

## INSTALLATION GUIDELINES - READ BEFORE STARTING!

# ELBOW PACKERS



HammerHead® Point Repair resin working and cure times are greatly affected by temperature. Warmer temperatures result in less working and cure time. The ambient cure resin is formulated for working and cure times published based on pipe temperature of 65°F (18°C). Store kits in a dry place between 50-86° F. For optimal control, resin components, fiberglass and packer equipment should be stored in a cool place prior to installation. Once the contents of the resin bag are mixed, they must be applied to the fiberglass mat and installed within the working time listed in the tables provided. This is a tested and proven system; only use HammerHead components. Always wear proper Personal Protective Equipment (PPE). **\*NOTE: Winter Express resin has significantly reduced working and cure time. Please consult with your HammerHead contact before installing.**

### STEP 1: INSPECTION & CLEANING

Visually inspect the pipe section to be repaired using CCTV camera. Inspect area to identify conditions that may prevent proper installation of the repair. Consult a HammerHead representative if necessary. Prior to installation, clean pipe by removal of all debris, roots, solids, other deposits, and sharp edges that could puncture packer during installation. Visually inspect pipe again to be sure it is ready to be repaired.

### STEP 2: MEASURE THE REPAIR

Insert camera into pipe and place head of camera at the center of damaged area. Stop camera and attach a piece of tape to camera cable at the entry point into the pipe. In the next step, this mark will be transferred to the push rods or air hose to indicate the distance to position the center of the point repair properly at the damaged area.

### STEP 3: PREPARE PUSH RODS (FIGURE 1)

For 3-8" repairs, connect flex adapter to packer and assemble necessary number of push rods to flex adapter. For 2" repairs, assemble the correct amount of push hose and connect it to the packer. For all size repairs, tape all connections to ensure each connection is locked in place to prevent accidental disconnection within pipe. Attach pull cable. Place camera head at center of packer and transfer tape mark from camera cable to push rods.

### STEP 4: TEST EQUIPMENT

Place packer inside a piece of plastic pipe of the same diameter as pipe being repaired. Inflate packer until repair reference lines are tight within pipe and note PSI used. This is the minimum PSI to use for this point repair process. NOTE: This needs to be done for each repair, as PSI needs will change over the life of the packer. Allow packer to sit for five minutes fully inflated inside test pipe. Deflate packer via regulator relief valve. Check push rods or air hose to verify there are no restrictions to air flow. Consult your HammerHead representative with any equipment testing questions.

### STEP 5: PERFORM TRIAL RUN

Pull a protective sleeve over packer. Using tape provided, secure protective sleeve to ends of packer. Push packer without a point repair to the point to be repaired. Verify packer can reach the area to be repaired with minimal difficulty. DO NOT INFLATE! Pull packer out of pipe using pull cable.

### STEP 6: LAY OUT MATERIALS (FIGURES 2-4)

Lay out work surface and secure. This should only be done on a flat surface. Lay out fiberglass piece. Lay out resin bag(s). Make sure that all materials are easily accessible. Separate twist ties for ease of access.

### STEP 7: PREPARE THE PACKER (FIGURES 5-6)

Replace protective sleeve from the trial run with the provided protective wrapping. DO NOT REUSE THE PROTECTIVE SLEEVE! At approximately a 45°

angle, wrap the packer from front to rear overlapping each pass by 6". Tape each end to secure the protective wrapping. Spray packer wrapping with a release agent such as PAM® cooking spray to assist with packer removal once the repair is complete.

### STEP 8: MIX RESIN (FIGURES 7-9)

Double glove by putting two gloves on each hand. Activate resin bag.

- Using Pin Style - Remove pin by separating inner and outer pin.
- Using Heat Style - Roll up one end of bag until inner seal divider in the middle opens.

Mix by massaging resin inside bag thoroughly until resin has a consistent, light-caramel color. This should take about one minute.

### STEP 9: WET OUT (FIGURES 10-12)

Cut off a corner of the bag and pour about half of mixed resin on to the fiberglass mat. Using spreader provided, move resin to allow for even and plentiful saturation of fiberglass mat. Flip the entire mat over. Pour the remaining resin onto the mat and spread out evenly. Remove excess resin by gently scraping it to the side. Fold right side toward middle of mat, as shown. Then fold left side over to create a 3" overlap.

### STEP 10: LOAD THE PACKER (FIGURES 13-15)

Center the mat on protected packer. Tightly roll the mat around the protected packer, overlapping itself. Secure mat to protected packer using the twist ties included. Position one tie approximately 1" from each end of the packer. Position the third tie in the middle of the mat. DO NOT USE TWO TIES ON ANY SINGLE SPOT. Tie a half knot in the twist tie before twisting the ends three full revolutions. Cut off any tails to 3-5mm in length, and DO NOT fold ends of ties over. Insert the packer into pipe and position it at the point to be repaired, as marked on the push rods.

### STEP 11: INFLATE PACKER

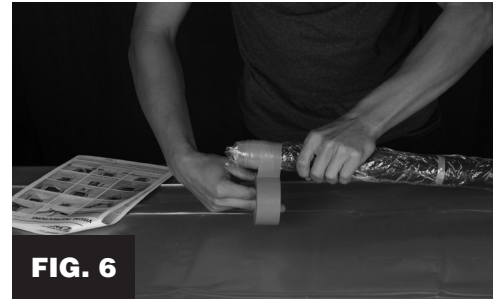
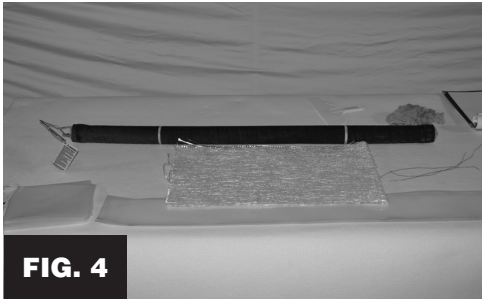
Using the air regulator, slowly inflate the packer to the predetermined PSI. The twist ties will release, pressing the wetted mat against inner surface of pipe at the point of repair. CAUTION: Take care during packer inflation, especially when damage to pipe is severe. Use the minimum inflation pressure of the packer determined during the testing step. This will minimize the possibility of damaging the host pipe or packer. Contact your HammerHead representative to answer any installation questions.

### STEP 12: DEFLATE PACKER

Leave the packer in place under maintained pressure, allowing point repair to cure for the predetermined time frame (use the resin cure table or consult with your HammerHead representative to determine this time frame). Deflate the packer and remove it using attached pull cable. DO NOT PULL USING THE PUSH RODS/HOSE! Inspect the point of repair with CCTV camera to confirm that repair is successful.

Disclaimer: The information contained here is offered for use by technically qualified personnel at their own discretion and risk. All statements, technical information, and recommendations contained herein are based on data we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. Always read, understand, and comply with hazard warnings described in the products' Safety Data Sheet(s) before use.

# VISUAL INSTRUCTIONS



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POINT REPAIR SYSTEMS BY HAMMERHEAD® TRENCHLESS

# STEP BY STEP CHECKLIST



**Use the following checklist each time you install a point repair to ensure that you never miss a step.**

- Inspect and clean the host pipe.
- Measure the distance to the center of the repair.
- Prepare the air regulator and push rods.
- Test the equipment and determine inflation minimum. PSI: \_\_\_\_\_
- Perform a trial run.
- Lay out materials and set up the work area.
- Prepare the packer. **NOTE: Never reuse the protective sleeve!**
- Thoroughly mix resin. Time: \_\_\_\_\_
- Wet out the fiberglass matting.
- Load the packer.
- Push the packer into position.
- Inflate the packer. Time: \_\_\_\_\_ PSI: \_\_\_\_\_
- Deflate and remove the packer. Time: \_\_\_\_\_

# WORKING AND CURE TIMES



Working and cure time are greatly affected by temperature. Warmer temperatures result in less working and cure time. Colder temperatures provide more working time and require longer cure time. Always read, understand and comply with hazard warnings described in Safety Data Sheet(s) before use.

SUMMER		
Ambient Temperature <sup>1</sup>	Working Time <sup>2</sup> (Minutes)	Cure <sup>3</sup> (Minutes)
50° F (10° C)	40	275
59° F (15° C)	35	200
68° F (20° C)	30	150
86° F (30° C)	20	100

WINTER		
Ambient Temperature <sup>1</sup>	Working Time <sup>2</sup> (Minutes)	Cure <sup>3</sup> (Minutes)
50° F (10° C)	35	150
59° F (15° C)	30	120
68° F (20° C)	25	90
86° F (30° C)	15	60

WINTER EXPRESS <sup>4</sup>		
Ambient Temperature <sup>1</sup>	Working Time <sup>2</sup> (Minutes)	Cure <sup>3</sup> (Minutes)
50° F (10° C)	15	50
59° F (15° C)	10	40
68° F (20° C)	5	35
86° F (30° C)	Not Recommended	

<sup>1</sup> Ambient temperature: Temperature of work area where resin system is mixed, used to saturate the fabric and assembled onto the packer. <sup>2</sup> Working time from the start of mixing resin to the time of the repair being positioned at the defect and expanded within the pipe. <sup>3</sup> Cure time: Time from the start of mixing resin to the time of substantial completion of cure of the point repair whereby the packer may be deflated and removed; based on pipe temperature of 65°F (18°C) <sup>4</sup> Limited sizes available. Contact HammerHead representative before installing.

## REORDER INFORMATION

24-INCH REPAIRS	
DESCRIPTION	PART #
3.00 x 24.00", Point Repair, Summer	PR-S3
3.00 x 24.00", Point Repair, Winter	PR-W3
3.00 x 24.00", Point Repair, Winter Express	PR-F3
4.00 x 24.00", Point Repair, Summer	PR-S4
4.00 x 24.00", Point Repair, Winter	PR-W4
4.00 x 24.00", Point Repair, Winter Express	PR-F4
6.00 x 24.00", Point Repair, Summer	PR-S6
6.00 x 24.00", Point Repair, Winter	PR-W6
6.00 x 24.00", Point Repair, Winter Express	PR-F6
8.00 x 24.00", Point Repair, Summer	PR-S8
8.00 x 24.00", Point Repair, Winter	PR-W8
8.00 x 24.00", Point Repair, Winter Express	PR-F8
10.00 x 24.00", Point Repair, Summer	PR-S10
10.00 x 24.00", Point Repair, Winter	PR-W10
10.00 x 24.00", Point Repair, Winter Express	PR-F10
12.00 x 24.00", Point Repair, Summer	PR-S12
12.00 x 24.00", Point Repair, Winter	PR-W12
15.00 x 24.00", Point Repair, Summer	PR-S15
15.00 x 24.00", Point Repair, Winter	PR-W15
18.00 x 24.00", Point Repair, Summer	PR-S18
18.00 x 24.00", Point Repair, Winter	PR-W18
24.00 x 24.00", Point Repair, Summer	PR-S24
24.00 x 24.00", Point Repair, Winter	PR-W24

48-INCH REPAIRS	
DESCRIPTION	PART #
3.00 x 48.00", Point Repair, Summer	PR-S3X48
3.00 x 48.00", Point Repair, Winter	PR-W3X48
3.00 x 48.00", Point Repair, Winter Express	PR-F3X48
4.00 x 48.00", Point Repair, Summer	PR-S4X48
4.00 x 48.00", Point Repair, Winter	PR-W4X48
4.00 x 48.00", Point Repair, Winter Express	PR-F4X48
6.00 x 48.00", Point Repair, Summer	PR-S6X48
6.00 x 48.00", Point Repair, Winter	PR-W6X48
6.00 x 48.00", Point Repair, Winter Express	PR-F6X48
8.00 x 48.00", Point Repair, Summer	PR-S8X48
8.00 x 48.00", Point Repair, Winter	PR-W8X48
8.00 x 48.00", Point Repair, Winter Express	PR-F8X48
10.00 x 48.00", Point Repair, Summer	PR-S10X48
10.00 x 48.00", Point Repair, Winter	PR-W10X48
10.00 x 48.00", Point Repair, Winter Express	PR-F10X48
12.00 x 48.00", Point Repair, Summer	PR-S12X48
12.00 x 48.00", Point Repair, Winter	PR-W12X48
15.00 x 48.00", Point Repair, Summer	PR-S15X48
15.00 x 48.00", Point Repair, Winter	PR-W15X48
18.00 x 48.00", Point Repair, Summer	PR-S18X48EZ
18.00 x 48.00", Point Repair, Winter	PR-W18X48EZ
24.00 x 48.00", Point Repair, Summer	PR-S24X48EZ
24.00 x 48.00", Point Repair, Winter	PR-W24X48EZ

48-INCH REPAIRS CONTINUED	
DESCRIPTION	PART #
30.00-36.00 x 48.00", Point Repair, Summer	PR-S30-36X48EZ
30.00-36.00 x 48.00", Point Repair, Winter	PR-W30-36X48EZ
42.00-48.00 x 48.00", Point Repair, Summer	PR-S42-48X48EZ
42.00-48.00 x 48.00", Point Repair, Winter	PR-W42-48X48EZ
54.00-60.00 x 48.00", Point Repair, Summer	PR-S54-60X48EZ
54.00-60.00 x 48.00", Point Repair, Winter	PR-W54-60X48EZ
72.00 x 48.00", Point Repair, Summer	PR-S72X48EZ
72.00 x 48.00", Point Repair, Winter	PR-W72X48EZ
ELBOW REPAIRS	
3.00 x 24.00", Elbow Point Repair, Summer	PR-ELS3
3.00 x 24.00", Elbow Point Repair, Winter	PR-ELW3
3.00 x 24.00", Elbow Point Repair, Winter Express	PR-ELF3
4.00 x 24.00", Elbow Point Repair, Summer	PR-ELS4
4.00 x 24.00", Elbow Point Repair, Winter	PR-ELW4
4.00 x 24.00", Elbow Point Repair, Winter Express	PR-ELF4
6.00 x 24.00", Elbow Point Repair, Summer	PR-ELS6
6.00 x 24.00", Elbow Point Repair, Winter	PR-ELW6
6.00 x 24.00", Elbow Point Repair, Winter Express	PR-ELF6
8.00 x 24.00", Elbow Point Repair, Summer	PR-ELS8
8.00 x 24.00", Elbow Point Repair, Winter	PR-ELW8

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