

## Protecting wood poles from fire

Wildfires are a fact of life. It's been that way since before humans were around to cause them. We can take steps to help prevent wildfires, but there is nothing we can do to avoid them altogether.

When wildfires occur, they have the capability of destroying just about anything that gets in their way. That includes the wood utility poles that support around 75 percent of the overhead electrical distribution infrastructure we all depend on.

Concerned about losing their overhead distribution and transmission assets in areas at high risk for wildfires some utilities have chosen to preemptively replace their wooden overhead structures with new structures made of alternative materials, only to learn the hard way that while wood burns, composite fiberglass and steel can soften and deform in the face of a wildfire's extremely hot temperatures.

### There is a better way

New technologies to protect wood infrastructure have been introduced in recent years. Chief among these are pole wraps—intumescent-coated wire or fiberglass mesh that can be applied to standing or new wood poles to keep them from becoming a fuel source or failing due to fire damage.

The technology is quite simple. When a fire approaches, its heat arrives before the flames. The heat activates the intumescent, causing it to swell to many times its original size, forming a char layer around the pole that insulates it from the heat and provides a barrier against oxygen. Fires need three essential ingredients in order to burn—heat, oxygen and fuel. Pole wraps work to remove two of those—heat and oxygen—in order to protect the wood pole from burning.

### Proven effective

Intumescent mesh pole wrap manufacturers have subjected their products to a barrage of testing prior to introducing them into the marketplace. These tests include fire resistance and fire exposure testing to ensure they are able to protect wood poles from burning.

The products also undergo bond, adhesion and mechanical tests, performance testing, environmental durability and aging tests, expansion performance testing, smoke development and flame spread testing, toxicity testing, and finally, application-specific testing or field testing. Specific test methodologies and results can be found on the manufacturers' websites. Some manufacturers also carry third-party certifications.

### Field testing

Intumescent mesh pole wraps were field tested in 2022 by the Wildfire Interdisciplinary Research Center (WIRC) at

*During field tests, intumescent mesh wrapped wood poles subjected to temperatures exceeding 2000 degrees F survived virtually unscathed. Some poles involved in the testing survived as many as three separate exposures from the same fire event, as winds shifted multiple times during the test.*



San Jose State University in conjunction with the California Department of Forestry and Fire Protection (CAL FIRE) as part of a study to examine extreme fire behavior in steep canyons. These types of fires are some of the most challenging because they intensify as they interact with the steep terrain and weather conditions.

For the study, CAL FIRE conducted a large prescribed burn in an area that included overhead distribution lines owned by Pacific Gas & Electric (PG&E). Intumescent mesh wraps were applied to dozens of wood poles to protect them from the fire, which carried temperatures in excess of 2,000°F.

After the testing CAL FIRE's Brice Muenzer stated, "When the wrap material was removed the poles, amazingly, looked perfectly fine."

Other testing confirms that assessment. The Southwest Research Institute conducted full-scale wildfire simulation tests, exposing wrapped poles to 2100°F. Full length break tests were then conducted to evaluate strength loss due to fire and heat degradation. The poles subjected to the fire showed no loss of strength when compared to a pole not exposed to fire.

### Performance in service

Several utilities in the West have employed pole wraps as part of their risk mitigation strategies, particularly in High Fire Risk zones.

Intumescent mesh wrapped poles were directly in the path of the Lake Fire which burned 31,000 acres near Los Angeles in 2020. The utility, Southern California Edison, examined the poles after the fire and reported the wrapped poles were "undamaged and continued to retain the color and look of a pole which had not gone through a wildfire." Further examination confirmed the poles retained their full strength after the fire.

Bonneville Power Administration (BPA), a generator providing utilities with about about 1/3 of the electric power

produced in the Northwest, began deploying intumescent mesh wraps for its wood transmission structures in 2023.

In a blog posted in September 2024, BPA stated, “the effectiveness of the fire wraps was on full display during the Wacoa Swawilla Fire in late July... which consumed 53,462 acres. Even with intense fire severity none of BPA’s wood poles were damaged to the point where they needed to be replaced.” BPA credited the wraps with making it possible to maintain power for the town of Keller during the fire.

In 2022, a regional Canadian utility working in partnership with Osmose Utilities Services Inc. installed intumescent mesh wraps on power lines in critical areas at high risk for wildfire. The following spring fires swept through the region, burning forests as well as some 20 kilometers of power lines. According to Osmose, the lines protected by the mesh wraps “emerged virtually unscathed, while a neighboring set of unprotected parallel lines suffered severe damage and caused significant power outages.” The utility said restoring the damaged lines was expected to cost \$3 million.

### Product specs and use

Pole wraps consist of wire or fiberglass-based mesh material that is covered with an intumescent coating. The coating adheres to the mesh material and is designed to last up to 45 years under the harshest weather conditions.

The products are produced in rolls of varying lengths and widths designed for ease of installation by field crews. The mesh substrate eliminates the potential for moisture entrapment, allowing the wood to “breathe” naturally. The mesh also allows crews to visually inspect wrapped poles. The mesh can also be cut away in sections to allow for inspection activities such as core sampling; the cutaway portion can simply be stapled back into place without impacting the wrap’s effectiveness. Additionally the mesh openings are optimally sized to provide full protection while also allowing line workers to safely climb the poles.

The coatings are non-toxic and none of the ingredients are considered to be hazardous chemicals. Once activated the coating primarily consists of carbon and will be dispersed by wind and rain. The wraps can be disposed of as construction waste in any municipal construction waste landfill.

Intumescent mesh wraps can be stored indoors or outdoors and have an unlimited shelf life. Handling (activated or unactivated) poses no environmental health or safety risk.

### Installation

It is recommended pole wraps be applied to a height at least equal to double the height at full maturity of vegetation around the pole.

Wraps should be installed at least 8 to 12 inches below groundline to protect the poles from fires started at the groundline. The wrap must be installed snugly to ensure small embers cannot be caught between the pole and the wrap as activated wrap may trap embers against the pole.

For poles in service, wraps can be field installed using minimum one-inch long galvanized staples with minimum ¾-inch crowns. No specialized tools or equipment are needed.

Detailed field installation instructions can be found on manufacturers’ websites.

Most pole suppliers offer wraps preinstalled on new poles as a value-add service. Contact your pole supplier for details.

### Manufacturers

The leading manufacturers of intumescent-coated mesh pole wraps are:

Genics, Inc.  
[www.genicsinc.com](http://www.genicsinc.com)

Hexion  
[www.hexion.com](http://www.hexion.com)



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