials including PVC, clay, cast iron, ductile iron, stainless steel, FRC and AC.
- Applied to pipes that are damaged due to corrosion, displaced joints, tree roots and ground or foundation movement.



## Frequently Asked Questions

1. Is the cure time affected by the ambient temperature?  
Yes – like all chemical reactions it is temperature dependent. As the ambient temperature increases the curing and working time decreases and likewise as the temperature decreases the curing and working time increases.
2. What effluent temperature can the Pipe Doctor withstand?  
The temperatures in contact with the cured resin must not exceed 85C
3. Does the pipe need to be cleaned prior to the repair?  
Yes – before a repair takes place it is recommended that the pipe is jetted and cleaned of any debris, solids, grease. In order to ensure a smooth bore, obstacles including tree roots, stones, etc may need to be removed using standard cutting equipment.
4. Will the Pipe Doctor withstand water jetting?  
The Pipe Doctor has undertaken rigorous tests in order to meet the required standards. In May 2003 the IKT, (German equivalent of Standards Australia) performed tests at 200 litres per minute at 80bar (1160PSI) at speeds of 0.1 to 0.3 metres per second.
5. What is the maximum distance from point of entry to the repair?  
If CCTV survey can detect the damaged area then the Pipe Doctor can be used regardless of the distance. Consideration must be taken with regards to the working time and distance required to get to the damaged area. A safety line should be attached to all packers to assist in every application. This will overcome friction on a long pipe run and ensure the security of the equipment.
6. Is the Pipe Doctor resistant to the aggressive chemicals found in Sewers, e.g. sulphuric acid and methane?  
Both the fibreglass mat and the resin are highly resistant to chemicals from PH 1 up to PH 13.5. If the resin was abraded the fibreglass mat would not be destroyed. Please contact our technical department for further advice if a particular application has a special combination of chemicals flowing through the line.
7. Are there any storage requirements?  
The Pipe Doctor kits should be stored in a dry place away from UV light. If stored in prolonged sub zero temperatures the waterglass, (clear liquid) may crystallise. If stored in prolonged high temperatures above 70C, the resin can be affected.
8. Will the Pipe Doctor repair be affected by shrinkage?  
No – The shrinkage is negligible and is subject to a maximum of 0.06%.



### Frequently Asked Questions - continued

9. What affects could areas in a high water table have on the repair?

None – The Pipe Doctor has been hydrostatically tested at 25 metres head of water. Other considerations must include:

- Downward loading with heavy traffic vibration
- Depth
- Pipe material, diameter and condition
- Soil conditions

Additional layers of matting may be required on pipes of 300mm diameter or above. Fernco can provide a liner thickness design calculation if required.

10. What training is available regarding Pipe Doctor installation?

Fernco can provide training at our warehouse upon request. Please contact the Fernco Head Office for further information.

11. Is the Pipe Doctor guaranteed for any length of time?

Yes – a German Government test house DBT has tested the Pipe Doctor and a guarantee of 10 years has been established for the materials. The projected lifespan is 50 years. Materials guarantee and projected lifespan were established using the standard Fernco Pipe Doctor installation process and equipment.

# Pipe Doctor Installation Process

## Straight Repairs

All preparation work should be carried out prior to mixing the resin. This involves preparation of the packer, push rods and packer inflation devices. If you are not familiar with the installation process then please take time to read these instructions before proceeding.

1. 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. The packer should be inserted into the first sleeve. This is secured at each end using the plastic tie wraps. These should be positioned around the air connector and the eye bolt. 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 tie wraps fitted 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.
2. Lay out the protective ground sheet and open out the fibreglass mat. Place the mat with the woven side facing upwards.
3. Ensure at this stage that you are ready to proceed with the repair. Put on the protective gloves, unwind the two wire ties and ensure you have tools available to cut open the resin bag and to trim the wire when fitted.
4. Remove the clip from the resin bag by pulling outward on the two ends of the resin bag. Mix thoroughly by kneading the bag for 1 minute. Mixing is complete when all the resin is of uniform colour.
5. Cut off one corner of the bag and pour half of the contents onto the fibre glass mat
6. 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 along the first guideline and pour some resin on the untreated surface. Spread evenly over the mat.
8. Fold along the second guideline and apply more resin onto the untreated surface. Spread evenly over this surface.
9. 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.
10. 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. To assist with installation the following procedure should be followed. Make the first fold on the right hand guideline and the second fold on the left. Once the mat has been turned over and wetted out, place the packer on the mat with the air connection / 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.
11. Roll the fibreglass mat around the packer. Take care not to roll the protection hose into the matting. The mat is secured in position using the two wire ties. Position the ties 25mm from the end of the fibreglass mat. Wrap the wire tightly around the matting and secure with three half turns. Trim off the excess wire just above the three half turns. Note that the wire has to break or unwind during the inflation of the packer.

12. The packer can be inflated slightly at this point to tighten onto the wires. This is probably only necessary if the introduction of the repair over the site of damage is particularly difficult.
13. Introduce the packer and patch assembly into the pipe.
14. Attach the air push rods and push the packer into the pipe and position it at the point of repair.
15. Inflate the packer to the minimum pressure required to fully fill the inside bore of the pipe.
16. It is advisable to monitor the pressure held in the system to ensure the pressure is maintained whilst the resin is curing.
17. Leave the packer in place until the resin is cured. After curing is complete, deflate the packer and remove from the pipe. The resin left in the bag and on the ground sheet will give an indication of when the resin has cured. It is better to err on the side of caution and leave the packer in place if there is any doubt about whether or not the resin has cured.
18. Remove the protection hoses from the packer as these should not be used again.
19. The waste materials do not present any hazard and can be disposed of as general waste.



# Pipe Doctor Installation Process

## Bend Repairs

All preparation work should be carried out prior to mixing the resin. This involves preparation of the packer, push rods and packer inflation devices. If you are not familiar with the installation process then please take time to read these instructions before proceeding. Ensure that the correct packer is used for this application. These are colour coded in green.

If the defect within the bend is severe it is likely that the packer will jam into the defect and be prevented from travelling around the bend. Part of the preparation should include a 'trial run' of the packer to ensure it will go around the bend. A secondary access point may be required so that a rope can be fed and attached to the eyelet on the front of the packer. A second operator can then assist by pulling on the rope to ensure that the packer does not enter the defect.

20. 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.
21. Lay out the protective ground sheet and open out the fibreglass mat. As both sides of the mat have the same weave pattern it does not matter which side is placed facing upward.
22. Ensure at this stage that you are ready to proceed with the repair. Put on the protective gloves, unwind the two wire ties and ensure you have tools available to cut open the resin bag and to trim the wire when fitted.
23. Remove the clip from the resin bag by pulling outward on the two ends of the resin bag. Mix thoroughly by kneading the bag for 1 minute. Mixing is complete when all the resin is of uniform colour.
24. Cut off one corner of the bag and pour half of the contents onto the fibre glass mat
25. 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.
26. Fold along the first guideline and pour some resin on the untreated surface. Spread evenly over the mat.
27. Fold along the second guideline and apply more resin onto the untreated surface. Spread evenly over this surface.
28. 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.
29. 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. To assist with the installation the following procedure should be followed. Make the first fold on the right hand guideline and the second fold on the left. Once the mat has been turned over and wetted out, place the packer on the mat with the air connection / flexible adaptor to the right. This ensures that the open edge of the overlap is facing away from the direction of entry into the pipe.
30. Roll the fibreglass mat around the packer. The mat is secured in position using the two wire ties. Position the ties 25mm from the end of the fibreglass mat. Wrap the wire tightly around the matting and secure with three half turns. Trim off the excess wire just above the three half turns. Note that the wire has to break or unwind during the inflation of the packer.

31. The packer can be inflated slightly at this point to tighten onto the wires. This is probably only necessary if the introduction of the repair over the site of damage is particularly difficult.
32. Introduce the packer and patch assembly into the pipe.
33. Attach the air push rods and push the packer into the pipe and position it at the point of repair.
34. Inflate the packer to the minimum pressure required to fully fill the inside bore of the pipe.
35. It is advisable to monitor the pressure held in the system to ensure the pressure is maintained whilst the resin is curing.
36. Leave the packer in place until the resin is cured. After curing is complete, deflate the packer and remove from the pipe. The resin left in the bag and on the ground sheet will give an indication of when the resin has cured. It is better to err on the side of caution and leave the packer in place if there is any doubt about whether or not the resin has cured.
37. The waste materials do not present any hazard and can be disposed of as general waste.





# PACKER SAFETY INSTRUCTION MANUAL



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## **PACKER SAFETY INSTRUCTION MANUAL**

The following instruction manual covers the necessary information required for use of the Pipe Doctor Packers

### **PACKER TYPES**

#### **STANDARD (SP)**

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; in this case 1.5metres. Colour coded with yellow bands

#### **WHEELED (WP)**

Suitable for pipe diameters from 150mm to 1200mm and 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. All wheeled packers within this range have an annular construction to allow water to flow down the centre of the packer when in use. Colour coded with yellow bands.

#### **BEND (BP)**

Bend packers are only available for two pipe sizes 100mm and 150mm. Unlike the previous products these are size specific. The PDBP10/15 being used for DN100 pipelines and the PDBP15/15 being used for DN150 pipes. Note that the coding is different. The last two digits still refer to the packer length. These are the only packers that should be used on pipe bend repairs. Colour coded with green bands.

### **NEW PACKERS**

In order to maximize the life of a packer it is advisable to coat new packers with silicone grease. This will help to stop contamination of the rubber with resin. Other substances can be used as long as they are not petroleum based. A suitable alternative would be udder cream.

It is advisable to determine the pressure that is required to fill each size of pipe. This can be done above ground. Insert the packer into a pipe and inflate slowly. Note the pressure when the packer has inflated to a reasonably tight and frictional fit. This pressure is the minimum pressure needed to fill that diameter of pipe. Use the same test for other pipe sizes in order to ascertain the minimum 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 stresses on the pipe being repaired. This above procedure can be repeated during the life of the packer. Note the pressure gauges have dual scales; both 'psi' and 'bar'. Ensure units are not confused.

### **WARNINGS**

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.

Do not use Standard and Wheeled Packers on bend repairs.

It is advisable to attach safety lines to the packer. The air push rods are designed for pushing the packer into position and the safety lines are used to assist with the extraction of the packer.

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. Each packer is marked with the maximum pressure.

Under inflation will produce a poor repair and may cause problems removing the packer from the pipe.

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.

There are two types of resin available; 'W' Resin and 'S' Resin. The 'S' Resin has an extended working time and longer 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)

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.

### **CHECKS PRIOR TO AND DURING APPLICATION**

1. Check the rubber body of the packer for any noticeable damage i.e. cuts, blisters, wear and tear etc.
2. Ensure all working parts on the air connection are functioning correctly and that there are no air leaks from the system. The quick release connectors can be lubricated with WD40 to assist in the efficient operation of all working parts.
3. Ensure the correct packer is selected to repair the damaged pipe. The nominal size range of the packer is highlighted on each packer.
4. Always use the supplied inflation equipment, ensuring that the hose, pressure regulator and air compressor function correctly and are free from any damage or contamination.
5. If applicable ensure the packer wheels are attached and adjusted correctly.
6. Remove any sharp stones or grit etc. from the pipe that may cause damage to the packer.
7. Insert packer into the pipe and avoid dragging the body of the packer against any sharp edges.
8. Inflate the packer to the minimum pressure required to fill the internal bore of the pipe.
9. Keep well away from the pipe end whilst the inflated packer is in the pipe.



## CURING TIMES AND TEMPERATURES

These figures should only be used as a guide.

### **'W' Winter Resin**

<u>Temperature</u>	<u>Working Time (Minutes)</u>	<u>Curing Time (Minutes)</u>
8°C	20-22	100-120
13°C	18-20	90-110
18°C	16-19	75-100
23°C	15-17	60-70
28°C	10-12	45-55
33°C	7-9	40-45

### **'S' Summer Resin**

<u>Temperature</u>	<u>Working Time (Minutes)</u>	<u>Curing Time (Minutes)</u>
8°C	45-48	150-300
13°C	41-45	130-150
18°C	32-35	120-135
23°C	30-32	90-100
28°C	20-23	70-85
33°C	14-16	65-75

Additional Information:

Working surfaces absorbing or producing heat will also affect the working and curing times.

This can significantly decrease the working and curing times on a hot day!

On extremely hot days it is recommended to store the resin pack in a cooler.



Fax Transmission from WRC plc  
Frankland Road, Blagrove, Swindon, Wilts, SN5 8YF, UK

Telephone: 01793 865000 International + 44 1793 865000  
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**WRC**

Contract Ref. No.: Hydrostatic

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To (Organisation): FERNCO INTERNATIONAL LTD

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For Attention of: TONY HICKMAN Date: 11/08/03

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Fax No.: 01226 340400 DDI/Extn. No.: 6130

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From: ANDREW RUSSELL No. of Pages: (Incl. This one) 6

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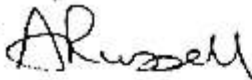
Dear Tony

Please find attached our draft test report for your Pipe Doctor repair – which passed the hydrostatic pressure test.

Please forward any comments you have and I will then post the revised test report to you.

Our hydrostatic test reports normally have a short paragraph in the introduction which briefly describes the materials used, lay-up, curing regime, etc. Would you be able to provide some details?

Best regards



Andrew Russell  
WRC Utilities

Direct dial number 01793 865130  
e-mail: russell\_a@wrcplc.co.uk

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For WRC internal use only:

Priority:

Within 1 hour

During the day

Overnight

Confirmation of transmission:

Internal Mail

Immediate



FERNCO AUSTRALIA PTY LTD ABN: 86 115 372 480  
DOCUMENT TITLE: FERNCO PIPE DOCTOR INFORMATION PACK DOCUMENT DATE: 8/9/08  
DOCUMENT STATUS: DRAFT PAGE 16 OF 18

**WRc:- Long-Term Testing**  
**on the**  
**“Pipe Doctor” No-dig Pipe Repair System**



**The test commenced on the 25<sup>th</sup> April 2007 and will be completed in mid November 2007.**

**The Pipe Doctor passed the Long-Term Test with a leakage rate of ... ZERO!**

