



CREATIVE
COMPOSITES
GROUP

FireStrong™



Fire-Resistant, Self-Monitoring
Fiber Reinforced Polymer Utility Poles





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Introduction

Fires are among Earth's most devastating disasters. Beyond the immediate casualties to lives and homes, fires have significant long-term impacts. Even short-duration, high-intensity wildfire flames wreak havoc on utility poles. Downed power lines can spark or worsen fires, and an unstable grid will leave families stranded without power. Traditional utility pole materials can withstand many extreme weather conditions, but few can stay strong after a fire.

The western United States – particularly California – is highly fire-prone. Especially during the summer months, the combination of high temperatures, low humidity and dry winds can quickly dry out vegetation and create ideal conditions for wildfires. Accidental ignition – downed power lines, unsmothered campfires and so on – can turn into a massive natural disaster. Northern California's peak season typically runs from June or July through November, with Southern California a month ahead (May to October). But the Western Fire Chiefs Association noted recently that conditions in California are primed for a year-round fire season.

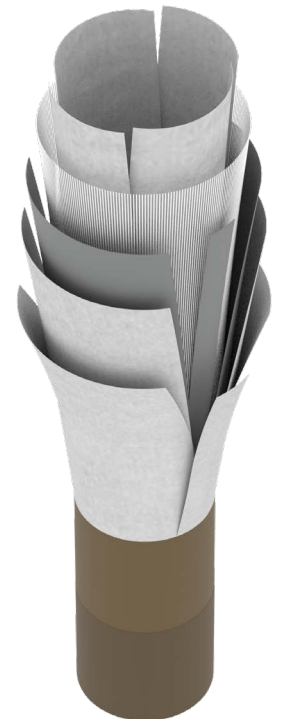
FireStrong Fiber Reinforced Polymer (FRP) utility poles by Creative Composites Group (CCG) have survived grass and chaparral fires without damage to the pole or its temperature recorder. Independent testing shows that FireStrong can literally stand up to nature's fiercest conditions.

What is FireStrong?

The customer-centric design of our patented FireStrong utility poles is engineered to bring utilities into the future.

CCG's innovative design combines an outer fire protection sleeve or shield layer with an inner StormStrong® utility pole as the primary structure to keep the utility grid intact even when extreme weather events occur. CCG manufactures pultruded poles with a fire-retardant vinyl ester resin chemistry. One of the additives in the outer FireStrong layer is a fire and heat protection inorganic metal hydroxide mineral that decomposes to form water molecules when exposed to heat. The endothermic reaction cools the pole's surface and reduces flame and smoke. The pole passed an Underwriters Laboratory vertical burn test, UL 94, with a V-0 rating, classifying the system as self-extinguishing.

Utility companies must assess pole damage after a fire. Before FireStrong technology, utility workers used their best guess to assess retained strength and often cautiously erred toward replacement. This was costly, not only in materials but also in labor and inconvenience to customers and travelers. FireStrong utility poles are manufactured with an irreversible temperature label to record the highest temperature exposure. This removes the guesswork from verifying that the temperature of the pole did not exceed the limit of the laminate.





(Left) Fire chars the protective sleeve of a FireStrong pole but protects the strong, inner layers.

(Right) The irreversible temperature label is intact, easy to read and lets utility workers determine the pole's remaining strength.



CCG designed FireStrong poles to the same dimensions as wood poles to better meet the market needs. FireStrong poles do not require special equipment like augers for drilling holes and setting the poles. The poles also have UV protection via in-mold coating and a surface veil, both incorporated into the outer layer to prevent fiber blooming and maintain architectural beauty.



FRP poles innately resist warping, rot and decay. By contrast:

- Termites and woodpeckers can destroy a wood pole in less than 10 years
- Concrete poles can fail due to de-icing salts on roadways
- Steel poles are heavy and more difficult to transport



FireStrong utility poles reduce utility companies' total cost of ownership from installation to end-of-life. Dividing the initial capital expense by years of service, the total cost of ownership for FireStrong utility poles far exceeds competing materials. FireStrong utility poles can exceed 80 years of like-new service with little to no maintenance. The protective polymer, reinforced with high-strength fiberglass, creates a premium composite that outlasts wood, steel and concrete.

And FireStrong poles are much lighter than traditional pole materials, saving transportation costs and improving safety. FireStrong poles are 60% lighter than wood poles, meaning that 50 Class 2 (50 ft., 600 lbs.) FireStrong FRP poles can be loaded on a single tractor-trailer versus 24 wood poles (50 ft., 1,652 lbs.). This light weight means that fewer line workers are needed to install each pole.

Testing and Certifications

Creative Composites Group submitted FireStrong utility poles for independent, third-party testing to provide firm, scientific evidence of our poles efficacy and durability.

Full-Scale Wildfire Simulation Burn and Bend Tests of 45' Class 1 FireStrong Composite Poles

The Southwest Research Institute (SwRI) in Sabinal, Texas, conducted tests on FireStrong utility poles for EDM International, Inc., in August and September 2021. The testing used controlled burns to provide elements of a fire risk assessment that considers all the factors pertinent to assessing the fire hazard of a particular end use.

Nine 45-foot, Class 1 FireStrong utility poles were sent to SwRI, and eight poles were subjected to fire exposure for up to three minutes with propane (pressure 30 psig) to reach temperatures between 1500 to 1800°F. The ninth pole was set aside as a control. Pole and flame temperatures and fire exposure heat fluxes were measured for each test. Four of the poles tested were loaded and deflection was measured.



Table 1: Utility Poles for Fire Performance Evaluation

Test No.	Pole Description*	Weight (lbs)*	Fire Exposure Duration (min)	Test Pressure (psi)	Load (lbs)	Test Date
1	45-ft pultruded glass fiber reinforced polymer composite pole with endothermic fire protective sleeve	825	3	55	1,325	8/30/2021
2	45-ft pultruded glass fiber reinforced polymer composite pole with endothermic fire protective sleeve	825	2	60	1,325	8/30/2021
3	45-ft pultruded glass fiber reinforced polymer composite pole with endothermic fire protective sleeve	825	2	45	1,325	8/30/2021
4	45-ft pultruded glass fiber reinforced polymer composite pole with endothermic fire protective sleeve	825	2	45	None	9/01/2021
5	45-ft pultruded glass fiber reinforced polymer composite pole with experimental protectant	825	2	30	1,325	9/01/2021
6	45-ft pultruded glass fiber reinforced polymer composite pole	705	1.5	30	None	9/01/2021
7	45-ft pultruded glass fiber reinforced polymer composite pole	705	1	30	None	9/01/2021
8	45-ft pultruded glass fiber reinforced polymer composite pole	705	2	30	None	9/01/2021

* Information provided by Client



*Test 1, Photographic Test
Documentation*



Pretest



Start of Fire Exposure



During Test



During Cool-Down



Post-Fire Exposure, Shroud Removed

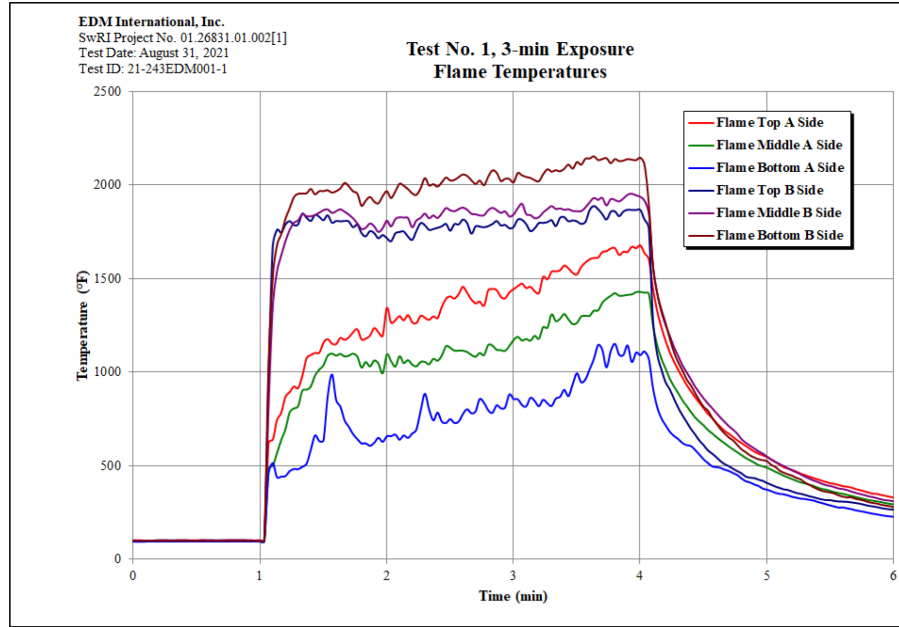


Post-Fire Exposure, Shroud Removed, Pole at Groundline

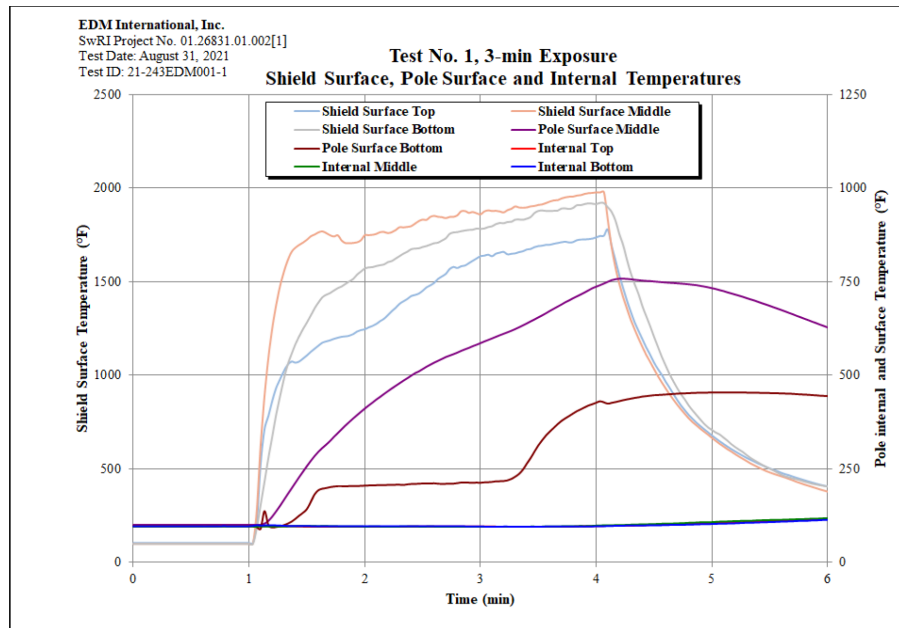


Test data revealed that the FireStrong technology in these utility poles and their shrouds significantly protected the poles' structural integrity.

Test 1, 3-min Exposure – Flame Temperatures



Test 1, 3-min Exposure – Pole External, Internal, and Shield Surface Temperatures





After the burn testing, the poles were subjected to destructive bend tests. These tests were designed to observe how a FireStrong pole would hold up to stress after withstanding a fire.

The FireStrong poles passed tests of two minutes at 2,100°F (twice the length of the average wildfire). The FRP poles that did not buckle during burn tests met the GO95 and NESC strength and deflection requirements during break testing.

FireStrong performs when real fires rage: Plantenders Nursery OC in Silverado, California, lost over \$10,000 in the aftermath of a wildfire – not from the flames but because the fire knocked out so many wood utility poles. With no power, there was no way to care for their plants, and the nursery suffered substantial losses. The California utility covering the Plantenders area chose FireStrong poles to replace the ruined wood poles to better protect businesses like this nursery.

A view of the FireStrong utility pole on the Plantenders Nursery property in Silverado, California.



Environmental Product Declaration

Utility poles by Creative Composites Group are (as of this writing) the only composite utility pole on the market to earn an Environmental Product Declaration (EPD). The EPD is for 1 metric ton of TU450 - vinyl ester 12" x 1/2" diameter round fiberglass reinforced polymer pultruded utility pole.

FireStrong poles aren't just made to last in a fire. They're also part of CCG's commitment to measuring and reducing the environmental impact of its products.



Harden the Grid with CCG's FireStrong

Creative Composites Group is more than a utility pole provider. CCG is your partner in grid hardening and utility pole loss mitigation. CCG engineers have a combined 50 years of experience in the utilities sector.

Composite utility poles meet today's market needs and plan for the market's future. FireStrong fire-resistant composite pole systems are patented by the United State Patent and Trademark Office (patent number US 11,686,418 B2). CCG FireStrong utility poles are available in ANSI O5.1 pole classes 10 through 1, including H class, up to 80 feet in length.

FireStrong technology is a direct result of our close work with everyone from line workers to utility executives. CCG's proven engineering processes are just the start; our expert support and resources like how-to installation videos make your job a true partnership from start to finish.

ABOUT THE COMPANY

Creative Composites Group is a custom design, engineering and Fiber Reinforced Polymer (FRP) manufacturer. We offer comprehensive engineering, design and fabrication for utility infrastructure projects. Our manufacturing capabilities include the broadest range of engineered FRP solutions to build your ideal projects. That's possible only with our proven engineering processes, end-to-end collaboration, service and support resources. Since FRP composites last longer than conventional materials they often have a lower lifetime cost when you consider longer service-life and low to no maintenance costs while protecting your grid.



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