

# APS

— AMERICAN —  
PIPELINING SUPPLIES

## INSTALLATION MANUAL

# VERSA-PATCH

A Versatile Pipe Patching System by **APS**



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## SAFETY SYMBOLS

Safety symbols and signal words are used throughout this operation manual and on the product to convey and emphasize important safety information. See the list below for descriptions of different safety symbols and signal words.

This is the safety alert symbol. This symbol means there are potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE indicates information that relates to the protection of property.

This symbol means read the operator's manual carefully before using the equipment. The operator's manual contains important information on the safe and proper operation of the equipment.

This symbol means always wear safety glasses with side shields or goggles when handling or using this equipment to reduce the risk of eye injury.

This symbol means always wear gloves when handling or using this equipment to reduce the risk of injury.

## GENERAL SAFETY WARNINGS

### WARNING

**Read all safety warnings, instructions, illustrations and specifications provided with this equipment. Failure to follow all instructions listed below may result in electric shock, fire, and or serious injury.**

**SAVE ALL WARNINGS AND INSTRUCTIONS FOR FUTURE REFERENCE!**

- **Keep work area clean and well lit.** Dark and cluttered work environments may lead to accidents
- **Do not operate equipment in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Equipment may create sparks which may ignite the dust or fumes.
- **Keep children and by-standers away while operating equipment.** Maintain focus while operating equipment.
- **Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges and refrigerators.** There is an increased risk of electrical shock if your body is earthed or grounded.
- **Do not overreach. Keep proper footing and balance at all times.** This helps maintain better control of the equipment in unique situations.
- **Do not take shortcuts or ignore instructions, especially in regards to safety.** Careless actions can cause severe injury.

## SAFETY INFORMATION

### WARNING

**This section contains important safety information that is specific to this equipment.**

**Read these precautions carefully before using the Pipe Patch to reduce the risk of chemical burns or other serious personal injury.**

**SAVE ALL WARNINGS AND INSTRUCTIONS FOR FUTURE REFERENCE!**

Keep this manual with the pipe patch for use by the operator.

## VERSA-PATCH SAFETY

- **Always wear appropriate personal protective equipment.** Appropriate personal protective equipment always includes safety glasses and chemical resistant gloves and may include equipment such as face shields, long sleeves, safety shoes, hard hat, and respirator as appropriate. This will reduce the risk of injury.
  - **Patch resin fumes may irritate the skin and lungs or damage the eyes.** Refer to the resin labeling and SDS for more information
  - **Drains may contain chemicals, bacteria and other substances that may be toxic, infectious, cause burns or other issues.**
- **Mix resin and wet out patch in a well-ventilated area.** This reduces the risk of irritation or reactions from resin fumes.
- **Do not leave mixed resin in container.** Chemical reactions during curing generate heat. If kept in the container, that heat could damage the container and cause burns. Excess resin can be left to dry on the protective table covering.
- **Do not inflate the packer outside of an appropriately sized pipe.** Do not inflate the packer without packer sleeve/patch/appropriate containment on the packer per these instructions. This will reduce the risk of the equipment bursting and causing serious damage or injury.
- **Do not over-pressurize the equipment.** This will reduce the risk of the equipment bursting and causing serious damage or injury.
- **Practice good hygiene. Do not eat or smoke while handling or operating the equipment or material. After handling or operating equipment, use hot, soapy water to wash hands and other body parts exposed to chemicals or drain contents.** This will help reduce the risk of health hazards due to exposure to toxic materials.
- **Do not use if there is the risk of contact with other utilities (such as natural gas or electric) during**

**operation.** Crossbores, improperly placed utilities and damaged drains could allow the equipment to contact and damage the utility. This could cause electrical shock, gas leaks, fire, explosion or other serious damage or injury.

- **Follow all applicable codes and regulations.** Do not use if prohibited by local code. This resin is not approved for use in the City of Los Angeles, CA.
- **Before operating the VERSA-PATCH equipment, read and understand:**
  - This operator's manual.
  - The SDS and labeling for the resin components.
  - The instructions and warnings for any other equipment or material being used.

Failure to follow all instructions and warnings may result in property damage and/or serious injury.

## APS Contact Information

If you have any questions concerning VERSA-PATCH products:

- Contact your sales representative
- Visit [www.americanpipeliningsupplies.com](http://www.americanpipeliningsupplies.com)
- Call APS (888) 258-9359

## Description

The VERSA-PATCH pipe patching system is a trenchless pipe repair and relining system. The system repairs cracks, holes, joint separation and other damage in a variety of pipe types, such as clay, concrete, cast iron or PVC.

The system uses a cylindrical fiberglass patch wet out with silicate resin. The patch is mounted on the inflatable installation tool (the "packer") and placed at the point of repair by pushrod or ropes. The packer is inflated to press the patch inside the repair point. When the resin is hardened, it creates a seal in the damaged area.



A variety of packers are available for different pipe sizes and patch lengths. *See Specifications.*

All VERSA-PATCH pneumatic equipment includes a special locking connector to reduce the risk of the connections coming apart during use.

This product is NOT suitable for use in potable water systems and is not for use in the City of Los Angeles.

### List of Required Equipment and Materials:

- Packer
  - Packer Ball
  - Air Push Rods
  - Air Connector Adapter
  - Regulator
  - Quick Link
  - D-Ring
  - Pull Rope
  - Air Hose
  - Flexible Adaptor
  - Containment Liner
  - Containment Tube
  - Sharp Scissors
  - Air compressor
  - Camera
  - Permanent Marker
  - Measuring Tape
- 
- Resin Part A
  - Resin Part B
  - Tape
  - Packer Sleeve
  - Patch Material
  - Table Covering
  - Gloves
  - Elastic Bands

# Specifications

## Versa-Patch Installation Equipment

Packer/ Nominal Pipe	Overall Packer Length	Max. Patch Length	Minimum Encroachment Zone **	Packer Operating Pressure*	22, 45, Long Radius 90° Elbows	Short Radius 90° Elbows and P-Trap	Pipe Size Transitions	Air Push Rods	Resin Amount	Resin Wet Out	Elastic Bands
2"	43"	32"	3"	43 psi	Y	Y	N	10' Integral	32"	Off Packer	2"
3"	43"	32"	3"	60 psi	Y	Y	N	5' Sections	32"	On Packer	3"-6"
3"-4"	4'	36"	5"	50 psi	Y	4" Only	3"-4"	5' Sections	3'	On Packer	3"-6"
3"-4"	7'	68"	5"	50 psi	Y	4" Only	3"-4"	5' Sections	2 x 3'	On Packer	3"-6"
4"-6"	4'	36"	5"	36 psi	Y	6" Only	4"-6"	5' Sections	3'	Off Packer	3"-6"
4"-6"	7'	68"	5"	36 psi	Y	6" Only	4"-6"	5' Sections	2 x 3'	Off Packer	3"-6"

\*Do not exceed packer operating pressure

\*\*Minimum amount of exposed packer rubber at end of patch requirement for proper installation of patch.

### Air Push Rod (For use with 3" and larger packers)

- Nominal Length .....5' (1.5 m) each
- Maximum Length .....100' (30.5 m)
- Maximum Pressure .....217 PSI (15 Bar)
- Not for use through P-traps or 3" elbows
- Air Hose Length .....100' (30.5 m)
- Pneumatic Connector Type.....Locking
- Adapter .....Adapts standard air hose connectors to locking style used with VERSA-PATCH pipe patching equipment.
- Required Compressed Air Supply.....100 psi to 130 psi (6.9 to 9.0 Bar)
- Pull Rope.....750 pound (3.3 kN) rating, 1/4" (6.4mm) Diameter, 250' (76 m) Long
- Gloves.....Nitrile
- 2" Versa-Patch Elastic Bands.....Specially sized for use with Versa-Patch 2" packer
- 3"-6" Versa-Patch Elastic Bands.....Specially sized for use with Versa-Patch 3" to 6" packers

### Pipe Patch Specifications

Versa-Patch kits are available for a wide range of pipe diameters, and in various lengths. *Refer to the APS catalog for available materials.*

- Patch Material .....Fiberglass
- Resin Type.....Two-Component Organic Silicate Material
- Resin Mix Ratio.....2:1 by volume, Controlled by Containers. Make sure both containers are marked the same (32" or 3')
- Resin Shelf Life .....One Year, Use By Date On Carton/Resin Container
- Resin Storage Temperature.....41°F to 113°F (5°C to 45°C) Do not allow resin to freeze
- Resin Application Temperature.....41°F to 68°F (5°C to 20°C) Do not
- Working Time (Pot Life).....15 Minutes (At Resin Application Temperature)
- Resin Set Time.....90 minutes (Internal Pipe Temperature 50°F to 68°F (10°C to 20°C))
- 180 Minutes (Internal Pipe Temperature 41°F to 49°F (5°C to 9°C))

Time to  
Final Hardness .....240 minutes (if pressure testing)  
Typical patch thickness .....0.16" (4mm)

This product is **NOT** suitable for use in potable water applications and can **NOT** be used in the City of Los Angeles.

**Standard Equipment**

Refer to the VERSA-PATCH® catalog for information on available materials, specific product numbers and more.

NOTICE: Versa-Patch® is designed to repair pipes. If used properly, it should not further damage the pipe that is being repaired. Pipe patching is not suitable for some situations. Obstruction of the pipe may occur when patching is done improperly. In some situations other methods of repair such as digging may be necessary to properly repair the damaged pipe.

**Glossary of Patching Terms**

**Containment Liner:** The restrictive liner used to prevent over inflating the packer in sections of pipe with bends.

**Containment Tube:** The restrictive tube used to prevent over inflating the packer in straight sections of pipe.

**Encroachment Zone:** The area at each end of the packer which cannot expand to the full pipe diameter during inflation. The patch CANNOT be in this zone or it can cause blockage in the pipe. The encroachment zone is the area where the black rubber meets the metal end of the packer. This zone measures 3" long for the 2" & 3" packers and 5" long for the 3"-4" & 4"-6" packers.

**Final Hardness Time(also known as "cure time"):** The time required for the patch to reach full hardness and strength.

**Flexible Adapter:** The short flexible air fitting assembly located at the back end of the packer which connects to the Air Push Rods or the Patching Air Hose.

**Internal Pipe Temperature:** The temperature inside the pipe that is being patched, at the area to be patched. Higher temperatures decrease resin set time, lower temperatures increase set time.

**Packer:** The inflatable bladder used to hold the patch in place while inflating it against the inside of the pipe while it hardens and cures.

**Packer Sleeve:** A clear protective sleeve that covers the packer and prevents contact from resin.

**Packer Test Insertion ("Dry Run"):** In this process, the packer is covered with a packer sleeve and lubricated with oil soap then pushed inside the pipe to the repair point in order to test its ability to navigate.

**Air Hose:** Can be used to pull the packer into place by attaching to the air fitting on the packer instead of the push rods

**Resin Set Time:** The time required for the resin to sufficiently harden so that the packer can be deflated and removed. Resin set time is temperature dependent. At this time, the pipe can be put back into service.

**Pre-Operation Inspection**



**Before each use, inspect your Versa-Patch system for any problems or issues that may result in serious injury from chemical burns, infections and other causes and prevent system damage. Correct any issues found before proceeding.**

**Always wear safety glasses, and other appropriate personal protective equipment.**

1. Clean the inspection equipment to be used to improve control during use.
2. Inspect patching equipment for the following:
  - Proper assembly and complete setup
  - Damage or wear, kinks, cuts, cracks and breaks.
  - Operating condition that could prevent safe and normal operation.

If problems are found, equipment must be repaired or replaced before equipment can be used

3. Inspect pull rope for damages that could reduce its strength.
4. Inspect the patch kit. Verify all components are present and in excellent condition. Verify the resin “use by” date is current and not expired (see image below)



5. Inspect and maintain any other equipment being used to verify it is functioning properly.

**Follow all warnings and instructions regarding resins. Read the resin labeling and SDS for more information. This will help minimize the risk of health hazards from exposure to resin material.**

**Mixed resin should NEVER be left in the container. Chemical reactions during curing generate heat which could damage the container and cause burns. All mixed resin should be poured onto the patch. Excess resin can be spread out and left too dry on the protective table covering.**

**Do not inflate the packer outside of a pipe that is properly sized. Always ensure the packer is inflated with the correct sleeve, patch, or containment in place, as specified in these instructions. This helps minimize the risk of the equipment bursting and causing potential damage or injury.**

**Do not exceed the recommended pressure limits. Over-pressurizing the equipment can lead to ruptures, potentially causing severe damage or injury**

**Follow the setup and operating instructions carefully to ensure safe installation and minimize the risk of injury.**

## Set up and Operation



**Always wear proper personal protective equipment. Proper personal protective equipment (PPE) always includes safety glasses and chemical resistant gloves. PPE may include face shields, long sleeves, safety shoes, hard hat, and respirator as appropriate. This will reduce the risk of injury.**

**Pipe patching resin fumes may irritate the skin and lungs or damage the eyes. See the resin labeling and SDS for important information regarding resin.**

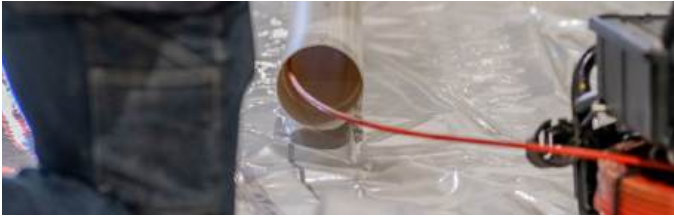
**Drains can contain harmful chemicals, bacteria and other toxic or infection substances which can cause burns or other issues.**

**Resin mixing and patch wet out should be done in a well-ventilated area in order to reduce the risk of irritation or reactions to resin fumes.**

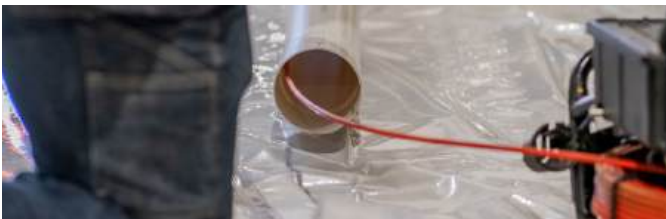
1. Check work are for:
  - Sufficient lighting
  - Resin mixing location that is out of direct sunlight but near the point of insertion into the pipe.
  - A clean, level, stable, dry location for equipment and operators.
  - Sufficient ventilation. When working indoors, windows may need to be opened and/or powered ventilation may be required to remove resin fumes.
  - Clear path between patch wet out area and point of insertion in pipe.
2. Properly inspect all equipment.

Successful patch installation relies on preparation and timing. Given the uniqueness of each job site, the installer’s skill and judgment are crucial in selecting appropriate methods and practices. A checklist is included at the end of this manual to ensure all steps are completed





**INSPECT THE LINE WITH A CAMERA TO ASSESS THE DAMAGE.**



**RE-INSPECT THE LINE TO CONFIRM IT IS CLEAN, THE LOCATION AND SIZE OF REPAIR**



**PREPARE THE PATCH AND PLACE THE PACKER AT THE REPAIR POINT.**



**CLEAR ALL BLOCKAGES AND CLEAN THE LINE WALL TO WALL**



**PERFORM A TEST RUN TO ENSURE THAT THE PACKER CAN REACH THE POINT OF REPAIR WITHOUT ISSUE.**



**INFLATE THE PACKER TO THE REQUIRED PRESSURE. ALLOW THE RESIN TO CURE FOR THE RESIN SET TIME.**



**ONCE RESIN IS CURED, DEPRESSURIZE THE PACKER**



**REMOVE THE PACKER**

## Preparing the Pipe for Patching



1. Use video inspection equipment ("camera") to determine:
  - The location and damage to the pipe (figure 7-1)

- The diameter and length of the patch required. Multiple patches can be applied for longer repairs. See installing Multiple Patches section.
- Verify the area being patched is mostly round.
- If the packer will be placed in a situation that leaves parts of it unsupported. Such as:
  - Openings larger than 1" in diameter (e.g. T's or pipe damage).
  - The packer extends into a larger sized pipe or out of the drain.

- Containment is required if the packer is not properly supported or the patch can bulge into an unsupported area. (see “containment” section).
- Obstacles that could prevent packer insertion or cause damage include pipe size(s), type(s), transitions, traps, shifted pipe, and others. Transitions in the pipe system may necessitate a smaller packer size.
- Best access to the area being patched. Some jobs require having access on both ends of the pipe to be patched so that the packer can be pulled into position. Determine how the packer will be moved into position.
- Visual inspection of the pipe is required throughout the patching process. While inspecting, determine the temperature of the pipe to be patched. The resin set time will be affected if the pipe temperature is outside the recommended resin application temperature range of 41 F to 68 F (5 C to 20 C). Lower temperatures will increase set time, while higher temperatures will decrease it.



2. The pipe system must be thoroughly cleaned and free of debris, roots, and other materials that may obstruct the packer’s movement, damage the pipe patch, or harm internal equipment. The pipe should be cleaned down to the base material. When working with PVC or other plastic pipes, the cleaning process must also roughen the base material to ensure mechanical bonding of the patch to the pipe.

Clean past the damaged area of the pipe so that water and debris can drain from the area. Area should be flushed and fluid flow shut off. Pipe can be patched with small amounts of water in the drain, but less water in the area is

better. While the drain does not need to be perfectly clean, any material left in the drain may make the patching process more difficult and prevent proper sealing.



3. Reinspect the drain using the camera to confirm it has been properly cleaned and meets the necessary conditions for patching. Ensure the pipe is clear of any sharp features, such as broken sections, that could damage the packer. Position the camera head at the center of the damaged area to be patched and mark the camera push cable (e.g., by wrapping tape around the push cable, as shown in Figure 8) near the pipe entrance. This mark will help measure the distance to the damaged area for patching.
4. In an open area, lay out the camera push cable so that the marked section is visible. Measure the distance from the camera head (patch location) to the mark on the push cable to determine how far the patch will be placed into the drain.
5. Determine whether the packer will be positioned using the air push rod, a pull rope, or a combination of both. A pull rope must always be used at the same end as the air push rod. If using a second pull rope from the opposite side of the packer, route the rope through the pipe.  
NOTE: Push rods cannot be used to push through P-traps or bends in pipes of 3 inches or smaller. In such cases, the lockable air hose will be attached to the back of the packer, with a pull rope at each end of the packer.

### AIR PUSH RODS

Assemble enough air push rods to reach the patch location. Lay the assembled packer and attached air push rods next to the camera push cable. Mark the air push rod at the same distance as the mark on the camera push cable. This ensures accurate placement of the patch in the pipe. Remove one air push rod, which will be attached to the packer during the installation process

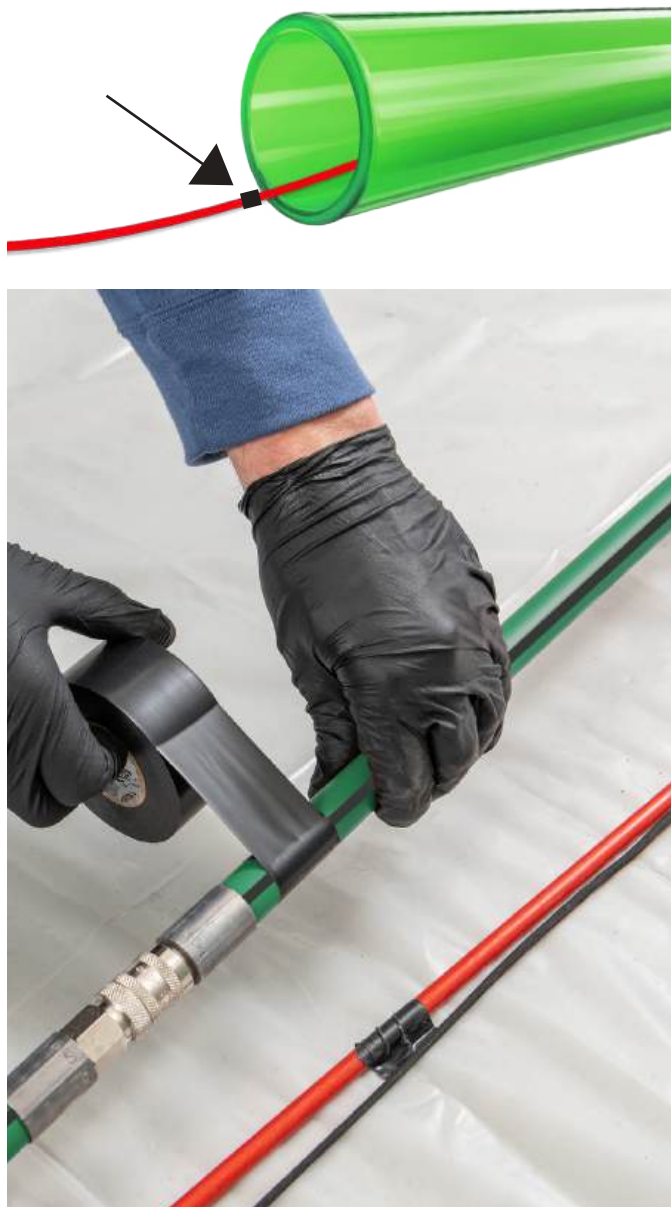
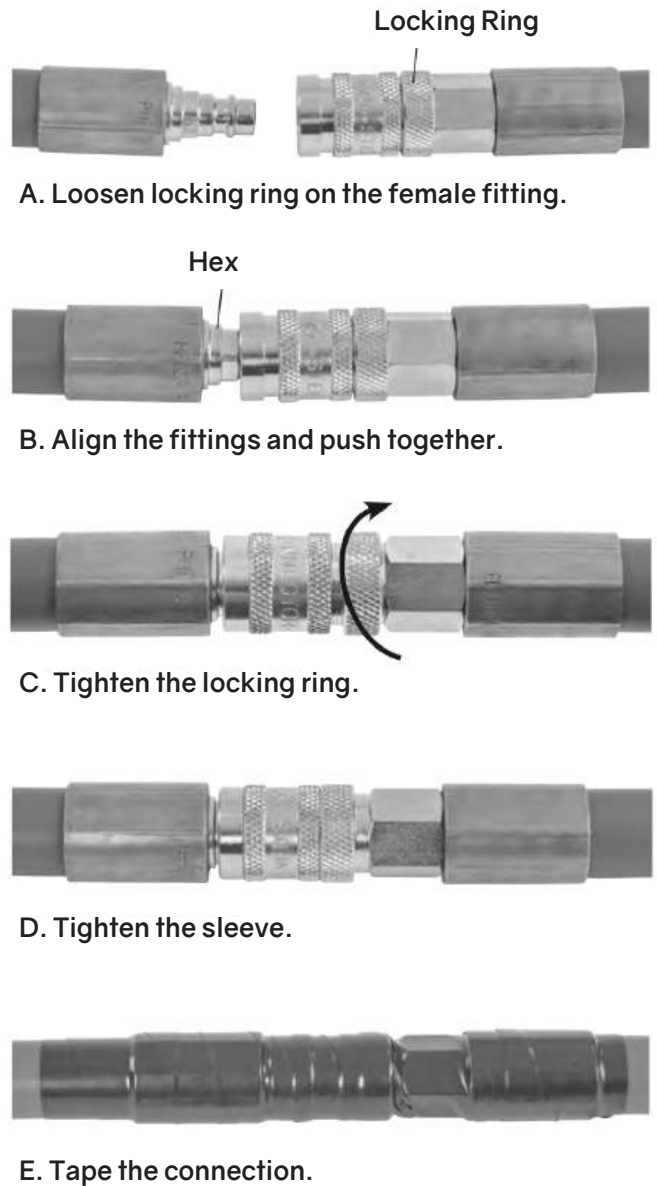


Figure 8

Secure each pushrod coupling by locking them in order to minimize the risk of separation in the drain. Wrap tape around each secured coupling, extending from one red section to the next, to prevent resin from entering and hardening inside the coupling.

The 2" Packer has an integrated push hose and it cannot be used with separate air push rods.

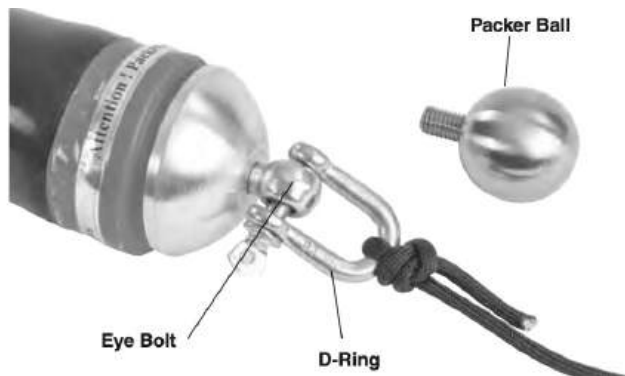


## PULL ROPES

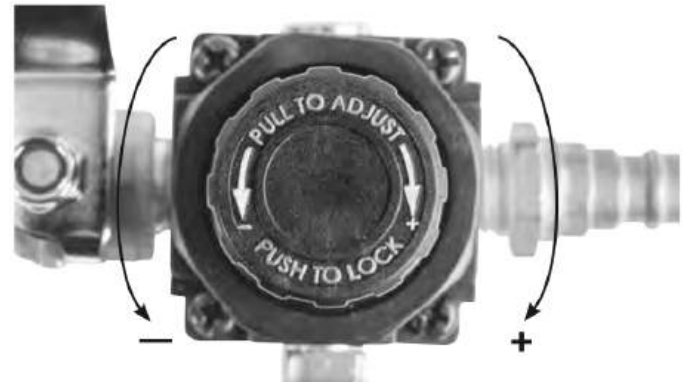
Each end of the packer is equipped with a pull rope connection point. Always attach a pull rope to the air supply end of the packer to facilitate its withdrawal. Avoid pulling on the air push rod or air hose unless you are using the 2" packer.

If a pull rope is used on the front of the packer, first unscrew the packer ball and replace it with the rope attachment eye bolt. The rope can then be attached directly to the eye bolt or to the supplied D-ring or quick link. Ensure that all pull ropes are securely fastened.

When using only pull ropes, connect the air hose to the packer and position the assembled packer and hose alongside the camera push cable. Mark the air hose at the same point as the mark on the camera push cable. This will assist in accurately locating the patch within the pipe.



6. Set up the air supply and connect an air hose to the point of use. Attach the regulator to the air hose. Pull out the regulator adjustment knob and turn it clockwise to verify that adequate pressure (at least 100 psi) is available to the regulator. Continuous air pressure is required throughout the patching process to ensure a proper patch. Once confirmed, pull out the adjustment knob and turn it counterclockwise to reduce the air pressure to zero. Refer to Figure 11. Place the regulator out of the way until it is time to inflate the packer.
7. Prepare the packer for the test insertion by installing the packer sleeve.



## INSTALLING THE PACKER SLEEVE

The packer sleeve protects the packer from resin exposure and makes cleanup easier.

1. Ensure that you have the correct packer, equipment, and materials required for the patching work.
2. If necessary, install containment on the packer (refer to the containment section for guidance). Containment is **NOT** used during test insertion.
3. Spread out the plastic table covering to protect your chosen work area from resin and to keep materials and equipment clean.
4. Ensure the packer is clean. If necessary, apply baby powder to the rubber portion of the packer and remove any excess powder from the work area.
5. Place the packer inside the clear packer sleeve.
6. The sleeve should extend about 1" beyond the front of the packer and approximately 6" beyond the back of the packer, past the air connector.
7. Position the packer in the center of the sleeve's width. Fold the edges of the sleeve tightly around the packer.
8. Tape the packer sleeve securely at the front of the packer. Wrap the tape around the metal end of the packer, covering the curve of the packer's end, but avoid covering the threaded connector. Wrapping the tape over the curve is crucial for ensuring the sleeve stays in place properly.

- Use the provided elastic bands to secure the packer sleeve to the packer by doubling them over every 12". It is crucial to use the correct elastic bands and to place them properly to ensure the packer and patch function effectively.





10. Similar to the front, secure the sleeve at the back end of the packer with tape. Wrap the tape around the metal end of the packer, ensuring you tape down over the curve of the packer end is important for proper retention of the sleeve in place. Roll back the sleeve to gain access to the air push rod connection and pull rope tie off point. connect the pull rope securely. Roll the sleeve down the length of the rod and rope and securely tape the end of the sleeve.



**TEST INSERTION**

The packer test insertion ensures that both the packer and equipment can navigate the pipe to the damaged section within the required time and can

be retrieved without damage. This step increases the likelihood of a successful patch. Do not attempt to install the patch without performing a test insertion first. Take into account the added thickness from the containment/patch during the patching process, as this may affect the packer's ability to properly insert. If the packer cannot be placed within the required time during the test insertion, do not proceed with patching the pipe.

This is general guidance for packer insertion. Every job site is unique, and the installer must use skill and good judgment to determine the appropriate methods and practices. For example, a second access point on the opposite side of the patch may be necessary. This would allow an additional pull rope to be fed through the pipe and attached to the front of the packer, helping to pull it into place.

1. Verify that the proper packer is fully prepared, including the installation of a packer sleeve. Containment is usually unnecessary for test insertion.
2. A small amount of oil soap can be applied to the packer sleeve to mimic the lubricity of resin on the packer. For better navigation, the optional accessory ball and spring guide may be used instead of the packer ball.
3. Gently insert the packer into the pipe system, taking care to avoid damage. Keep track of the time required for the insertion process.
4. Push the packer into the pipe until the distance mark on the air push rod or air hose aligns with the pipe entrance. Assess whether it is feasible to navigate the packer and patch to the designated site before the resin hardens. **DO NOT INFLATE** the packer during the test insertion. Keep in mind that patch installation is time-sensitive; if navigation is challenging or takes too long, the patching process may fail.
5. With your camera, inspect the line and confirm that the packer is positioned correctly in the place where the patch will be applied.
6. Retrieve the packer from the pipe using the pull rope. **DO NOT** pull on the air push rods because this can damage the air push rods.
7. Remove the used packer sleeve, and the air push rod or air hose assembly from the packer.

## CONTAINMENT

If the packer will be positioned in a way that leaves parts of it unsupported (such as in T-junctions, pipe damage exceeding 1 inch in diameter, connections, breaks, or when the packer extends into a larger pipe or out of the drain) containment must be used. Containment should also be used when the pipe is suspected to be brittle based on material, age, or inspection results.

Containment Types:

**CONTAINMENT TUBE**  
(for use in straight pipes)



**CONTAINMENT LINER**  
(For use in bends)



Containment minimizes the risk of the patch bulging into unsupported areas or the packer becoming damaged or bursting. It is always applied beneath the packer sleeve and is removed along with the packer once the patch is complete. Since the packer's diameter is larger than usual with containment, a pull rope may be required to position it correctly. While the containment tube and liner can be reused, they should be thoroughly inspected beforehand to ensure they are in good condition and free of damage.

## CONTAINMENT TUBE

When containment is needed in straight pipes, use the Containment Tube. Containment tubes can be used at one end, both ends or over the full packer.

## ENDS ONLY

Determine the appropriate length for the containment tube. At a minimum, the tube should be 12" (305 mm) long and must extend at least 4" (100 mm) beneath the patch. If the patch is not full length, the tube can extend further than 4" under the end of the patch, but it should never be less.

1. Use sharp scissors to cleanly and squarely cut the containment tube. This will minimize tearing when inflating.
2. Slide the containment tube over the packer until it lines up with the end of the packer.
3. The packer should be placed in the middle of the width of the tube. Fold up the edges of the tube tightly to the packer.
4. Tape the containment tube securely to the end of the packer. The tape should be wrapped around the metal end of the packer and down over the curve of the end of the packer. Do not cover the threaded connector.
5. Place elastic bands doubled over individually every 9"-12" to keep the containment tube folded and secured neatly to the packer.
5. Continue assembling the packer as usual by installing the packer sleeve.

## FULL PACKER

1. Measure the Containment tube to cover the entire packer, hose and locking connector.

The 2" packer does not need the locking connector covered. The length of the containment tube should be the length of the 2" packer plus 4".

2. Use sharp scissors to cleanly and squarely cut the containment tube. This will minimize tearing when inflating.
3. Slide the containment tube over the packer until it lines up with the end of the front metal head of the packer.
4. The packer should be placed in the middle of the width of the tube. Fold up the edges of the tube tightly to the packer.
5. Tape the containment tube securely to the end of the packer. The tape should be wrapped around the metal end of the packer and down over the curve of the end of the packer. Do not cover the threaded connector.
6. Place elastic bands doubled over individually every 9"-12" to keep the containment tube folded and secured neatly to the packer.
7. Continue assembling the packer as usual by installing the packer sleeve.

## CONTAINMENT LINER

Containment liner is required when patching through bends to prevent wrinkles. Examples can be large holes or corrosion in a bend. Using a containment liner will increase the overall diameter of the packer making it tighter in pipe but will not restrict the packer from navigating the bends. The container liner has a loop stitch on the inside. Containment liner cannot be used as a patch and patch cannot be used as containment liner.

1. Measure the containment liner to cover the entire packer end to end, including the metal ends of the packer. Using sharp scissors, cleanly and squarely cut the containment liner to length.
3. Slide the containment liner onto the packer. Baby powder can be used on the packer to more easily slide the liner over the packer.
4. Tightly apply tape to the containment liner over the metal ends of the packer as shown in. Tape should start where the black rubber of the packer meets the metal head and continue over the rounded end (but not cover the threaded connector). The tightness of the tape over the rounded ends holds the containment liner in place. Apply doubled over elastic bands every 12". If needed, the liner can be folded over.
5. Continue building out your packer as normal by installing the packer sleeve. Pulling the patch onto the packer with a containment liner will be difficult.



## SETTING UP THE PACKER

When handling resin, always wear safety glasses and the provided protective gloves. Prepare the resin and patch only on the supplied table covering.

Refer to the resin containers and Safety Data Sheets (SDS) for detailed information on proper handling and usage

**The patching process is time sensitive due to the limited work time of the mixed resins. If the packer is not inflated in place before the work time runs out, the process will need to be restarted.** All materials, equipment, and personnel should be ready and available to limit work time.

1. Verify that the packer is properly prepared, with any required containment in place and the packer sleeve correctly installed
2. Place the patch next to the packer, ensuring it is centered along its length. Verify that there are equal lengths of black rubber packer extending beyond both ends of the patch—these are the encroachment zones. **Encroachment zones** are critical for the proper installation of the patch. If the patch sits too close to the ends of the packer (into the encroachment zones), the ends of the patch will not be securely pressed against the pipe's inner diameter, potentially causing the patch to fail. Refer to the specifications table for the minimum encroachment zone required for each packer.

When using containment, determine the end of the encroachment zone by feeling for the transition from the packers hard metal end to the rubber body.

The patch can be trimmed with sharp scissors to create the minimum encroachment zones required.

After verifying the patch length, position and encroachment zones, use a permanent marker to mark the end locations of the patch on the packer sleeve.



**MIXING RESIN**

1. Gather the patch resins. Resin should contain a “Part A” and “Part B” with the patch length on the label. Verify the resin is in date. (6’ patches will require two sets of 3’ containers).
2. Check resin temperature to confirm it is within the application temperature range. You may have to place the unopened containers in cool or warm water to correct temperatures outside the appropriate range.
3. Open both resin containers carefully. Pour Part A into Part B. Replace the cap on the resin container securely and shake vigorously for a minimum of one minute. Record the time of mixing the resins.



**OFF PACKER WET OUT**

Wetting out the patch off of the packer is the generally recommended wet-out method. It makes it easier to fully saturate the patch. This method cannot be used with the 3” -4” packer though.

1. The patch should be placed in the center of the table covering. Mix the resin and pour the entire container on the patch. Leaving mixed resin in the container can rupture or melt the container from heating up.

With gloved hands, saturate the patch with resin. The patch should be covered in yellow resin with zero white areas remaining. Excess resin can be left to cure on the plastic table covering.

2. Gently place the patch on the packer. Do not deform or stretch the patch. Place the patch at the center of the packer. Verify the patch is centered and that the encroachment zones are visible. This reduces the risk of an improper patch.

3. Neatly fold over the excess patch. Place a doubled over elastic band at the front end of the patch. Place an additional doubled over elastic band every 1/2” until there are 4 elastic bands in place. Then place double over elastic bands every 4” along the remaining length of the patch. Place 4 elastic bands 1/2” apart at the other end of the packer as well. **Doubling over the elastic bands and placing them as instructed is important to keep the patch in place on the packer.** Wipe away remaining resin off the packer sleeve. Do not wipe the patch.



- The patch is now ready to be carried to the pipe opening. Carry by wrapping the plastic table covering around the patch.



## ON PACKER WET OUT

Always use this method of wet out for the 3"-4" packers and when using containment on the 3" packer. Carefully slide the patch onto the packer before mixing the resin. Be careful not to stretch or deform the patch. Place the patch centered on the packer assembly. Check that the encroachments zones are visible and the patch is properly placed.

- Place the packer with patch in the center of the table covering. Mix the resin and carefully pour all the resin mixture on to the patch. No not leave any mixed resin in the container. it will heat up and may rupture or melt the container.

Wearing gloves, begin working the resin into the patch until it is fully saturated and completely yellow in color. There should be no white remaining. Excess resin can be left to cure on the plastic table covering.

- Verify that the patch is still centered and the encroachment zones are still visible, and the patch is properly placed for any containment used.
- Take any excess patch and fold it over neatly. Apply a doubled over elastic band at the front end of the patch, and then another one ever 1/2" past that until there are 4 elastic bands placed. Continue placing doubled over elastic bands every 4" along the remaining length of the patch. Place 4 elastic bands 1/2" apart at the other end of the patch. **Doubling over the elastic bands and placing them as instructed is important to keep the patch in place on the packer.** Wipe away remaining resin off the packer sleeve. Do not wipe the patch.

- The patch is now ready to be carried to the pipe opening. Carry by wrapping the plastic table covering around the patch.



## PATCHING THE PIPE

- Put on clean gloves.
- If not using a pull rope at the front of the packer, securely install the packer ball.
- Securely connect the remaining air push rods, pull ropes, and air hose assembly to the packer. Use tape to reinforce the connections, minimizing the risk of resin entering the fittings or the connections becoming loose.
- A small amount, no more than 8 o.z., of an oil based soap can be poured in the pipe, as needed, to lubricate the equipment as it is inserted.
- Carefully insert the packer assembly into the patch and cautiously maneuver the patch into the proper position. When the mark on the air push rod or air hose meets the pipe entrance, use your camera to verify that the patch is positioned correctly. Ensure the patch is properly aligned before you inflate the packer. Check the time since the resin was mixed, ensuring you do not exceed the allowable working time. Wrapping tape around the camera inspection head spring can help prevent resin from accumulating and hardening in the spring.
- Finally, attach the pressure regulator to the air push rod or air hose.



Open the regulator valve, pull the regulator knob and slowly turn it clockwise to inflate the packer to the required air pressure (see Figure 7-6). Refer to the Specifications table for the correct pressure values. Record the time the packer was inflated. If the allowable working time since the resin was mixed has been exceeded, the packer and patch must be removed, and the process restarted with a new patch. Refer to Figure for additional details.



Always use the pressure regulator when inflating the packer. Exceeding the maximum pressure could rupture the packer. Incorrect inflation may result in the patch collapsing or failing to expand to the full pipe diameter, which could also lead to the packer becoming stuck in the pipe.

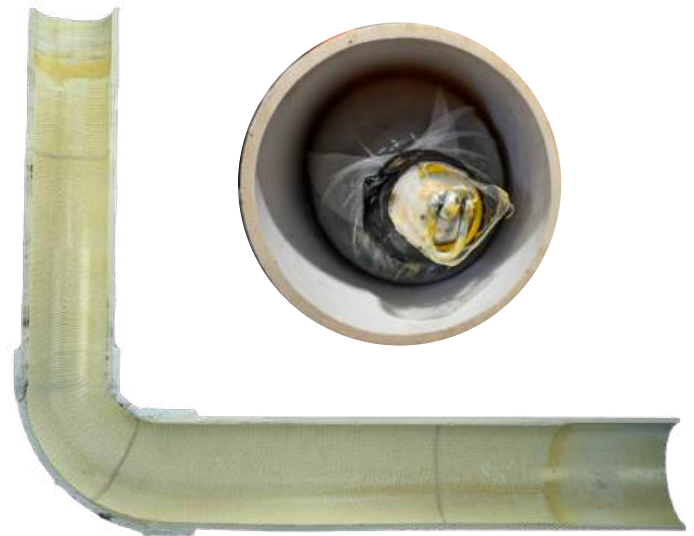
Once the packer is properly inflated, inspect the patch position again using the camera to ensure it is correctly placed. Continuously monitor the air pressure to ensure it remains stable and does not unexpectedly decrease. Do not close the regulator valve or adjust the air pressure during this time.

Clean up any spilled resin immediately. Allow the resin to harden, then dispose of it properly.

8. Allow the resin to cure for the designated "Set Time." Typically, the resin set time is 90 minutes. If the internal pipe temperature is below 50°F (10°C), the set time increases to 180 minutes. If the pipe temperature is outside the resin's application range, the set time will be affected, and further adjustments may be necessary. Lower temperatures will extend the set time, while higher temperatures may shorten it. Under normal conditions, full cure occurs at 4 hours.

Do not depressurize the packer before the set time is complete, as this could result in improper sealing, patch failure, or pipe blockage.

9. You can now depressurize the system to loosen the packer from the patch.
10. The air pressure regulator and air hose should be removed from the air push rod.
11. Retrieve the packer from the pipe using the pull rope. DO NOT pull using the air push rods. They could break from too much force.
12. Inspect the patch with your camera.
13. Disassemble the air push rods, pull rope and packer ball from the packer.
14. Thoroughly clean up the area. Excess resin should be dry on the table covering before disposing.



### INSTALLING MULTIPLE PATCHES

Multiple patches can be installed for damaged exceeding the length of one patch. When installing multiple patches, start with the furthest patch first then work your way back to the access point. The first patch needs to reach resin set time before installing the next patch. The patches can be overlapped, but this will create a reduced diameter where overlapped.

## STORAGE AND MAINTENANCE INSTRUCTIONS

### WARNING

Before performing any maintenance, ensure the pipe patching system is disconnected from all air connections. Always wear safety glasses and any other necessary protective equipment when carrying out maintenance.

### CLEANING

It is important to clean your Versa-Patch system after each use. Disassemble the air push rods sections. You should wipe down the packer, air push rods, and other connections with a damp, soft cloth. You can also use a mild detergent or antibacterial solution. Avoid using solvents, abrasives, or harsh cleaning agents. Ensure no debris, liquids, or other contaminants enter the air connections, as this could damage the regulator and packer, impairing their function.

Use a paper towel to remove any dried resin.

Once the packer is clean, dust the black rubber parts with baby powder. This will help protect the rubber and facilitate smooth movement between the packer and its coverings during use.

### PACKER TESTING

Regularly testing your packer is important. This will ensure the packer is free of any leaks and can properly inflate. Packers should only be tested in properly sized pipes to avoid damaging the equipment and potentially bursting the packer. Follow the steps below for testing packers.

1. Install a packer sleeve on the packer.
2. Find a clean, straight piece of pipe that matches the diameter of the packer being tested and is at least 1 foot longer than the packer.
3. Attach a single air push rod to the packer. Place the packer centered along the length of the pipe.
4. Rotate the regulator knob completely counterclockwise to bring the pressure to zero, then close the regulator valve. At the end of the air push rod, attach the pressure regulator. Then attach the compressed air supply to the pressure regulator.
5. Open the air regulator valve and begin slowly turning the knob clockwise to inflate the packer to the required air pressure. Shut the regulator valve.
6. Let the packer hold pressure for 5 minutes and then check. If the pressure has dropped, there is a leak. Fix any leaks before using your packer. If the leak is coming from the connections, you may be able to fix the leak by tightening the connections or lubricating the seals.
7. After testing is completed, depressurize the packer and disassemble.

### STORAGE

Ensure the equipment is clean before storing. Coil the air hose and pull ropes, and store the packer and other equipment in a carry case, or keep them stored flat and straight. Never place anything on the packer, as this can cause damage and lead to leaks. The equipment must be kept dry and stored indoors, or well-covered if stored outdoors. Store it in a locked area, away from children and individuals unfamiliar with the pipe patching system, as improper use can result in serious injury.

**DISPOSAL**

This equipment contains valuable materials that can be recycled locally. Dispose of the components in accordance with all relevant regulations. For more information, contact your local waste management authority.

**SERVICE AND REPAIR**

Service and repair should always be done by American Pipelining Supplies Service Department. For information or questions regarding repairs, service or equipment, contact APS.



**APS Contact Information**

If you have any questions concerning VERSA-PATCH products:

- Contact your sales representative
- Visit [www.americanpipeliningsupplies.com](http://www.americanpipeliningsupplies.com)
- Call APS (888) 258-9359

## VERSA-PATCH CHECKLIST