

Utility Pole Restoration

UPR™ PR (Standard) and NF (No Flow)

TECHNICAL DATA SHEET

Description:

UPR™ PR and NF Pole Repair Sealants repair woodpecker holes in wooden utility poles. They are easy and convenient to use. The two-part formulas are deployed with a standard caulking gun and mix right in the nozzle. There is no direct handling of the products.

UPR™ PR kits include wood blocks to fill cavity space so that less product is required. UPR™ NF quickly gels so that it does not flow through cracks in the wood.

UPR™ PR and NF Pole Repair expand in the hole to fill irregular shaped cavities and integrate with the wood. This creates superior adhesion to the wood. It hardens like wood with compression strength similar to the cross-sectional hardness of a wood pole. They remain gaffable and will not chip out in chunks when a climber's hooks are embedded into its surface structure.

Compressive Strength

UPR™ PR and NF Pole Repair have similar compressive strength to wood, perpendicular to the grain. Common utility pole wood is compared.

(Data U.S. Forest Products Laboratory)

Compressive Strength

UPR™ PR Standard	1500 psi
UPR™ NF No Flow	850 psi
Southern Yellow Pine	910 psi
Douglas Fir	760 psi

UPR™ PR and NF Pole Repair match wood pole strength. The repair area will not create a stress point when the pole flexes during storms and high winds.

Fungal Resistance

UPR™ PR and NF Pole Repair are inert materials: mold and fungus cannot use them as a food source. The reaction temperatures exceed 212° F (100° C), eliminating most molds and fungus. The repairs block moisture. This keeps the areas dry and less likely to support mold and fungus growth.



Woodpecker damage repaired with UPR™ Pole Repair

Product Benefits:

- Expands to fill all voids
- Creates a strong resilient repair
- Blocks water ingress
- Matches wood characteristics, gaffable
- Wide installation temperature range

Installation Benefits:

Both UPR™ PR and NF Pole Repair come in convenient packaging and kitting.

- No special deployment tools needed
Less expensive, more convenient
- No drilling to deploy the product
Less labor time
- No mixing or direct handling of the product
Less mess and safer
- Single kit will repair one hole
Less waste

Component Properties:

Both UPR™ PR and NF Pole Repair are two-part, urethane structural foams mixed at a 1/1 ratio.

UPR™ PR & NF Pole Repair

<u>Property</u>	<u>Part A (Resin)</u>	<u>Part B (Curing Agent)</u>
Color	Amber	Brown
Form	Liquid 200 -250 cps	Liquid 1050 cps
VOC Content:	0 g/L	0 g/L
Specific Gravity	1.22 -1.23	1.05

Cured Properties:

Both products cure to solid, closed-cell foams.

UPR™ PR & NF Pole Repair

<u>Property</u>	<u>Typical Result</u>
Appearance	Brown with small, even cells
Closed Cell Percent	> 90%
Density (static mixer)	
UPR™ PR Standard	25 lbs/cu ft
UPR™ NF No Flow	26 lbs/cu ft
Compressive Strength (ASTM D1691)	
UPR™ PR Standard	1,500 psi
UPR™ NF No Flow	850 psi

Moisture Testing:

UPR™ Pole Repair does not absorb water, so it will not increase the chance of pole decay. It is good practice to use a dry fungicide prior to deploying any wood pole repair product to reduce or negate any fungal growth that is present.

Moisture Repellency Testing

Six 1-1/2-inch cubes reacted UPR™ were aged in water for 7 days at 122°F (50°C). Weight gain was measured.

	<u>Water Weight Gain</u>
UPR™ PR Standard	< 1%
UPR™ NF No Flow	< 1%

The UPR™ PR and NF Pole Repair act to seal the hole from water and protect the pole from further degradation.

OSHA Requirements:

OSHA 1910.269 App D requires poles to be inspected and tested before climbing. The standard notes that “hollow spots and woodpecker holes can reduce the strength of the wood pole.” Pole repair satisfies OSHA requirements and improves the pole strength. It also reduces the likelihood of decay.

Gaff Testing:

Cut-Out Test

The “Pole Cut Out Test”¹ was used as a guideline to test Polywater’s UPR™ PR and NF Pole Repair repairs. In this test, the climber jabs the gaff into the pole at a 30° angle to a depth of ¼-inch. Pressure is exerted onto the gaff and the point of the gaff penetrates the wood. The pole surface cut is measured, and shall be no more than 2 inches.

¹ Buckingham Manufacturing Company, Inc. *Buckingham Gaff & Climber Information; “How to Perform the Pole Cut Out Test”*

<u>Gaff Surface Cut</u>	<u>Result</u>
½ to 1-½inch	Pass

The Pole Cut-Out Test showed that both UPR™ PR and NF Pole Repair are gaffable.

Penetration Test

UPR™ PR and NF Pole Repair were molded into 7-inch cylinders. A Buckingham gaff was used to penetrate the side of the form. An Instron unit was set to 50 mm/minute to drive the gaff into the form to a depth of 0.475 inches and load force was measured. An average of three tests was calculated:

<u>Substrate</u>	<u>Penetration Force</u>
UPR™ PR Standard	270 lb _f
UPR™ NF No Flow	140 lb _f
Douglas Fir	244 – 290 lb _f
Southern Yellow Pine	232 – 475 lb _f

Both UPR™ PR and NF Pole Repairs fall within the same range as the wood poles² and are relatively easy to penetrate.

² Shupe, Todd F. and Freeman, Mike H. (October, 2011) *Effect of Preservative Type and Gaff Type on Gaff Penetration Into Wood Poles*. Eastern Utility Pole Conference, Baltimore, MD.

Installation:

Polywater® UPR™ PR and NF Pole Repair are packaged in kit form. Everything needed to repair damage to wood poles caused by woodpeckers is included.

The two-part formulas are dispensed using a 2-part coaxial caulking tube with static mixing nozzle. They do not require hand mixing, which allows for multiple applications, and makes it easier to direct the product into the hole when deployed. The curing temperatures are not dangerously hot as are some other repair products, yet may be warm enough to reduce pole decay.

Once a skin has formed, the foam may be visually inspected through the shrink wrap to determine whether the hole has been completely filled.

To decrease cure time in cold temperatures, warm UPR™ Pole Repair cartridges prior to use. UPR™ NF *must be warmed* to 60°F.

Usage Quantity

UPR™ PR Standard

Hole Depth (in)	Product Required	Hole Diameter 6 inches	8 inches
8	Cartridge	3	6
	Blocks	5	7
12	Cartridge	5	9
	Blocks	6	10

UPR™ NF No Flow

Hole Depth (in)	Product Required	Hole Diameter 6 inches	8 inches
8	Cartridge	5	9
12	Cartridge	8	13

Safety:

UPR™ PR and NF Pole Repair are two-part urethane foams containing reactive chemicals. Polyurethanes are common in the construction industry and have been used for many years. Some individuals may become sensitized to components in the unreacted resin. Precautions must be observed during use and handling of these materials.

For more information on safe use of urethanes, please see the white paper: "MDI Monitoring on American Polywater Foaming and Non-foaming Urethane Products". [MDI Monitoring Paper](#)

Cure Rate:

UPR™ PR and UPR™ NF can be used in temperatures down to 20°F (-6°C). The cartridges must be kept between 50°F and 80°F for proper use. At low temperatures, the reaction is slow, but will completely foam and cure with time. At cold temperatures, the components become more viscous and flow through the mixing nozzle at a slower rate. This higher viscosity may block the UPR™ NF nozzle if it is not warmed. Cure times are as follows:

UPR™ PR Standard Pole Repair	Reaction Time (Minutes)	
	40° F (4° C)	70° F (21° C)

Foaming, Expansion Complete	8 – 9	4 – 5
Hard, Non-sticky Skin Formation	15 – 18	7 – 9

UPR™ NF No Flow Pole Repair	Reaction Time (Minutes)	
	40° F (4° C)	70° F (21° C)

Foaming, Expansion Complete	4 – 6	3 – 5
Hard, Non-sticky Skin Formation	8 – 10	3 – 5

Environmental Resistance:

UPR™ PR and NF Pole Repairs withstand the rigors of the changing, outdoor environment.

Cured Sealant Temperature Use Range
-40° F to 150° F (-40° C to 65° C)

Clean-up

Any unreacted material may be cleaned from surfaces with a solvent wipe such as Polywater's Type HP™ Cleaner/Degreaser. The Part A, amber resin will react with water if surfaces are washed with a soap and water solution. Once reacted, the foam has strong adhesion, and may be scraped or cut from surface. The reacted product is an inert solid with non-hazardous character.

The use of UPR™ PR and NF Pole Repair in the prepackaged cartridge controls and reduces exposure. Once reacted, the foams are solid, closed-cell polyurethanes. The finished products may be considered non-toxic. See SDS for more information.

Storage and Handling:

Keep containers cool, dry and away from sunlight. Leave cartridges in the protective foil pouch until ready to use/reuse.

Product shelf life is 18 months. Shelf life is one month after the product is opened.

Model Specification:

The statements below may be inserted into a customer specification to help maintain engineering standards and ensure work integrity.

Approved utility pole repair sealant is UPR™ Pole Repair Sealant. The repair sealant shall come in a multiple-use cartridge to fill various sized defects in poles. The sealant shall be an expanding foam system to best fill all voids in the defect.

The packaging shall automatically meter and mix the sealant. The sealant kit shall include wood blocks which act as filler reducing the needed amount of sealant. The cure rate of the sealant shall be fast. It shall reach full expansion in less than 5 minutes at 70°F (21°C) and form a hard, non-sticky skin in less than 10 minutes at 70°F (21°C). The reaction temperature of the sealant should reach a minimum of 212°F (100°C) to help kill microbes present in the defect.

Once cured, the sealant shall be waterproof. The sealant shall have compressive strength similar to utility wood as measured perpendicular to the grain. It shall be between 750 and 2,000 psi. The foamed sealant shall have a density of 25 lbs/cu ft. The foamed sealant shall pass the Cut-Out Test to determine gaffability. The sealant shall yield a less than 300 lbf in the Gaff Penetration Test.

Order Information:

Cat

Package Description

UPR-PRKIT12
(1 unit/case)

12 - 8½-oz two-part foam
caulking style cartridges
with resealing cap
16 - Static mixing nozzles
1 - Roll shrink wrap
18 - Wood blocks (filler)
1.5" X 1.5" X 4"
4 - Pair gloves
1 - Instructions

UPR-PRKIT3
(1 unit/case)

3 - 8½-oz two-part foam
caulking style cartridges
with resealing cap
4 - Static mixing nozzles
1 - Roll shrink wrap
5 - Wood blocks (filler)
1.5" X 1.5" X 4"
1 - Pair gloves
1 - Instructions

UPR-NFKIT12
(1 unit/case)

12 - 8½-oz two-part foam
caulking style cartridges
with resealing cap
18 - Static mixing nozzles
1 - Roll shrink wrap
3 - Pair gloves
1 - Instructions

UPR-NFKIT4
(1 unit/case)

4 - 8½-oz two-part foam
caulking style cartridges
with resealing cap
6 - Static mixing nozzles
1 - Roll shrink wrap
1 - Pair gloves
1 - Instructions

For installation instructions, video and other product information, please see the

[UPR™ Pole Repair Website](http://www.polywater.com/upr.asp)

(www.polywater.com/upr.asp)

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Important Notice: The statements here are made in good faith based on tests and observations we believe to be reliable. However, the completeness and accuracy of the information is not guaranteed. Before using, the end-user should conduct whatever evaluations are necessary to determine that the product is suitable for the intended use.

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