

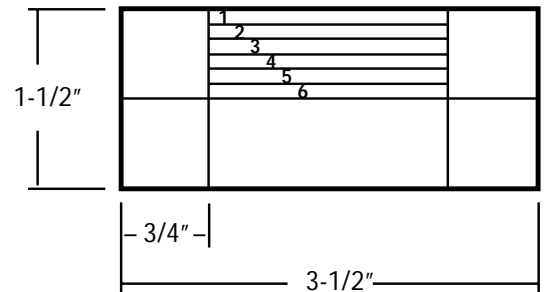


ProWood Micro Penetration and Gradient

When a reputable company brings a new preservative to market, as you can imagine, extensive testing and research takes place to ensure the preservative will perform as expected. One important aspect of performance is how well the preservative penetrates the wood and how much preservative is present in the wood as you move from the outer edge to the center of the board (this is referred to as a gradient). This technical bulletin details testing that compares the penetration and gradient of ProWood Micro¹ to the familiar ACQ² treated wood that is common in the market today.

Research Project #1:

This test studied the gradient of the copper and quaternary components of both ProWood Micro and ACQ at a level that is appropriate for above ground uses³. Southern pine 2x4s were treated with both preservative systems then dried and cut in half. From these sections, six different zones were taken in the middle of the board in 1/8" intervals, where Zone 1 is on the outside edge of the board and Zone 6 is at the center of the board. (See the illustration to the right.)



Each zone was analyzed for copper and for quaternary. Results are shown on the graphs below.

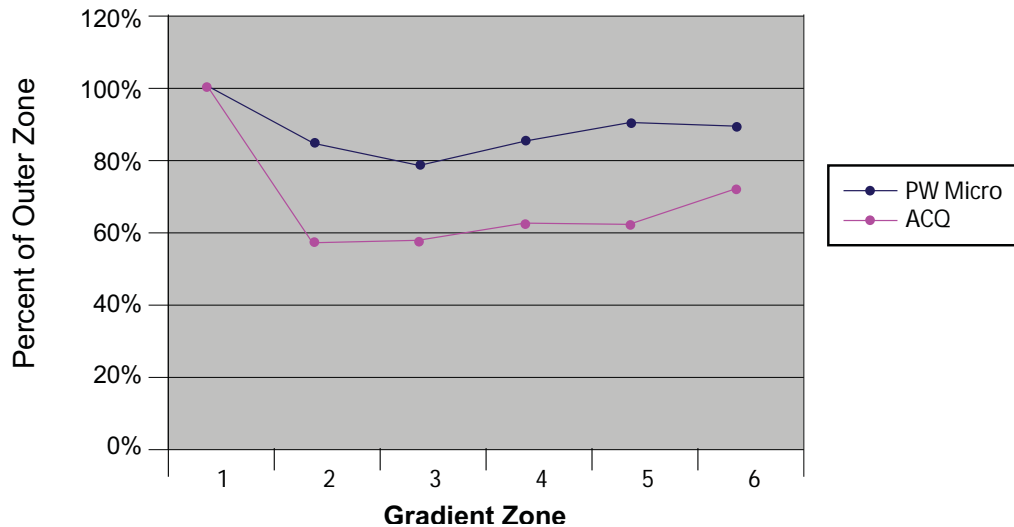


Figure 1. Research Project #1 - copper as a percent of the outer zone.

¹ ProWood Micro is Micronized Copper Quaternary.

² ACQ is Alkaline Copper Quaternary Type D.

³ The target retention levels for the ProWood Micro and ACQ were 0.25 pcf. "Retention" is the concentration of preservative in the wood measured in pounds of preservative per cubic foot of wood.



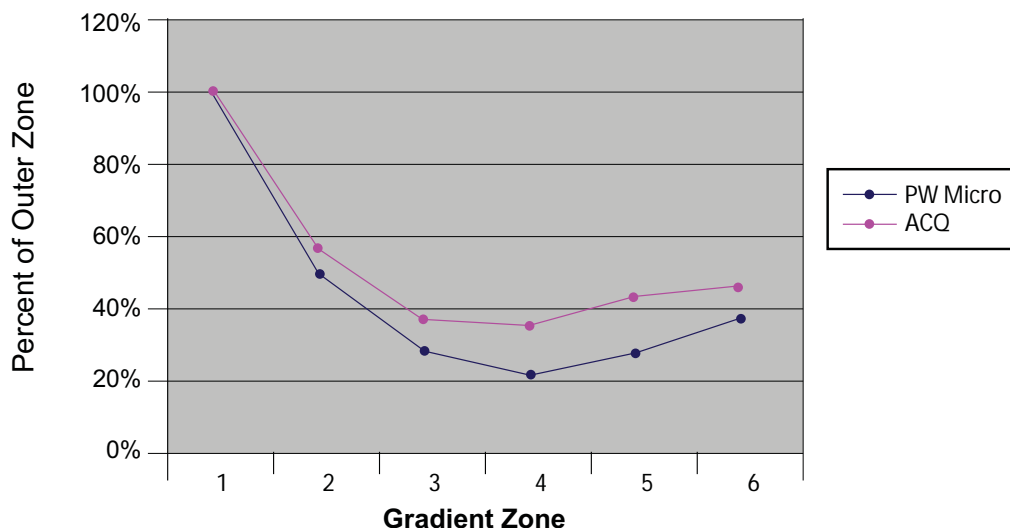


Figure 2. Research Project #1 - quaternary as a percent of the outer zone.

The two main conclusions that can be drawn from this testing are (1) in both preservative systems, there is penetration of both the copper and the quaternary through to the center of the board (Zone 6), and (2) in both preservative systems, there is a similar gradient, although the amount of copper present in the ProWood Micro is a bit more even across each zone.

Research Project #2:

This test studied the penetration and gradient of both ProWood Micro and ACQ at a level that is appropriate for ground contact uses⁴. Southern pine 6x6s were treated with both preservative systems then dried and cut in half. On the fresh-cut face, the preservative penetration was determined by using standard quality control methods⁵. Any heartwood present will turn orange-red, and wherever copper is present will turn dark bluish-black, indicating penetration of the preservative. The pictures below show examples of the 6x6s and the copper penetration.

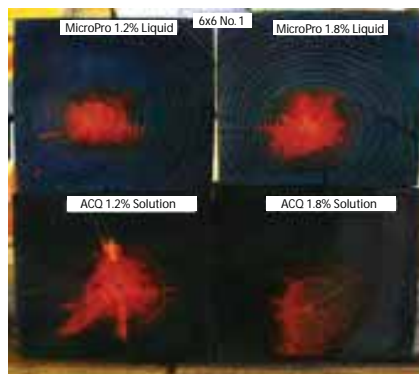


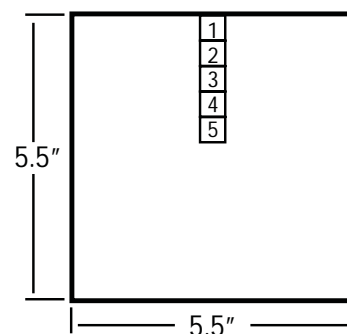
Figure 3. Penetration results.

⁴The target retentions for both ProWood Micro and ACQ were 0.40 pcf.

⁵Heartwood was identified by using the sapwood heartwood indicator for pines (American Wood-Preservers' Association Standard M2-01, Section 4.3.1.1) and Chrome Azurol S (AWPA Standard A3-05, Section 2) was applied for the visual determination of copper penetration.

Figure 3 is representative of the other material in the study and clearly shows the penetration of the sapwood for both preservative systems.

In addition to the penetration part of the project, the gradient was also studied. As in Project #1, gradient zones were taken; however, this time they were taken in 1/2" intervals for a total of five zones. The zones were cut from the middle of the piece, approximately 1/2" thick, and extending 2.5" from the outside edge toward the center. Again, Zone 1 is on the outside edge of the board, and the fifth zone, Zone 5, is the closest to the center of the board. Each gradient zone was analyzed for copper and for quaternary. See the illustration to the right.



Results are shown on the graphs below, and each zone is expressed as a percent of the outer zone (Zone 1).

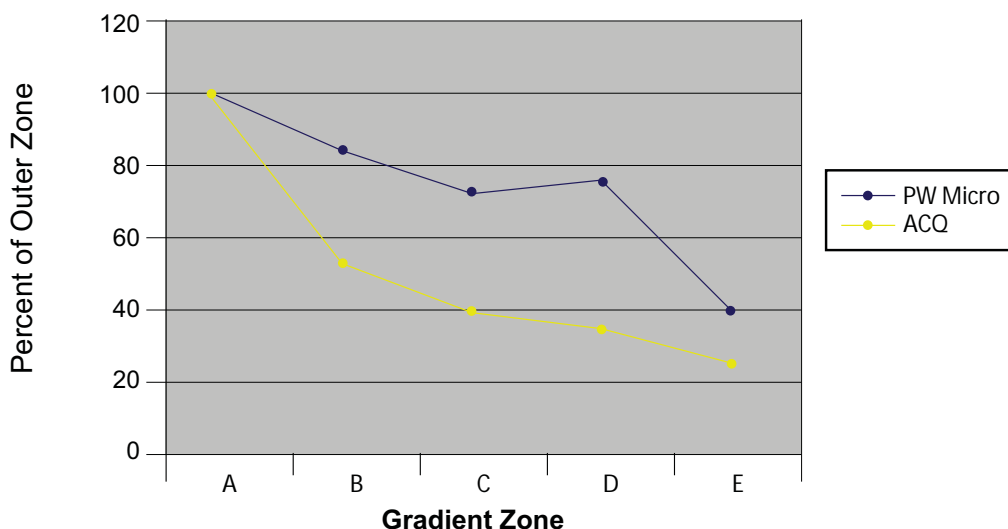


Figure 4. Research Project #2 - copper gradient as a percent of the outer zone.

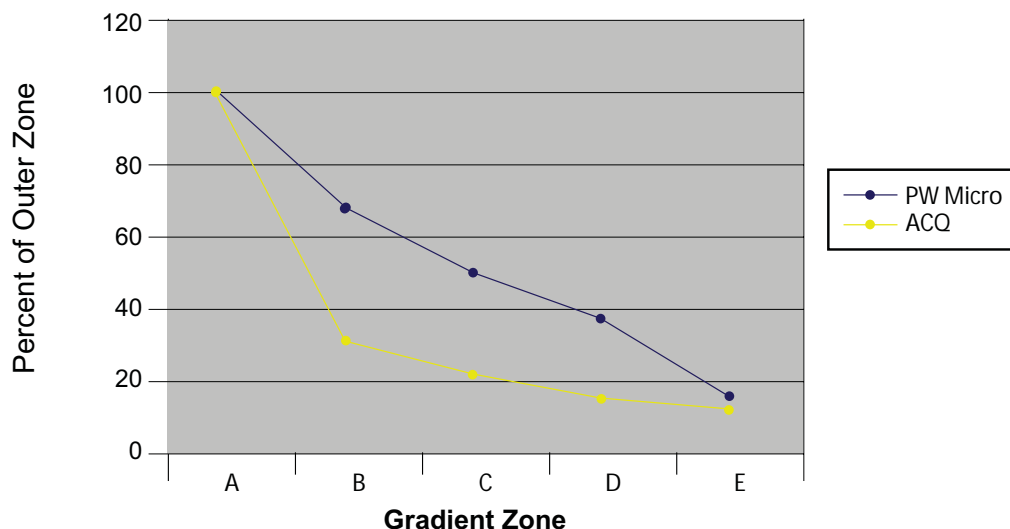


Figure 5. Research Project #2 - quaternary gradient as a percent of the outer zone.

Research Project #2 shows that the 6x6s are well penetrated by both preservatives. It also shows that ACQ had a somewhat steeper gradient than the ProWood Micro for both copper and quaternary in this sample set.

Conclusions

These two research projects demonstrate that both the copper and quaternary components in ProWood Micro clearly penetrate the wood on both dimension (2x4) and timbers (6x6). In addition to our rigorous in-house quality control program and third-party inspection program, these projects show that ProWood Micro is a quality product with penetration characteristics similar to the familiar ACQ treated wood that is common in the market today.

Look for additional Technical Bulletins from the Wood Preservation Department on www.ufpi.com.