

Pressure Treatment

What is Pressure Treatment?

Lumber used in cooling tower construction must be treated with a reliable preservative compound to prevent decay. The industry's current preferred treating chemical is Chromated Copper Arsenate (CCA), a waterborne formulation which prevents biological attack by fungi or other microbes. Other preservatives are also available.

This preservative is injected into the wood in a controlled process using a vacuum – pressure method. Pressure is maintained for a minimum time period and until a prescribed amount of preservative is absorbed (retention).

Why Proper Treatment Procedure is Vital to the User

Two critical elements are necessary to provide adequate lumber treatment in cooling towers: retention and treatment after fabrication.

The effectiveness of lumber treatment depends directly on the amount of preservative chemical retained in the wood. *CTI (Cooling Technology Institute) Bulletin STD-112 "Pressure Preservative Treatment of Lumber for Industrial Water-Cooling Towers"* requires a minimum retention of 0.4 pounds of chemical per cubic foot of lumber. According to the standard, retention is measured in pounds per cubic foot (pcf) on an oxide basis by analysis of wood borings after treatment.

This 0.4 pcf requirement is a carefully considered number agreed to by many users and manufacturers of cooling towers within CTI to enable treated wood to serve a useful economically viable life in a tower. It cannot be shortcut without serious increased cost to the user.

The standard clearly defines the means by which retention data are measured. In addition, the standard provides for accountability by requiring that "Copies of treating reports ... shall be made available."

Factors affecting final retention include:

- Strength of the treating solution
- Pressure with which the solution is applied
- Duration of treatment at pressure

Durability of cooling tower framing lumber depends also on penetration of pressure treatment chemicals into all surfaces, including the member ends and fabricated holes and grooves. Any untreated ends and holes are subject to fungal attack and premature decay.

Therefore, CTI STD-112 requires that "All material shall be treated after fabrication."

The Marley Difference

Some cooling tower suppliers disregard CTI STD-112 requirements by providing lumber with retention below the necessary 0.4 pcf. They circumvent the requirement by claiming to “treat to refusal;” ignoring or overlooking the fact that solution strength is very weak. In the extreme case, it is possible to “treat to refusal” with plain water! Obviously, the lumber would gain no protection from this treatment.

By contrast, we require that all lumber be treated with a specified solution strength; at a specified pressure level; and for a specified time at pressure. We then verify the 0.4 pcf retention by taking sample borings of each “charge.” If necessary, we retreat until the 0.4 pcf minimum is achieved. We maintain treatment reports and boring sample reports for each new cooling tower contract. Copies of these reports are available for our customers’ review, as required by the CTI standard.

Although these steps are more expensive, they assure you that your tower has been properly treated to maximize longevity.

Some suppliers not only provide inadequately treated material, but they also perform extensive fabrication of various members at the job site after the lumber is treated and shipped.

All Marley lumber is fabricated before treatment so that virtually all ends, holes and grooves are fully pressure treated. Only minor exceptions to shop fabrication are allowed, such as the bottom ends of the columns which must be cut to conform to the basin slab in the field, as well as fan deck openings for fan cylinder fit-up. These cuts receive a field treatment with an approved leach-resistant preservative.

How to Specify

Include in your specification very explicit language, such as the following:

Lumber shall be pressure treated in accordance with CTI Bulletin STD-112 with a solution of Chromated Copper Arsenate of sufficient strength, applied pressure and duration to obtain a minimum of 0.4 pounds per cubic foot (as oxides) retention as verified by sample borings. Treatment records, including boring sample reports, shall be maintained and available upon owner request.

All lumber shall be pressure treated after fabrication. Only minor field drilling and cutting of lumber after delivery will be permitted to accomplish fit-up of column bases and fan cylinders. All such cuts shall be dipped after cutting in a leach-resistant preservative treatment suitable for exterior exposure.

Finally, inspect your tower’s lumber and demand treatment reports. Don’t settle for material that won’t hold up in service.

To order copies of CTI publications, contact:

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