

## TECHNICAL BULLETIN

### Treated Lumber

#### I. LUMBER PRESERVATIVE TREATMENTS

Lumber can be protected from decay and insects by applying selected chemicals. The degree of protection obtained depends on the kind of preservative used and the amount of penetration and retention. Some preservatives are more effective than others and some are more adaptable to certain use requirements.

The types of preservative treatments (treatments for longer life) are: (A) Oil-Borne Preservatives, (B) Creosote, (C) Water-Borne Preservatives, (D) Dip Treatments, (E) Gas-Borne Treatments.

##### A. Oil Borne Preservatives

Pentachlorophenol (commonly referred to as Penta) is the most common of this type of preservative. Penta solutions for wood preservation generally contain 5% Penta Salts dissolved in a heavy oil similar to #2 Diesel Fuel. The heavy oil solvents remain in the wood for a long time and usually don't produce a paintable surface. When Penta Salts are dissolved into a solution of Mineral Spirits and water repellent compounds, the wood treatment is almost water repellent and is considered paintable. This treatment is known as Penta W-R or Water Repellent Penta. Both of these solutions are applied under a vacuum-pressure operation that forces the preservative into the cellular structure of the wood.

Care must be taken when using Sentrigard Metal Roofing Systems' products with Penta treated lumber. In the past it has been found that corrosive reactions will occur between the Penta Salts and Galvanized Steel or Aluminum. Therefore precautions should be taken to insure that the metal does not come into direct contact with the lumber. Materials that should be used as a barrier include vapor barriers, high zinc content paint, any solid insulating material, or any other products which will restrict the flow of moisture.

##### B. Creosote

Creosote at one time was the most popular wood preservative treatment until the introduction of Penta and water-borne preservatives. Its primary use today is by the Railroads and large Utility Companies.

Creosote is a black or brownish oil made by distilling coal tar. Its advantages are: High toxicity to wood destroying organisms, relative low water solubility and volatility give it high permanence, ease of application, easily determined penetration, general availability and low cost, and a long record of satisfactory use.

Creosote's disadvantages include: It cannot be painted, the odor is unpleasant to some people, the vapors produced by the preservative are harmful to growing plants and

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some foodstuffs, direct contact causes skin burns and blistering, and freshly creosoted wood can be ignited, readily burns and produces dense smoke. There is no history of Creosote being corrosive to galvanized Steel or Aluminum, so therefore, any of Sentrigard Metal Roofing Systems' products may be used with Creosote treated lumber.

### C. Water-Borne Preservatives

Water-Borne Preservatives are salts that are dissolved in a water solution and applied under a vacuum-pressure operation that forces the preservative into the cellular structure of the wood. The solution is reduced by the wood's sugars to form insoluble precipitates in the wood cells which resist leaching, are non-volatile and will not evaporate. Manufacturers recommend that the wood be dried following treatment to reduce the water content of the lumber to 16%. Normal applications of the salts are .25 lb./cu. ft. for lumber in above ground use and .40 lb./cu. ft. for lumber in contact with soil. Lumber used for post foundations is available in .60 to .80 lb./cu. ft.

The types of salts presently being used and their trade names are as follows:

1. Chromated Copper Arsenate (C.C.A.) -
  - (Type A) Greensalt
  - (Type B) Boliden CCA  
Koppers CCA-B  
Osmose K-33
  - (Type C) Chrom-AR-CU (CAC)  
Langwood CCA Osmose  
K-33C Wolman CCA  
Wolmanac CCA
2. Ammoniacal Copper Arsenate (ACA) - Chemonite
3. Acid Copper Chromate (ACC) - Celcure
4. Chromated Zinc Chloride (CZC)
5. Fluor Chrome Arsenate Phenol (FCAP)
  - Osmosalts
  - Tanalith
  - Wolman FCAP
  - Wolman FMP
6. Alkaline Copper Quaternary (ACQ)
7. Copper Azole (CA)
8. Copper Boron Azole (CBA)
9. Micronized Copper Quaternary (MCQ)

The chromated copper Arsenate (CCA) Salts, Type C, are the most popular of the water-borne preservatives. Its advantages are that it is odorless, paintable and glueable. The two principal manufacturers are the Osmose Wood Preserving Co. (Osmose K-33) and Koppers Company, Inc. (Wolmanized Lumber). As of December 31, 2003 the pressure treated lumber industry has voluntarily removed CCA from use in residential applications

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and where children may come in contact with this material because it leaches arsenic. As a result, this product is no longer readily available and has been replaced by mainly by ACQ, and to some extent by CA and CBA. These replacement products, however, all contain copper so they are more corrosive to our metal panels, flashings and fasteners.

Manufacturers recommend that galvanized, brass or stainless steel fasteners be used for fastening the CCA treated lumber. All accessories that come into contact with lumber should be back primed using a high zinc content paint to avoid corrosion. Steel sheets that are galvanized should not experience any problems when used with CCA treated lumber, but must be isolated from ACQ, CA or CBA. The Aluminum Association does not recommend the use of aluminum in direct contact with most of the water-borne preservatives so aluminum must be isolated from all pressure treated lumber. Quoting their publication on food and chemicals "Some wood preservatives are corrosive to aluminum, in particular those containing copper and mercury salts". Therefore it is recommended that aluminum should not be used with these products unless some precautions are taken to insure that the metal does not come into direct contact with the lumber. Materials that should be used as a barrier include vapor barriers, high zinc content paint or any insulating material. Stainless steel or other specially treated fasteners should be used into these pressure treated lumbers.

The newest pressure treatment out is Micronized Copper Quaternary (MCQ). It also goes by the trademarks of "ProWood Micro", "MicroPro/Smart Sense", and "YellaWood". This material is only slightly more corrosive than untreated lumber and less corrosive than either ACQ or CCA. The suppliers say that this pressure treatment does not require a barrier when in contact to either steel or aluminum panels. Also, our standard fasteners for untreated lumber can be used into this MCQ treated lumber.

### D. Dip Treatments

This treatment is for very light exposure. The most common trade name is woodlife which is a mixture of Penta in a very light carrier such as Naphtha and a sealer. The most common use of this type of treatment is for window and door units and millwork. This treatment should not be used on lumber which is going to be in contact with the ground since it is only a surface treatment.

### E. Gas-Borne Treatments

The common trade name for this treatment is Cellon, and it is a process where the preservative (usually Penta) is dissolved in a liquid Petroleum Gas such as Propane or Butane. The gasolution is forced into the lumber under vacuum-pressure process, the gas is allowed to evaporate, leaving only the Penta. The gas is recaptured to be used again. The one major drawback of this process is that it is very expensive to install the facilities to treat with this process, and therefore the cost is too high to be used for general purposes. Utility poles are the most common item now being treated with Cellon.

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Advantages of Cellon are that it is odorless, colorless, it can be painted, it is water repellent and will not raise the grain of the lumber. An added advantage of Cellon is that coloring can be added to the solution, and the treated item can come out in any shade desired.

### II. FIRE RETARDANT LUMBER

Fire retardant lumber is a treatment to dried lumber of very high concentrations of salts or organic substrates applied in water solution under a vacuum-pressure operation that forces the solution into the cellular structure of the wood. The wood is then re-dried till it returns to a maximum water content of 19%. Since there is no standardization in the industry, the types of salts used can vary among producers who do not disclose their composition. The common trade names are Flameproof, NonCom, Pyresote and PFR.

Fire retardant lumber reacts automatically when subjected to fire exposure. The salts react with the combustible gases and tars normally generated by untreated wood and convert them to carbon char and harmless carbon dioxide and water at the expense of the flammable gases and tars. Wood loses strength in a fire only at the rate which its cross section is reduced. The increased production of char acts as a heat insulation and reduces the rate at which the cross sectional area is reduced.

Fire resistant lumber as a rule is generally manufactured for use in interior applications. Care must be taken to insure that lumber treated for interior use is not used in an exterior situation. The salts in interior fire retardant lumber remain soluble following treatment and thus when exposed to weather or soil will begin to leech out of the lumber. The Salts are also hygroscopic; that is they will absorb moisture from the surrounding air at high relative humidity. Normally the hygroscopic process will not begin below 80% humidity. With humidity higher than 80% the rate of moisture absorption increase rapidly with the increase in humidity until it reaches 90% where the lumber will have reached the saturation point and will start to discharge water. The combination of the salts and water will cause rapid corrosion in either Steel or Aluminum. Therefore our products should not be used with interior fire retardant lumber in applications where the humidity will be higher than 80% or where the lumber will be exposed to weather. In situations where the relative humidity will be constantly below 80% our products may be used provided care is taken to insure that the metal does not come into direct contact with the lumber. Materials that can be used as a barrier include vapor barriers, any solid insulating material or any material which prevents the transfer of moisture.

Fire retardant lumber designed for exterior applications will not exhibit the leeching of the salts or the hygroscopic process. Therefore, the use of galvanized Steel will not exhibit any problems. Aluminum should not be used in direct contact with exterior fire retardant lumber. Without knowledge of the salts being used by the manufacturer, the Aluminum could be used in an application that could cause severe corrosion. Therefore, precautions should be taken by using vapor barriers, high zinc content paint, any insulating material, or any product which will restrict the flow of moisture as an insulator between the lumber and the Aluminum.