

Executive Summary

A Comprehensive Review of Copper Based Wood Preservatives with a Focus on New Micronized or Dispersed Copper Systems

Authors: Dr. Craig McIntyre and Michael Freeman are nationally and internationally recognized as wood preservation experts. Together, they have over 60 years of experience in wood preservation research and testing and have published over 200 technical articles. This scientific review paper has also been peer reviewed by two other leading international wood preservation experts.

Review Summary and Conclusion: The results of the laboratory and field tests in this scientific review paper conclude that micronized copper preservatives perform as well or better than soluble copper based wood preservatives, such as ACQ and soluble copper azole systems. The laboratory and field tests demonstrate that micronized copper treated wood products provide protection against fungal decay, such as, brown rot, white rot, and soft rot, as well as termite resistance in both above ground and ground contact applications. In addition, the paper states that micronized systems leach less copper and have improved corrosion resistant properties when also compared to soluble copper based wood preservatives.

This scientific review examined:

- Microdistribution of Copper in Wood
- Micronized Treated Wood Corrosion Properties
- Soil and Water Contact Leaching
- Above Ground and Ground Contact Effectiveness Against Fungal Decay and Termite Attack
- Field Test Studies
- Micronized Treated Wood Strength Properties

Background: Copper is currently the most widely used wood preservative biocide for wood preservation in the world. In 2006, micronized copper preservative systems were first introduced into the United States. Today, there are three wood preservative manufacturers producing micronized or dispersed copper systems: micronized copper quat and micronized/dispersed copper azole.

Research and Testing: The scientific review paper reports on the research and testing that has been conducted on micronized/dispersed copper wood preservative systems. These studies have been conducted by six leading wood science universities, independent wood science research institutions, and by independent wood inspection and testing companies. These include Louisiana State University, Michigan State University, Michigan Technological University, Mississippi State University, State University of New York, and Timber Products Inspection Agency, to name a few. In addition, this review also reported on findings from three international wood science institutions from Canada, New Zealand, and Australia. The authors recognized in their paper that all of the studies they reviewed were conducted in accordance with national and internationally

recognized testing procedures, such as those established by the American Wood Protection Association (AWPA), the Australian Wood Preservation Committee (AWPC), and ASTM International, Inc. (ASTM).

Scientific Paper Review Findings:

Microdistribution of Copper in Wood: Three separate independent studies, conducted using *Scanning Electron Microscopy*, concluded that the microdistribution of copper in wood treated with micronized copper are similar to the distribution of copper in wood treated with conventional soluble copper based wood preservatives.

Micronized Treated Wood Corrosion Properties: Two studies conducted by Timber Products Inspection Agency and two additional studies by the State University of New York concluded that wood treated with micronized copper is only slightly more corrosive than untreated wood and less corrosive than wood treated with soluble copper based wood preservatives.

Soil and Water Contact Leaching: Six studies conducted by several universities and independent research scientists concluded that the loss of copper from micronized copper systems are significantly less than soluble copper based wood preservatives.

Above Ground and Ground Contact Effectiveness: Over thirteen laboratory studies have been conducted both in the United States and at recognized international locations comparing micronized/dispersed particulate copper systems to soluble copper based wood preservatives. In all of these tests, the micronized copper systems performed equal to or better than soluble copper based wood preservatives in protecting wood from soft rot, fungal decay, subterranean (Native) and Formosan termite attack.

Field Studies: The authors state, “For most wood preservation researchers, the most important criteria for judging performance of a system is the comparative performance of the system against well known standardized preservative systems in field efficacy tests.” Over seven tests have concluded that micronized copper systems are similar or better in performance when compared to soluble copper based wood preservatives. The authors also state, “There is no reason to believe that long term performance of micronized systems will not match that of other waterborne copper systems.”

Micronized Treated Wood Strength Properties: In three separate independent tests, the strength properties of micronized treated wood were not significantly different than wood treated with water only or untreated wood controls.

This scientific review paper was published in its entirety in the November issue of the Forest Products Journal. This publication is an internationally recognized scientific journal that reports on research and developments within the wood, fiber, and forest products industries.