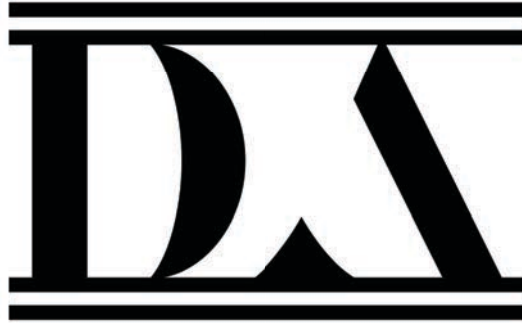


D R A I N



A C A D E M Y

**Pipe Repair Patch
System
Instruction Manual**

Radius Repair Information & Instruction Manual

Site Health & Safety

All tasks shall be undertaken in accordance with your country's Health and Safety regulations and client-driven requirements that are applicable to the site conditions.

Kit contents available from Drain Academy LLC

[Suitable for a single patch repair]

- Disposable protective gloves
- Pre-measured fibreglass mat
- Disposable protective groundsheet
- Two-part resin pack(s)
- Packer protection wrap
- Resin spreader

Hardware Requirements

- **Compressed air supply**
- **Flexible air push rods**
- **Flexible adaptor**
- **Inflatable packers**
- **Pressure regulator**
- **Airline (compressor to regulator)**

PACKER SELECTION

Drain Academy LLC Packers are made of the highest quality grade available and we carry a vast multitude of selections that range in all sizes to meet all your project needs.

STRAIGHT PACKER

Workspace diameter

Diameter : **1.4" inches up-to 40" inches** | 35mm up-to 1000mm

Length : **40 inches up-to 236 inches** | 1000mm up-to 6000mm

CURVE \ RADIUS PACKER (Can also be used for straight repairs.)

Workspace diameter

Diameter : **2" inches up-to 8inches** | 50mm up-to 200mm

Length : **40 inches up-to 120 inches** | 1000mm up-to 3000mm

RADIUS and STRAIGHT PACKER

Warning Notes !!!!!

- 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.
- All packers have been tested and are ready for use upon delivery.
- Suitable for sewer repair only.
- Packers are to be used as specified and are not intended to be used as a tool for anything other than as stated herein.
- Not a toy or sexual device.
- Note the pressure gauges have dual scales; both 'psi' and 'bar'
Personal guarantees are only offered to individuals who have completed the certified installation training course offered by Drain Academy LLC.

Resin Selection

At Drain Academy LLC we offer only the highest grade of resins and mats available, so you can be assured of job well done and client satisfaction.

Curing times and temperatures

Resin

Temp Work Time Cure Time

8°C (33°F) 20-22 mins 60-70 mins

13°C (55°F) 18-20 mins 50-60 mins

18°C (64°F) 16-19 mins 50-60 mins

23°C (73°F) 15-17 mins 50 mins

28°C (82°F) 10-12 mins 40 mins

33°C (91°F) 7-9 mins 40 mins

RESIN GUIDANCE NOTES

- Resins should be stored in dry conditions at ambient temperatures 18°-23°C (64°-73°F)
- 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 than 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 cup the mixed resin can generate high temperatures, affecting both working times and curing times.
- It is strongly advised to ensure that there is adequate cooling available at the site location during the hot summer months, e.g. portable cooler/ freezer.

Pre-Installation Advice

- Prior to installation, a CCTV survey will have been carried out; to determine the condition of the drain and identify locations where the Patch Repair is considered suitable.
- 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, greases and root ingress. This should be confirmed by CCTV inspection.
- 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.
- 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.

Installation Process

General Preparation

All preparation work should be carried out prior to mixing the resin. This involves preparation of the packer, push rods, flexible adaptor, pressure regulator and packer inflation devices. It is the users responsibility to ensure good housekeeping is employed so that the equipment is working correctly and maintained in a good condition.

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

Packers

- Ensure the packer is of a type suitable for the installation and that it is the correct diameter for the repair being undertaken (The nominal size range of the packer is highlighted on each packer).
- 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 the 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.

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 adapter rubber.

Push Rods

- Prepare all push rods and ensure the locking collar is tightened on each push rod.

System

- Ensure that the hose, pressure regulator and air compressor function correctly and are free from any damage or contamination, all air connections are functioning correctly, and that there are no air leaks from the system. 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 air push rods).

Packer Preparation



- The packer should be protected with a polyethylene cover or stretch film (recommended). The film should be wrapped around the packer in such a way that a good overlap between the individual layers is ensured. The wrapping should overlap each end of the packer generously.

Installation Process

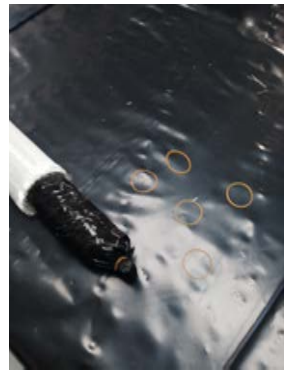


- Lay out the protective base plate and lay out the fiberglass mat.
- At this time, make sure that you are ready to proceed with the repair. If not already done, put on both pairs of protective gloves and goggles; unwind the tapes to ensure that you have tools available to mix the resin containers (A+B) in a separate bucket.

- Now pour the mixed resin from the bucket onto the fiberglass mat (at 2 there was always a virtual bucket of resin on each side of the mat)
- Use the supplied spreader to distribute the resin evenly on the surface of the mat. Make sure that all edges are coated. Resin that is sprinkled on the polyethylene base plate can easily be sprinkled back onto the fiberglass mat.



- Pour some resin on the untreated surface. Distribute evenly on the mat.
- Apply more resin to the untreated surface. Distribute evenly on this surface.
- Turn the impregnated mat over and pour the remaining resin onto this surface. Distribute evenly on the mat. Note that the resin must cover all surfaces and soak into the mat. If there appears to be excess resin on this last surface, do not remove it. This will be pressed into the mat when the pressure is applied by the packer.



- 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. This 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 fully impregnated, place the packer on the mat with the air connection adaptor on the right. This ensures that the open edge of the overlap is facing away from the direction of entry into the pipe.



- Roll the fiberglass mat around the packer. The mat is secured in position with the rubber bands. One should be positioned 2 inches from each end of the fiberglass mat and several rubbers distributed (rule of thumb: 5 rubbers per 4 feet). Note that you are not using a wire. it could damage the packer.

Never try to install a patch that is not secured correctly to the packer - this can lead to a displacement of the patch along the packer.

- Attach the extension cord to the eyelet and insert the packer assembly into the pipe, taking care to avoid 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.

Attach the flexible connector and air push rods to the packer, and push into the pipe over the pre-determined distance, so it is in position at the point of repair. Carry out a final check that 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.

Inflate the packer to the required pressure. See previous note under

'General Preparation'

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 the correct installation equipment to inflate the packer, never exceed the maximum inflation pressure.

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

Keep well away from the pipe end while the inflated packer is in the pipe.

Curing

- Monitor the packer pressure at regular intervals during the curing period to ensure that the target pressure is maintained.
- Leave the packer in place until the resin is cured. The resin left in the cup 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'.

Removal of Packer

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

- The repair should be inspected using the CCTV equipment.
- Remove the protection wrap from the packer. These should not be reused and should be removed from site and disposed of in an appropriate manner.

RESIN SAFETY INFORMATION

- Each resin cup has a label indicating the potential hazards of the contents.
- All precautions should be taken when handling the resin cup and contents.
- Employ best practice with regards to hygiene.
- Do NOT eat, drink or smoke when handling.
- Wear suitable Personal Protective Equipment (PPE).
 - Hand protection – wear the disposable gloves provided.
 - Eye protection – wear safety glasses or goggles.
 - Safety boots and protective overalls.
- Where possible, ensure adequate ventilation of the preparation working area.
- Uncured resin can be removed safely from unprotected skin or clothing using soap and water.

FIRST AID MEASURES

- **Inhalation** - move to a well ventilated location, keep warm, rest; if respiratory effects occur obtain medical assistance.
- **Skin Contact** - remove by mechanical means, wash out with soap and water.
- **EyeContact** - flush eyes with generous amounts of water whilst holding eyelids apart. Seek medical assistance.
- **Ingestion** – do NOT induce vomiting. Seek medical aid.

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