Bor8 Rods and Board Defense

In general, “Borates” are naturally occurring minerals containing boron, the fifth element on the Periodic Table. Trace amounts exist in rock, soil, and water. Plants need them to grow. People need borates, too, as an important part of a healthy diet and an essential ingredient in many products necessary for an acceptable standard of living. They are also used in detergents, insulation, and heat proof glassware. Borates are also a key ingredient in all fire-retardant formulations.

Boron and boron compounds have been long used for pressure treatment, dip diffusion, and remedial treatments of wood because of their proven efficacy against fungi and insects. These materials are especially attractive because their high water solubility promotes deeper penetration into wood. Other useful properties of boron include its neutral pH, non-corrosiveness, lack of color or odor, and little or no effect on wood strength. Boron also has low-mammalian toxicity and minimal environmental effects.

How Borates Protect Wood

The most accepted and effective method for preventing infestations of wood destroying insects and decay fungi in log homes has been by impregnating the wood with a solution containing the element boron. Boron salts are referred to as borates, and the most used borate utilized for this purpose is disodium octaborate tetrahydrate (DOT), the active ingredient found in Bor8 Rods and Board Defense as well as all other borate-based wood preservatives.

The reason for using DOT instead of borax or boric acid is because it has a much higher boron content per pound and is significantly more water soluble than other boron-containing compounds. But what is it about boron that makes it so effective for preserving and protecting wood? In the case of wood digesting insects, like termites and wood-boring beetles, boron disrupts their digestion process by killing the protozoa that allows the insects to digest cellulose. There is also some evidence that boron interferes with the insects’ metabolic systems. These modes of actions do take some time, unlike “RAID” or similar products that kill instantly but have no residual value. Insect activity may continue for a while after ingesting borate treated wood. However, once eliminated, the wood will be protected from future wood consuming insect infestations as long as the boron remains within the wood’s cellular structure.

In the case of decay fungi, the presence of boron disrupts the cellular production of enzymes that allow the fungi to extract nutrients from the wood. Borate will kill decay fungi rather rapidly, usually within a day or two although the damage done will not be reversed. Same for mold, the organism is dead quickly, but the black mold stain may still be present. Bleach is an effective tool for removing mold stains, but the borate treatment keeps it from coming back.

Diffusion

Diffusion is the process whereby the boron moves through wood. When applied as a liquid solution, it penetrates the surface. Then, mixes with the moisture in the wood,

which carries it in deeper. If the wood is dry, the borate will remain near the surface as a reservoir and will diffuse when the internal moisture increases to around 28%. From a Bor8 Rod installed deep into the wood, it will dissolve and diffuse when the wood gets wet providing a “time released” internal wood treatment.

Borate Treatment Methods

Pressure Treatments

Pressure treating wood with preservatives dates to the 19th century when railroad ties were impregnated with creosote under pressure. Since then, several chemical formulations have been used for pressure-treating logs and dimensional lumber, but most have been discontinued due to their toxicity or health and environmental hazards. Due to their low mammalian toxicity and environmental friendliness, borates are now being used by several pressure-treating companies for treating logs, utility poles, railroad ties, timbers and dimensional lumber. The one limitation of borate pressure-treated lumber is that it cannot be used for wood in contact with the soil, since the moisture in the soil will extract out the water-soluble borate over time.

Dip Treatments

A number of log home manufacturers dip their logs in a solution of borate before they are shipped to the customer. Although there are no set standards for the “Dip Diffusion” process, very few companies actually meet these standards, since it requires dipping unseasoned logs in a hot, concentrated borate solution and then storing the logs in a covered building for a minimum of two weeks. Most log suppliers simply dip their logs in a borate solution for a few minutes then allow them to dry. This procedure has been used for over four decades and as long as the borate concentration in the dipping solution is maintained at or above 10%, this should provide adequate protection to new logs.

Remedial Treatments

Pure borate/water solutions like our Board Defense are also used for remedial applications. We recommend a 10% solution by mixing one pound of Board Defense powder into a gallon of water and a teaspoon of Dawn dishwashing liquid. One pound of Board Defense will fill up a one quart measuring cup loosely packed. Using hot tap water will also help the powder dissolve faster and aid with penetration. The Dawn, acts as a surfactant making the water wetter which will help with initial penetration. A second coat of solution applied within 4 and 24 hours will greatly enhance the level of protection. Log ends and corner joints are especially vulnerable and should double coated.

Penetration is greatly enhanced when the wood is very wet. After a home is pressure washed is an excellent time to apply Board Defense. The best time is between a few hours and a couple of days after pressure washing. If the home is new, it is recommended to thoroughly wet the logs down a couple of times, a day apart, then

apply the borate solution. This process is not temperature dependent as long as its above freezing and not is not in a hot and/or windy environment. If a white crystalline residue forms after the treatment dries, lightly wet it down and the borate crystals will dissolve and soak into the wood. Don't apply the water to the point of runoff. Just enough to wet the surface.

Due to the non-toxic and odor free nature of the Board Defense solution, it can also be applied indoors. Critical areas include the crawlspace, attic, window and door openings bathrooms, laundry rooms, kitchen and around penetrations for windows, plumbing and electrical in new construction.

The one limitation of any surface applied borate is that it must be applied to bare wood. If there is anything on the surface that inhibits the absorption of water into the wood, the borate solution will not soak in.

Fused Boron Rods (Bor8 Rods)

Bor8 Rods are made by melting DOT at over 2000 degrees until it becomes a molten liquid. That fusion process eliminates all air and water leaving a highly concentrated boron solution. That hot, thick solution is drained into molds where it cools and hardens into what we call Bor8 Rods. They are inserted into drilled holes and sealed with a plug. When the moisture in the wood gets high enough to support decay fungi, the rods begin to dissolve. The Bor8 Rod dissolves and becomes part of the water in the wood and begins to move along and across the grain. Think about the celery stick and food coloring experiment you may have studied in school. While that experiment mostly shows capillary action, moving along the grain, diffusion goes a step beyond by penetrating the cell wall and moving across the grain to provide an excellent internal log treatment. Logs and big timbers tend to rot from the inside. When you see rot on the surface, the inside of the log is probably compost so internal decay prevention in a big timber is critical in areas where wood rot is common

In new construction, Bor8Rods are very valuable around window and door openings, rafter ends, purlins, lower logs in corners, bottom logs were splash back from the roof is likely. This is your insurance policy for a lifetime of protection against wood rot in the most vulnerable areas of your dream home. We have 6 different rod sizes and an application chart that specifies what size rod to use given the size of your logs or timbers.

The biggest users of Bor8 Rods are contractors that do work on utility poles. While utility poles are pressure treated with heavy duty wood preservatives, the preservative only penetrates an inch or so. When big wood seasons, it cracks or checks. Sometimes these checks are deeper than the preservative envelope and internal decay begins. The Achilles heel of a utility pole is the groundline. In that zone, 6" above the ground and 18" below is the first to go since it has the right combination of oxygen, moisture, and food. Groundline inspection and treatment is a very large industry as there are over 150 million utility poles in the US. While log homes are not normally in contact with the ground, they still absorb water through open end grain and in up-facing checks. These are the Achilles heels of log home and Bor8 Rods insure against having rot problems.

As of September of 2023, we are entering year 6 in a study we are conducting with the USDA Forest Products Lab in Mississippi. We installed Bor8 Rods into 10” x 10” x 10’ Red and White Oak timbers prior to pressure treatment with Creosote. This is another way to accomplish a “dual treatment” which has become the industry standard for railroads. At 30 days, all of the rods had dissolved, and diffusion had begun. By then end of the first year, the boron had moved about a foot in either direction along the grain and somewhat less across the grain. The most recent analysis was at 60 months and the boron had diffused from the rods all the way across and along the grain of these huge timber.

Conclusion

The success rate of properly applied borate treatments is truly astounding. It has less toxicity to mammals that aspirin, no smell and does not change the color of the wood. There have been over 50 white papers written on the effectiveness of borates in wood preservation. Boron is readily available and relatively inexpensive. We look at is cheap insurance against the rot. Water is the biggest enemy of wood because is creates an environment for decay to start and strive. Boron uses that naturally occurring water as a carrier to diffuse and protect the wood from the inside out.