TECHNICAL DATA SHEET

POLYWATER® UPR™ NF NO FLOW UTILITY POLE REPAIR SEALANT

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DESCRIPTION

UPR™ NF No Flow Pole Repair Sealant makes it easy to repair woodpecker damage and pole line hardware holes on utility poles. The two-part formula is installed using a standard caulking gun. It is mixed right in the nozzle so there is no direct handling of the resins.

UPR NF Pole Repair seals pole cracks and quickly gels without leaking down the pole and onto climbing gear and equipment. UPR NF expands in the hole to fill irregularly shaped cavities and then integrates 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. Use it to repair penta treated wood, western red cedar, douglas fir, red pine, southern yellow pine, lodgepole pine, and other varieties of wood poles. Repairs are gaffable and will not chip out in chunks when a climber's hooks are embedded into the surface structure.

COMPRESSIVE STRENGTH

UPR NF Pole Repair has similar compressive strength to wood, perpendicular to the grain. Common utility pole wood is compared below.

COMPRESSIVE STRENGTH	
UPR NF	905 psi (625 N/cm^2)
Southern Yellow Pine	910 psi (630 N/cm^2)
Douglas Fir	760 psi (525 N/cm^2)

(Data from U.S. Forest Products Laboratory)

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

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." UPR NF Pole Repair satisfies OSHA requirements and reduces the likelihood of decay.

Polywater UPR NF Pole Repair can be applied without drilling extra holes into the pole.

PRODUCT BENEFITS

- Gels quickly – fills hole without leakage
- Expands – completely fills irregularly shaped cavities
- Adheres – solidly integrates with surrounding wood
- Hardens – cures to the strength of wood poles
- Gaffable – will hold climbing gaffs
- Quick mixing – two-part formula mixes in nozzle when applied

INSTALLATION BENEFITS

UPR NF Pole Repair comes in convenient packaging and kitting.

- No special 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

UPR NF Pole Repair is a two-part, urethane structural foam mixed at a 1:1 ratio.

PROPERTY	PART A (RESIN)	PART B (CURING AGENT)
Color	Brown	Light amber
Form	Liquid 200 – 250 cps	Liquid 1050 cps
VOC content	0 g/L	0 g/L
Specific gravity	1.22 – 1.23	1.00

CURED PROPERTIES

UPR NF Pole Repair cures to solid, closed-cell foam.

UPR NF POLE REPAIR	
PROPERTY	**TYPICAL RESULT**
Appearance	Brown with small, even cells
Closed Cell Percent	> 90%
Density (static mixer)	24-26 lbs/ft^3 (384-416 kg/m^3)
Compressive Strength (ASTM D1691)	905 psi (625 N/cm^2)

MOISTURE TEST

UPR NF 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 1½-inch cubes of reacted UPR were aged in water for 7 days at 122°F (50°C). Weight gain was measured.

	WATER WEIGHT GAIN
UPR NF No Flow	<1%

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

GAFF TEST

Cut-Out Test:

The "Pole Cut-Out Test"[1] was used as a guideline to test Polywater's UPR NF repair seals. In this test, the climber jabbed the gaff into the pole at a 30° angle to a depth of ¼ inch. Pressure was exerted onto the gaff and the point of the gaff penetrated the wood. The pole surface cut was measured to no more than 2 inches.

[1] Buckingham Manufacturing Company, Inc. Buckingham Gaff & Climber Information; "How to Perform the Pole Cut-Out Test."

GAFF SURFACE CUT	RESULT
½ to 1½ inch (13 to 38 mm)	Pass

The Pole Cut-Out Test showed that UPR NF is gaffable.

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

SUBSTRATE	PENETRATION FORCE
UPR NF No Flow	297 lb$_f$ (135 kg)
Douglas Fir	244–290 lb$_f$ (111-132 kg)
Southern Yellow Pine	232–475 lb$_f$ (105-216 kg)

UPR NF Pole Repair falls within the same range as the wood poles[2] and is 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.

FLOW TEST

UPR NF Pole Repair gels quickly to limit leakage through cracks and channels in the pole. To test flow, a full 250 mL cartridge was dispensed into a small pail with a ½" hole (13 mm) drilled in the base. The pail was set over a board with a ¾-inch (19 mm) channel, 4.95 inches (126 mm) in length drilled at a 45° angle. Foam leakage was measured as a percent weight loss through the channel.

UPR NF FLOW TEST	RESULT
Weight percent material loss. Full cartridge applied directly above channel	<4.0%

INSTALLATION

UPR NF Pole Repair is packaged in kit form. Everything needed to repair damage to wood poles caused by woodpeckers is included.

UPR NF is available in a 250-mL coaxial caulking tube or a 600-mL side-by-side cartridge. The two-part formula is dispensed through a static mixing nozzle. Hand mixing is not required. Use of a static mixer 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 stretch wrap to determine whether the hole has been completely filled.

To decrease cure time in cold temperatures, warm the UPR NF cartridges prior to use. UPR NF *must be warmed* to 50°F (10°C).

STANDARD USAGE QUANTITY UPR NF			
HOLE DEPTH (IN)	PRODUCT REQUIRED	HOLE DIAMETER	
		6 INCHES (15 CM)	8 INCHES (20 CM)
8 (20 cm)	250 mL Cartridge	4	7.5
12 (30 cm)	250 mL Cartridge	6.5	11
8 (20 cm)	600 mL Cartridge	2	3
12 (30 cm)	600 mL Cartridge	3	4.5

SAFETY

UPR NF Pole Repair is a two-part urethane foam 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 the 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 NF Pole Repair can be used in temperatures down to 20°F (-6°C). Keep cartridges between 50°F and 80°F (10°C and 27°C) for best performance. At low temperatures, reaction is slow, but will completely foam and cure with time. At cold temperatures, material is more viscous and flows 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 NF NO FLOW	REACTION TIME (MINUTES)	
	40°F (4°C)	70°F (21°C)
Complete expansion	4–6	3–5
Hardened structure	8–10	3–5

STORAGE AND HANDLING

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

Product shelf life is 18 months. Use within one month of opening.

ENVIRONMENTAL RESISTANCE

UPR NF Pole Repair withstands the rigors of the changing outdoor environment.

Cured Sealant Temperature Use Range:
-40°F to 150°F (-40°C to 66°C)

CLEANUP

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 the surface. The reacted product is an inert, non-hazardous solid.

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

MODEL SPECIFICATION

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

The UPR™ Pole Repair Sealant is an approved utility 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 will thicken quickly to limit leakage from secondary holes in the pole. 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 (515 and 1380 N/cm^2). The foamed sealant shall have a density of 26 lbs/ft^3 (417 kg/m3). The foamed sealant shall pass the Cut-Out Test to determine gaffability. The sealant shall yield less than 300 lbf in the Gaff Penetration Test.

No substitutions are permitted without certification from an officer of the manufacturer that the substitute product meets all the requirements of this specification.

ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
UPR-NFKIT12 (1 unit/case)	12 - 250-mL UPR NF No Flow Pole Repair cartridges 18 - mixing nozzles 1 - roll stretch wrap 3 - pair gloves 1 - instructions
UPR-NFKIT4 (1 unit/case)	4 - 250-mL UPR NF No Flow Pole Repair cartridges 6 - mixing nozzles 1 - roll stretch wrap 1 - pair gloves 1 - instructions
UPR-NF6B10 (1 unit/case)	10 - 600-mL UPR NF No Flow Pole Repair cartridges 10 - mixing nozzles 1 - roll stretch wrap 3 - pair gloves 1 - instructions
UPR-NF250PT1 (1 unit/case)	2 - 250-mL UPR NF No Flow Pole Repair cartridges 2 - mixing nozzles 1 – 18-inch x 18-inch canvas 50 - ½-inch staples 1 - pair gloves 1 - instructions
TOOL-250	High ratio caulking gun

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