

**WATER-BORNE PENTACHLOROPHENOL  
PRESERVATIVE SYSTEM**

by

Bob Inwards  
Reichhold, Tacoma Washington

Reichhold Chemicals, Inc. has developed a water-borne pentachlorophenol preservative based on an ammoniacal system. Extensive testing of the system to satisfy submission requirements of the American Wood-Preservers' Association (AWPA) has been completed and this report summarizes the results of that testing.

The preservative must be capable of protecting wood against attack by fungi and termites. Testing of the system by a laboratory soilblock culture method (ASTM D1413) results in a threshold of 1.44 kg/m<sup>3</sup> and 2.40 kg/m<sup>3</sup> for Gloeophyllum trabeum (ATCC 11539) and Poria placenta (ATCC 11538) respectively. This is reasonably close to the threshold for pentachlorophenol in other carrier systems. The leached (AWPA Standard M11) threshold for Gloeophyllum trabeum is 2.88 kg/m<sup>3</sup>. A nonstandard unsterile soil test of treated and leached birch blocks to determine protection against soft rot fungi indicates a threshold between 3.52 and 7.04 kg/m<sup>3</sup>. After 41 months of field testing (ASTM D1758) involving 19 mm x 19 mm x 457 mm southern pine stakes in Gainesville, Florida, the mean decay grade system ratings (0=failure, 10=sound) of 4.7, 6.4, 8.1, 9.1 and 9.1 resulted with respective retention levels of 3.20, 4.64, 6.24, 9.76 and 11.36 kg/m<sup>3</sup>. Termite attack ratings for the same groups of stakes were 7.7, 7.8, 9.0, 9.4 and 9.6 respectively. Unusual early attack after 11 months in a stake plot in Mississippi is being studied to determine the cause.

The preservative system must be subject to reliable analytical methods which will provide satisfactory laboratory, field and plant control. Analyses for ammonia and pentachlorophenol can be performed by standard procedures in the AWPA book of standards. A penetration indicator which relies on the pH change of the wood caused by the treating solution has been developed.

The preservative must remain in the wood in sufficient quantities to provide protection for the intended use. Amounts of about 20% of the original retention of pentachlorophenol are leached out of 19 mm southern pine wood cubes when subjected to the leaching procedure of AWPA Standard M11. Comparison of the leach rate with other wood preservatives for above ground applications is in progress and should be available. A migration and depletion study of 19 mm x 19 mm x 457 mm southern pine stakes after 11 months in a test plot in Mississippi shows a 71% mean cross sectional retention of the original treatment.

The preservative system must be suitable for use with treating equipment and must be relatively free from objectionable

qualities during handling and use. Laboratory simulations of corrosion tests indicate galvanized hardware should be used with treated wood, but no unusual corrosion of plant equipment should occur. Flammability tests of treated wood do not show unusual burning characteristics.

It is thought the results of the testing program involving this system support use of treated products in primarily above ground applications. The successful penetration of western wood species and the extremely clean and aesthetically pleasing appearance of the treated product are considered major advantages of this system.