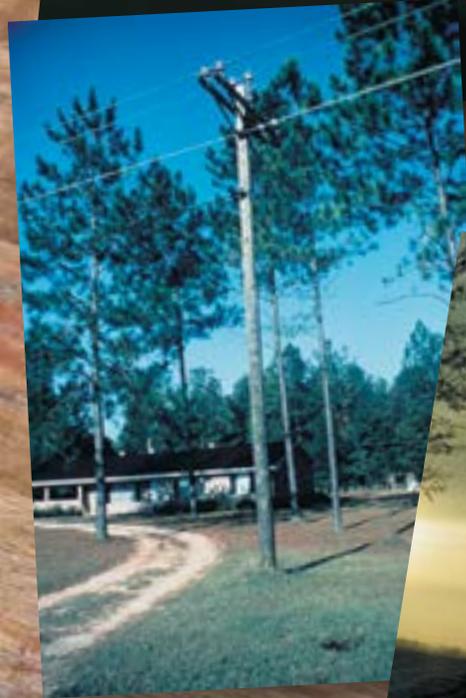


# The CCA Pole

*The pole of the future  
with a 75-year past.*



# A 75-Year Past And Still Counting

**W**hen the Bell Telephone System installed 18,000 CCA-treated southern pine poles in 1940 and 1941, it was the first large-scale use of CCA-treated wood poles by the utility industry. While most of those poles have been removed since then due to line obsolescence or accidents, not a single one is known to have been removed due to biological degradation.

CCA preservative was first formulated in 1933 and has been used in countless residential, commercial, agricultural, and institutional projects. Supporting transmission, distribution, and communication lines around the globe, CCA poles have been exposed to a huge range of conditions with the same results: dependable performance and long service life.

## The Ideal Material and an Unsurpassed Preservative

Wood is the ideal material for utility poles. They are produced from a renewable resource which is resilient and extremely resistant to oxidation, corrosion, fatigue, crumbling and spalling.

From a commercial standpoint, wood has only one shortcoming: this natural resource is biodegradable. But with CCA preservative, wood is easily and cost-effectively protected against the biological degraders that cause it to weaken and collapse in nature, namely fungi and termites.

*Treating wood with  
Wolmanac® CCA preservative  
extends service life 10-20 times  
because after treatment the wood  
is no longer attractive as a food  
source to fungi and termites.*

*This claim is backed by a  
50-year limited warranty on  
Wolmanized® CCA poles.*



# How CCA Works

**C**hromated Copper Arsenate, or CCA, is a chemical preservative which gives utility poles durability by rendering the wood fiber useless as a food source for fungi and termites. Wolmanized® CCA poles are protected by an oxide formulation of CCA Type C. It is a mixture of stable metallic oxides which, on contact with wood fibers, forms insoluble precipitates in the wood cells. These precipitates become fixed in the wood. The treated poles are highly leach-resistant. Since Wolmanac® preservative is an oxide formulation of CCA, it provides optimal reactivity and fixation without leaving unwanted by-products on the surface of the pole.



*Stakes treated with Wolmanac preservative and embedded in a test plot, such as the one pictured here, by the U.S. Forest Service in 1934 have shown no sign of failure from decay or insects. Untreated posts failed after just three years.*



*Poles are moved into a treating cylinder where CCA is forced into wood under pressure. When treating is completed and CCA poles are pulled from the cylinder, approximately 80 percent of the preservative is "fixed" in the wood. Further fixation occurs soon thereafter, leaving the poles highly leach resistant.*

## Emergency Response

***Katrina ...*** After Hurricane Katrina, 5,200 wood poles were delivered to the storm ravaged area within 24 hours. By the third day after the storm, 19,200 wood poles had been delivered. A total of 92,000 wood poles and 90,000 wood crossarms were delivered within four weeks of the storm's passing.

***Sandy ...*** In preparation of Super Storm Sandy, more than 4,400 wood poles and 22,000 crossarms were delivered to the Northeast. During the first week of clean up, 24,600 wood poles and 59,000 crossarms were delivered. As rebuilding continued in week two, 24,400 poles and 12,500 crossarms were delivered. Eleven thousand seven hundred wood poles and 10,000 crossarms were readied to fill additional needs. The industry provided a total of 65,100 wood poles and 103,500 crossarms in the wake of Super Storm Sandy.

*Source: Southern Pressure Treaters Association*

# Features Add Up to Dependability, Durability

**W**olmanized® CCA poles have a number of features which make them the utility poles of choice. They are non-oily, odor free, highly leach resistant, and renewable. In addition, they offer low conductivity and low corrosivity. And with CCA pressure-treatment, the physical properties that make wood a superior material for utility poles are protected.



## Long Life

Wolmanized® CCA-treated poles are backed by a 50-year limited warranty against damage from termites and fungal decay. If, within 50 years of purchase, a Wolmanized® CCA pole suffers damage from either cause that renders the pole unfit for its use, the owner will be reimbursed for the full original purchase price. For details, see [www.WolmanizedWoodHD.com/poles](http://www.WolmanizedWoodHD.com/poles).



*Ongoing research and development has led to improvements in both the production and performance of CCA poles.*

## Low Conductivity

Since the Wolmanac® preservative used in CCA poles is an oxide, rather than a salt formulation, there are no by-products to increase conductivity. The low conductivity of dry Wolmanized® poles provides protection against the effects of electrical current leakage, maintaining the safety and security of line workers.

## Low Corrosivity

Corrosion of hardware — galvanized through bolts, metal pole steps, and lag screws — has not been a problem with CCA poles since the oxide formulation was introduced. Fasteners meeting ASTM A 153 are recommended.

*The Wolmanac® CCA oxide formulation is just slightly more corrosive than untreated wood and water, and has not caused troublesome corrosion of hardware.*



# ability

## Strength

Full-scale testing has shown that CCA treatment does not significantly affect bending strength and, in some species of wood, it even increases it slightly. The increase in modulus of rupture is not sufficient to impact the calculation of design stress, but it does eliminate concerns about the strength of CCA treated poles and it provides an extra cushion in the engineering and construction of a utility pole line.

## Fixed Preservative

Because of CCA fixation in the wood, there is virtually no migration. As a result, remedial groundline treatment is not necessary for aging poles and there is no need to rotate poles in storage.

## Cleanliness

In addition to the long-lasting performance they provide, CCA poles make good neighbors. Since the preservative is carried into the wood in a water solution and is highly leach resistant, CCA poles are non-oily, non-staining, and have no fumes for utility crews and to the general public who might come in contact with them.

## Health Risk Assessment

A respected environmental consulting firm, Gradient Corporation, conducted a human health risk assessment on children who play near CCA poles and workers with exposure to these poles. The assessment found that exposure to CCA-treated utility poles and adjacent soil is significantly less than the intake of naturally occurring inorganic arsenic in food or tap water. The report is available in printed and electronic formats (see [www.WolmanizedWoodHD.com/poles](http://www.WolmanizedWoodHD.com/poles) and click on *Human Health Risk Assessment*).



An eastern utility has subjected CCA poles to strength tests. All samples passed ANSI design criteria, some deflecting more than seven feet before breaking.

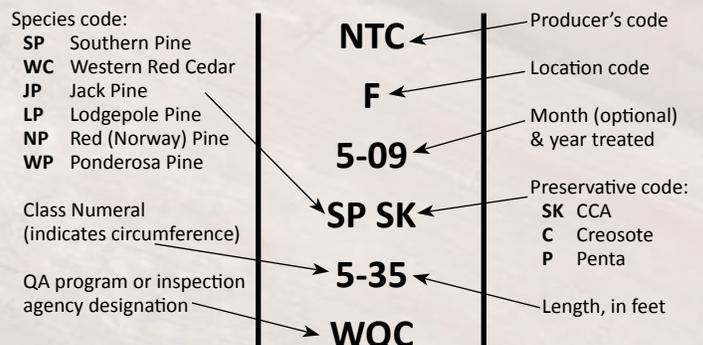


At left, before the treating process begins, Wolmanac® CCA solution is analyzed to confirm its proper composition. Above, penetration depth and retention levels are verified by core borings extracted from every charge.

## Life Cycle Assessment

An independent life cycle assessment confirmed that CCA utility poles use less energy and resources, offset fossil fuel use, and have a reduced environmental impact when compared to concrete, steel and fiber-reinforced composite utility poles. For more information see the report at [www.WolmanizedWoodHD.com/poles](http://www.WolmanizedWoodHD.com/poles).

### Reading a Utility Pole Brand



# Wolmanized® ET® Poles

All the advantages of CCA poles, plus they're easier to climb

Even though the increased use of bucket trucks in recent years has reduced the need to climb poles, gaff penetration continues to be a concern for some users. The ET® pole, available in clear or brown, combines the longevity and cleanliness of CCA poles with the climbability of oil-impregnated poles. Developed by Lonza Wood Protection, North America's technological leader in CCA preservative, the ET® pole is treated with a refined hydrocarbon oil emulsion in the outer layer of the pole following treatment with CCA. The viscous oil emulsion serves as a lubricant, making the pole easier to climb and to work on without affecting the preservative properties of the CCA treatment.



The original ET enhancement is colorless; a brown colorant is now available.



## Climbing trials show lasting value

The numbers below represent average combined scores for climbability, as given by linemen following climbing trials. Scores are based on a 1-10 scale, with 10 being the highest rating.

	9-Year Trial 1997	14-Year Trial A 2002	14-Year Trial B 2002	20-Year Trial 2008	23-Year Trial 2011	25-Year Trial 2013
<b>CCA</b>	4.8	5.5	4.6	5.6	5.1	5.1
<b>Penta</b>	7.2	7.0	—	7.6	5.7	6.9
<b>CCA ET</b>	7.6	7.3	6.8	7.6	6.8	6.1

All poles were installed in 1988. The 9-year evaluation was done by climbers from Carolina Power & Light; the 14-year by climbers from Georgia Power Company; 20-year by climbers from Snapping Shoals EMC, Mid-Carolina Cooperative, and EnergyUnited; the 23-year by climbers from AEP-SWEPCO, Public Service Company of Oklahoma, and AEP-Texas; and the 25-year by climbers from AEP-Ohio, AEP SWEPCO, and Snapping Shoals EMC of Georgia.

### One-Year Evaluation of ET® Brown Poles (Category Average)

Treatment	Gaff Penetration	Insertion Force	Withdrawal Force	Confidence
CCA ET® Brown	6.0	6.2	6.9	6.7

After a one-year evaluation, linemen also rated CCA ET® Brown poles. Above are the results.

## Another alternative: PA

In addition to the ET treatment, CCA poles may be treated with Polymer Additive to facilitate climbing.

Co-developed with the research institute of Hydro-Québec, the patented CCA-PA system begins with pressure-injection of water-soluble solution into the poles. The wood is then heated, polymerizing the additive so that it forms a three-dimensional insoluble network.

## Production of CCA Poles — *from forest to market*

Following is a typical sequence in the production of a Wolmanized® CCA utility pole.



1. Most Wolmanized® CCA poles produced in North America are cut from southern yellow pine, although some are cut from red pine, lodgepole pine, ponderosa pine, western red cedar, and jack pine. Felled trees are visually inspected while still in the forest to determine their suitability as poles.



2. Pole-quality trees are processed to remove bark and the cambium layer, and to trim all branch stubs and overgrown knots. Waste removed during these steps is recycled as bedding or landscape chips, or is used as a fuel.

3. Poles are then separated into classes based on their circumference 6 feet from the butt. They are inspected for straightness, twist of grain, excessive knots, defects, decay, or other damage, according to ANSI standards. Next they are dried to a moisture level to assure penetration in the zone 2" to 3" from the pole surface.



4. The poles are framed or cut to the specifications necessary for crossarms, before treatment. This ensures that the cut surfaces will receive adequate preservative treatment. Each pole is burn-branded or tagged so there is a permanent record of vital information about it for later reference.

5. For treatment, the poles are loaded onto a specially designed tram. Trams are pushed into a large, horizontal treating cylinder, the cylinder door is sealed, and a vacuum is applied to remove most of the air from the cylinder and from the wood cells.



6. Under vacuum, Wolmanac® CCA solution is pulled into the cylinder and then pressure is raised, forcing the preservative into the wood. The pole is treated to a retention level of 0.60 pounds per cubic foot in the assay zone appropriate for the species. For ET® poles, the oil emulsion is impregnated into the outer one inch zone of the pole following CCA treatment.

7. After treatment, the poles are allowed to dry, and the chemicals become "fixed" in the wood. The poles are then shipped to their destinations, where they can be stored in the same position for years without any loss of protection or need for rotation.

8. CCA poles are in common use around the world for both the distribution and transmission of electricity.



## Wolmanized® ET® pole benefits

- No need to rotate poles during storage because of the emulsion's high viscosity.
- Can be touched and handled without additional safety precautions.
- Easier to saw, drill and nail into than regular CCA poles because the emulsion additive acts as a lubricating oil.
- Retention of oil can be readily verified by inspection agencies — a difficult task with other additives.
- RUS (formerly REA) approved.
- Resistance to termites and fungi for decades.
- Excellent climbing characteristics confirmed by numerous field-climbing trials on both new and aged poles.
- No need for future groundline remedial treatment, since fixation of CCA virtually eliminates preservative migration.
- Low corrosivity.

## FireSheath™ Coating

A field-applied fire retardant coating called FireSheath™ fire retardant coating helps protect poles against brush fires that can damage or even topple a pole.

FireSheath™ coating is applied by brush, roller, or power sprayer (preferably airless sprayer) typically from the pole's groundline to a height of about six feet. The intumescent coating foams up in the event of a fire, creating char which insulates underlying wood from the fire's heat. In the ASTM E 84 tunnel test, wood coated with the formulation qualified as a Class A fire retardant material, with a Flame Spread rating of 5 and a Smoke Developed rating of 65. The coating will remain effective for several years,

depending on application, weather, and occurrence and duration of fires.



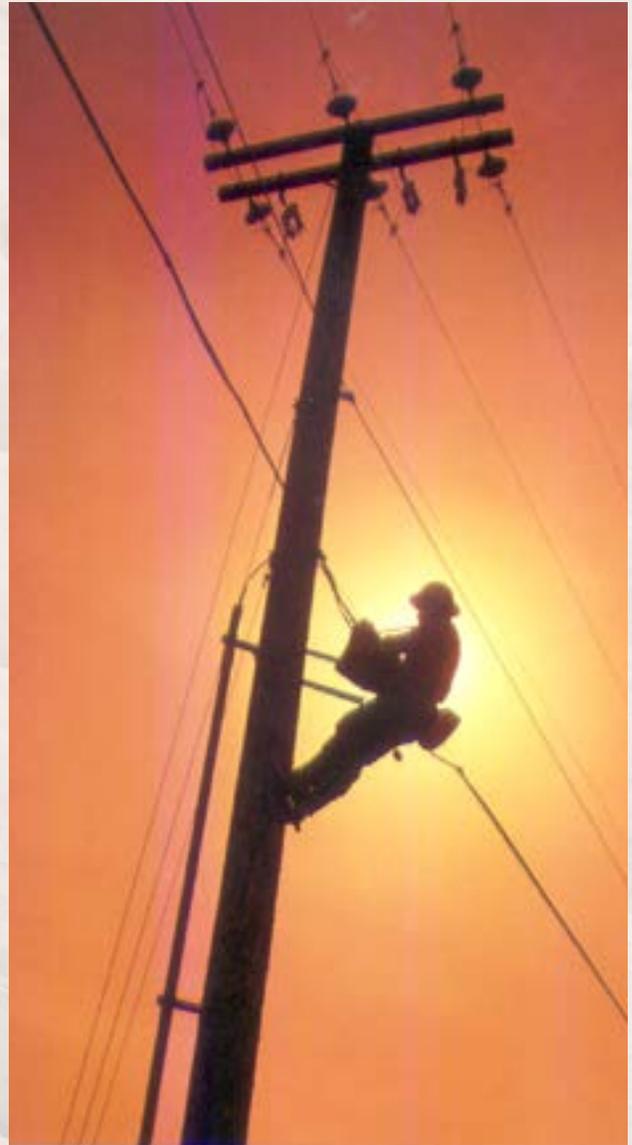
## Backed by international expertise . . .

**W**olmanized® CCA preservative is a product of Arch Wood Protection, Inc., which also oversees the quality of its licensed brands: Wolmanized® wood and ET® CCA/oil emulsion. In alliance with innovative organizations, Lonza Wood Protection, Inc., is a world leader in the production and technology of waterborne wood preservatives. The Lonza expertise results from decades of experience and ongoing research at laboratories in the United States, England, and New Zealand.

## . . . And proven environmental benefits

**W**olmanized® wood is a proven and environmentally sound choice.

- It comes from a rapidly replenished, renewable resource grown on managed timberlands.
- It requires less energy to produce than alternative products.
- It embodies carbon, reducing greenhouse gases.
- Its production does not create wastewater.
- The CCA is manufactured, in part, from recycled materials.
- The treatment extends the service life of wood, thereby reducing demands on forests.
- Because of its lighter weight, preserved wood can often be installed with smaller equipment that has less environmental impact.



[www.WolmanizedWoodHD.com](http://www.WolmanizedWoodHD.com)