



Stake Tests Prove ProWood Micro Protection

This Technical Bulletin presents detailed information on key tests proving the effectiveness of ProWood Micro¹ treated wood, a product backed by Universal Forest Products, Inc. (UFPI), with the same industry-leading warranty program used for its CCA² and ACQ³ treated products. We will address the tests used by the wood preserving industry to assess product performance, present the test results and discuss what these tests mean to the long-term performance of ProWood Micro treated products.

Stake Tests: The Ultimate Test of a Treated Wood Product

Reputable wood preservative manufacturers demand that their products perform for decades. However, to develop new products, the industry needed accelerated tests; they simply could not wait 20 years to determine if a potential new preservative system was effective. This challenge was answered by the American Wood-Preservers' Association⁴ (AWPA). The most rigorous and telling AWPA test method used to evaluate wood preservative performance is the field stake test.

AWPA E7 uses treated wood stakes driven into the ground in locations known to be hard on wood (prone to wood decay and/or termites) to evaluate wood preservatives. Both 3/4 stakes and Fahlstrom stakes⁵ are used in these tests. The combination of very small size and harsh conditions allows these stakes to predict long-term performance in a matter of just a few years⁶. Additionally two types of "controls" are used to help understand the test results. First, untreated wood is used. This ensures that the conditions at the site really are as destructive as the test envisioned. The second "control" is an established wood preservative system like ACQ or CCA.

FAHLSTROM STAKE

1-1/2" x 1/8"

19MM STAKE

3/4" x 3/4"

COMMERCIAL 4x4

3-1/2" x 3-1/2"

¹ ProWood Micro is Micronized Copper Quaternary.

² CCA is Chromated Copper Arsenate.

³ ACQ is Alkaline Copper Quaternary.

⁴ Throughout this document, we refer to AWPA test methods used to evaluate ProWood Micro. The preservative used in ProWood Micro has not yet been presented to AWPA for consideration and listing in its Book of Standards. We do not wish to imply differently.

⁵ Developed by noted wood scientist George Fahlstrom, these stakes measure 1.5" x 0.156".

⁶ The reason for the accelerated attack is the amount of wood exposed to attack from either decay or insects compared to the total amount of wood in the piece; a high surface-to-volume ratio.



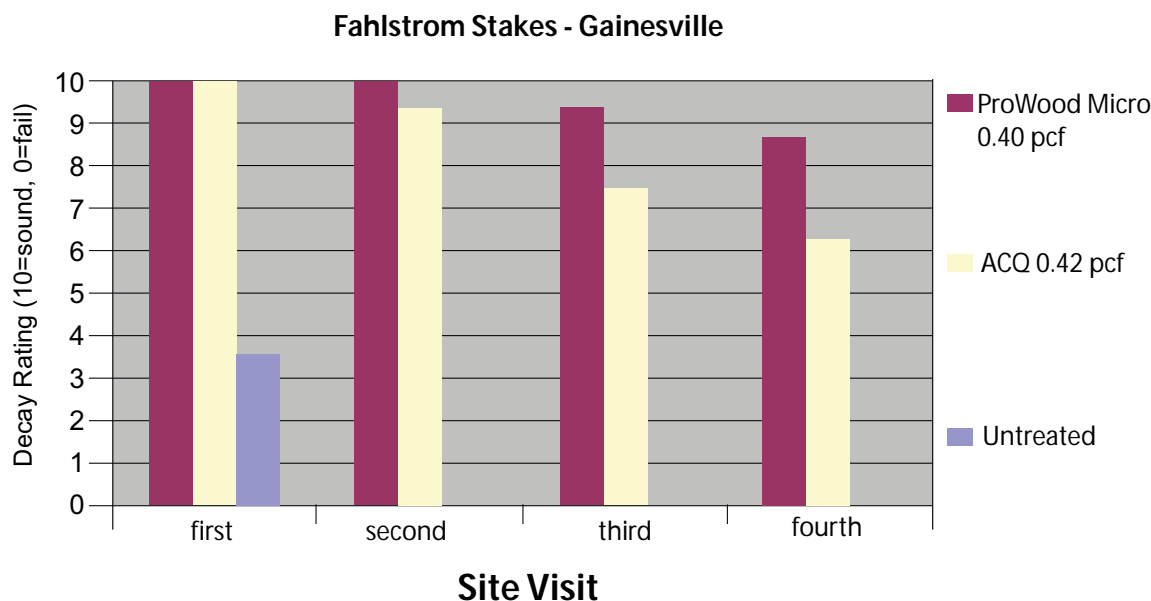
Now that we have our test stakes, where do we put them? The AWPAs answered that question as well. AWPAs recommends that the stake tests be conducted in “two geographically separated test sites” and “two distinctly different climates and soil types⁷.” Specifically they recommend a site in the Gulf Coast region and a site in windward Hawaii, both of which are characterized as “known high decay hazards.”⁸ The tests presented below fit the bill: a well-known site in Gainesville, Florida was used for the Gulf Coast site and Hilo, Hawaii for the windward Hawaiian site.

Results of Field Stake Tests

In the previous section, we discussed the accelerated nature of stake tests. We also discussed that known, well-performing wood treatments like ACQ are used to compare the results of the new system. In fact, it is this comparison which is most telling. For this reason, stake tests generally use a range of different “retentions”⁹ including retentions not recommended for ground contact. Results for all retentions tested are reported at the end of this report for completeness. Only results for ground contact suitable retentions (around 0.40 pcf) are presented graphically in an effort to simplify the report.

Gainesville Tests

Fahlstrom stakes were installed by Osmose Wood Preserving March 2003 in Gainesville, Florida. ACQ was used as the treated control along with untreated wood.



⁷AWPA Technical Committee Regulations, Appendix A “Data Requirement Guidelines for Listing Wood Preservatives in the AWPAs Standards,” AWPAs Standards 2006, page 402.

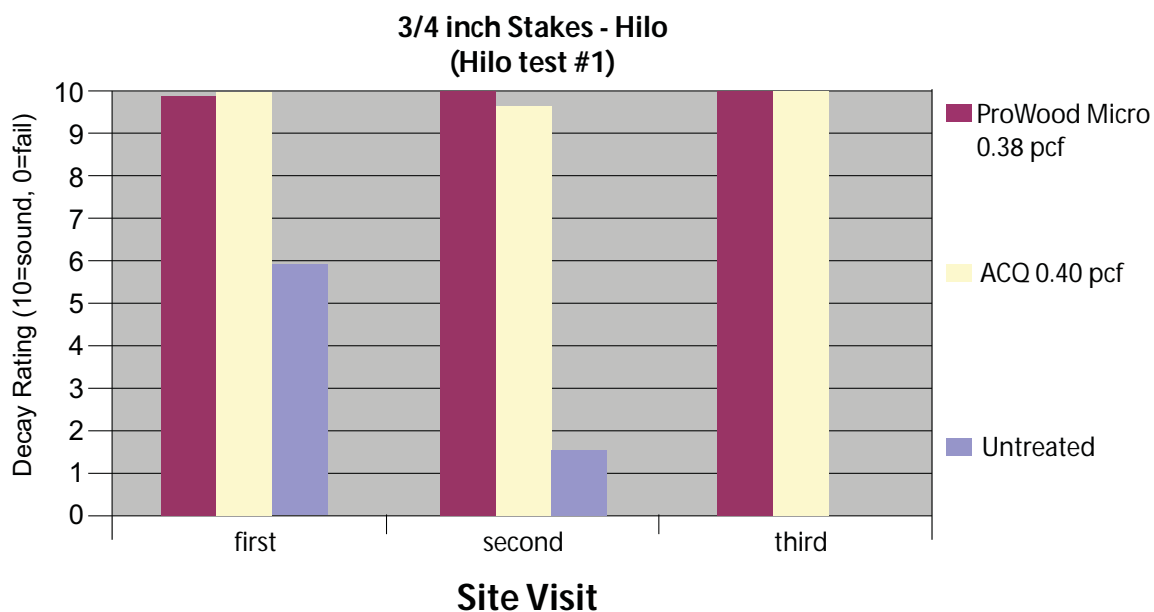
⁸ Ibid.

⁹ Retention is a term used to describe the amount of preservative in the wood expressed as pounds of preservative per cubic foot of wood (pcf).

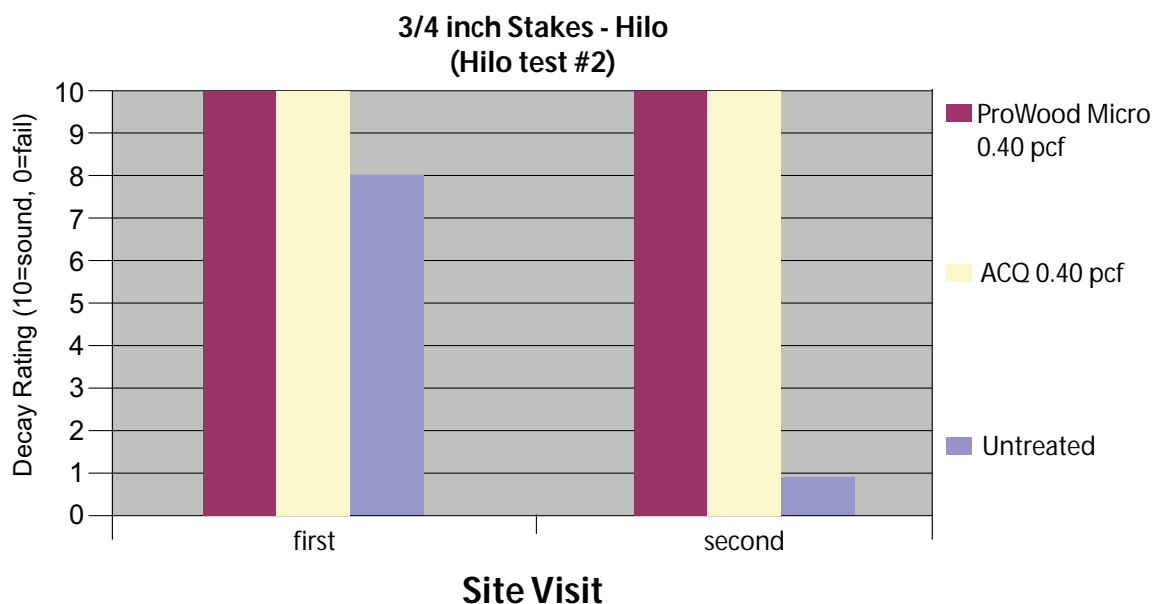
The Gainesville test site is very hard on wood. The site is known for a broad range of decay including soft rot and copper-tolerant fungi. The aggressiveness of this test is confirmed by the very fast failure of the untreated controls, with all of them destroyed after the first site visit. The effectiveness of ProWood Micro is proven by the fact that it performs well compared to the ACQ controls. ACQ is providing excellent protection (most of the ACQ stakes are still sound after four inspections), and ProWood Micro is proven to be just as effective.

Hilo Tests

Two different sets of tests will be reported from Hawaii. The first was installed in Hilo November 2003 and has had three inspections in accordance with AWPA recommendations for assessing preservative systems. However, this test did not include ACQ stakes as treated controls. ACQ stake results from a different test in Hilo are included for reference, but this is not as good as comparing a set of treated controls in the same test. For this reason, a second test with stakes installed in Hilo the following year is presented as well. This test has ACQ treated controls but has only had two inspections. All of these tests were conducted by scientists from Michigan Technological University (MTU) using 3/4 stakes¹⁰.



¹⁰ These stakes measure 0.75" x 0.75".



While the Gainesville site is very aggressive with not only soft rot but other types of decay attacking the treated wood, Hilo is known as being the location to determine how effective a product is against soft rot. Once again, in both Hilo tests presented, the untreated stakes failed quickly, proving the aggressiveness of the test. Yet in all of the results, ProWood Micro is fully protecting the stakes even as soft rot destroys the untreated stakes.

Stake Tests Confirm Protection Offered by ProWood Micro

Although this is a highly technical topic, we felt it was important to present this data publicly to demonstrate why we have such confidence in our ProWood Micro treated products. This is, by no means, all of the data which we have reviewed to reach this conclusion, but stake tests are widely accepted as being the most critical, single type of test for evaluating the protection offered by a preservative system. The stake tests from both Gainesville and Hilo prove ProWood Micro is providing protection equal or better than established products.

Appendix: Full results of all stake tests presented**Gainesville, Florida
Osmose Tests****Fahlstrom Stakes
Installed March 2003**

Scale: 0 (completely destroyed) to 10 (completely sound)

Decay Ratings	Site Visit (months exposure)			
	first (12)	second (24)	third (36)	fourth (43)
Untreated	3.6	0	0	0
ProWood Micro 0.10 pcf	7.9	1.8	1.4	0.8
ProWood Micro 0.20 pcf	9.9	7.6	6.2	5
ProWood Micro 0.40 pcf	10	10	9.4	8.7
ACQ 0.12 pcf	8.7	4.3	0.9	0.9
ACQ 0.26 pcf	9.8	7.6	5.2	1.9
ACQ 0.42 pcf	10	9.3	7.5	6.3

**Hilo, Hawaii
MTU Tests****3/4" Stakes
Installed November 2003**

Scale: 0 (completely destroyed) to 10 (completely sound)

Decay Ratings	Site Visit (months exposure)			
	first (12)	second (24)	third (36)	
Untreated	5.9	1.6	0	
ProWood Micro 0.094 pcf	9.9	9.9	8.8	
ProWood Micro 0.19 pcf	9.8	9.95	9.7	
ProWood Micro 0.38 pcf	9.9	10	10	
ACQ 0.15 pcf	9.9	9.8	9.9	
ACQ 0.25 pcf	9.9	9.9	9.9	
ACQ 0.40 pcf	9.6	10	10	

Notes:

1. Stakes relocated to Oahu Feb. 2006 by MTU.
2. Treated controls not installed; ACQ data from different test in Hilo.

**Hilo, Hawaii
MTU Tests****3/4" Stakes
Installed November 2004**

Scale: 0 (completely destroyed) to 10 (completely sound)

Decay Ratings	Site Visit (months exposure)			
	first (12)	second (24)		
Untreated	8	0.9		
ProWood Micro 0.15 pcf	10	9.8		
ProWood Micro 0.25 pcf	10	9.9		
ProWood Micro 0.40 pcf	10	9.95		
ACQ 0.15 pcf	10	9.7		
ACQ 0.25 pcf	10	9.9		
ACQ 0.40 pcf	10	10		

Notes:

1. Stakes relocated to Oahu Feb. 2006 by MTU.

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