
GUIDANCE DOCUMENT F: GUIDELINES FOR EVALUATING COMPOSITE WOOD PRODUCTS PRESERVATIVE TREATED USING NONPRESSURE PROCESSES

Jurisdiction: Technical Committee T-11

Adoption: Previously Appendix F to the AWPA Technical Committee Regulations, this document was converted to a Guidance Document by the AWPA Executive Committee in January 2013.

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This Guidance Document is not an AWPA Standard. These are nonmandatory guidelines presented to aid the user in understanding the basic testing requirements for wood protection systems and to assist the AWPA Technical Committees in the development of AWPA Standards. The testing of products in accordance with this Guidance Document does not constitute conformance to any AWPA Standard. No product can be considered to conform to an AWPA Standard until it has been subjected to complete technical review and voting by AWPA's Technical Committees, and procedural review and final action by the AWPA Executive Committee pursuant to the AWPA Technical Committee Regulations.

1. Introduction

1.1 The purpose of this protocol is to provide a guideline for evaluating composites which have been treated with preservatives using non-pressure processes. This guideline will assist composite manufacturers who engineer composites for specific end uses by identifying evaluation procedures and helping establish Standards jurisdiction. This guide is a complement to AWPA Standard U1 Commodity Specification J and AWPA Standard T1 Section J.

2. Scope

2.1 Composite wood products can contain various levels of wood fiber. The use of any wood species, species blend, virgin or recycled fiber is permitted. The term "fiber" represents any form of wood material including fibers, particles, wafers, strands or veneer.

2.2 This guideline applies to composites which have been treated by non-pressure means. Treating may occur with the furnish during blending, or as a post treatment process, or in some other manner. The treatment method is determined by the composite manufacturer.

2.3 Where appropriate, Use Category System Standards are to be referenced. If a specific Standard does not apply, AWPA Guidance Document A may be used as the outline for evaluation.

2.4 Where appropriate, AWPA, ASTM or ANSI Standard Test Methods shall be used. Where existing methods do not apply, non-standard methods may be utilized provided they are based on sound scientific principles.

3. Treatments & Treating

3.1 The active ingredients used shall be those recommended for standardization by Committees P-3 or P-4. The actives or formulations shall be registered, or have registration pending, with the U.S. Environmental Protection Agency.

3.2 The treatment method is selected by the composite manufacturer. Any treatment method is permitted, provided the method can be shown to provide adequate protection for the application use class. Treatment methods fall into two broad categories: treatment of furnish or introduction of additives prior to composite manufacture, and treatment of the composite after manufacture. For the latter, spraying, dipping and vacuum coating are examples of treatment methods.

3.3 The preparation or manufacture of the end product shall follow all recommendations and instructions of the formulations and additive suppliers. This applies to the use of preservatives, water repellents, adhesives, and other additives. Disposal and other related environmental issues should be addressed on the Material Safety Data Sheet.

4. Evaluation Methods

4.1 Where applicable, the nonpressure treated composite (NPTC) shall be evaluated using existing AWPA "A" Analytical and or "E" Evaluation Standards. Examples of relevant evaluation methods are listed in Section 5 and Table 1. Careful assessment of the intended end use for the product will ensure the correct evaluation tests are performed.

4.2 If existing Evaluation or Treatment Standards listed in Section 5 do not apply, non-standard methods can be used. AWPA Guidance Document A will serve as a general guide for exhibiting adequate performance. The use classification targeted for the composite will determine the appropriate tests. Determining active ingredient distribution or water repellency for composites may require modified or new methods. It is the responsibility of the manufacturer to develop and apply all appropriate tests and Standards. Further, some composite-product specific test methods and requirements are listed in Table 2.

5. Methodology for Generating Performance Data

This section describes the performance testing requirements listed in Table 1 in more detail and gives some example methods to obtain the performance data. Standard test methods are not available for evaluating all of the performance criteria. Whenever standard methods are not available, nonstandard methods are suggested. Use of methods other than those suggested (or modified suggested methods) may also be acceptable provided they are based on sound experimental principles. A decision on the acceptability of data generated by new or modified test methods will be made by the particular AWPA Technical Committee that has jurisdiction over listing the proposed treated wood composite system, product, or process. The name of the institution or company which performed the test should be stated. The use of third-party testing labs and agencies for critical tests is recommended. The final decision on whether the data package supports the proposed treated composite system, product, or process lies with the appropriate Technical Committee. Data substitutions, for example long term field studies may preclude the necessity for certain accelerated laboratory testing, may be allowed by the Technical Committee. Allowing such data substitutions is the prerogative of the Technical Committee. Guidance on such issues can be obtained from the appropriate Technical Committee Chair. Contact information can be obtained from Association Staff (found at www.awpa.com).

5.1 Wood Preservative Efficacy

This section refers to specialized considerations when evaluating the anti-fungal and/or anti-insect performance properties of nonpressure-treated composite products.

5.1.1 Most composites contain mixtures of sapwood and heartwood. Samples should be large enough to ensure adequate representation of both.

5.1.2 Some composites contain layers with different binding agents or additives. When inner layers are anticipated to be exposed to biodeterioration in service and the test uses small sample size, sets of replicate samples should be cut from each zone.

5.1.3 When testing composites treated during the manufacturing process, the cutting of samples for biological testing may expose a relatively high proportion of material that would not be directly exposed to fungi or insects in full dimension products in service. Most or all of the cut surfaces should be sealed with a coating that will withstand any expansion of the material under the conditions of test. With some materials, epoxy resins are not flexible enough. Beeswax has been found to be a suitable material for this purpose.

5.1.4 Some composites incorporate binding agents with unreacted compounds or components (such as formaldehyde or sodium hydroxide) that may contribute to decay, mold or termite resistance. If such components are anticipated to be lost in service, the test samples should be subjected to leaching or accelerated ageing steps to remove these fugitive components prior to biological testing. Alternatively, the test method may be designed to promote loss of these fugitive components allowing sufficient time for biodeterioration to then occur.

5.1.5 Some composites incorporate processing parameters (such as high temperatures), binding agents (such as thermoplastics), or additives that prevent the wood component reaching a suitable moisture content early enough in defined-duration laboratory tests for biodeterioration to be detectable before the recommended test period is over. If such components are anticipated to be lost in service, or if the wood component is anticipated to ultimately reach a suitable moisture content in service for biodeterioration to occur, the samples should be subjected to accelerated aging or pre-wetting procedure, or the test method should be extended sufficiently for biodeterioration to occur. To separate the effect of preservative from the effects of processing parameters, binding agents or additives, controls should include both untreated composite and solid wood of the predominant species used to manufacture the composite.

5.1.6 Some composites subjected to compression during manufacture will swell more than solid wood when exposed to conditions conducive to biodeterioration. Allowance should be made in the test design to ensure that such swelling would not interfere with the ability to remove the sample from the test assembly without physical damage.

5.1.7 Where efficacy tests rely on weight loss as a method of assessing the decay or termite resistance, care must be taken to ensure that particles or wafers are not dislodged from the test samples during each step of the test.

5.1.8 Where efficacy tests rely on visual evaluation as a method of assessing the decay or termite resistance, care must be taken to note any voids in each test sample at the beginning of the test to avoid these being confused with decay or insect damage.

5.1.9 Where efficacy tests rely on change in mechanical properties as a method of assessing the decay or termite resistance, a set of reference samples should, where possible, be exposed to the same environmental conditions, but in the absence of the test organisms to assess the effects of the environmental conditions on mechanical properties.

5.2 Effect on Wood Physical Properties

Preferred Methods: The data package should include information on the physical properties of the composite. Any

appropriate standardized test method may be used. Generally, data should be provided on: strength properties before weathering, strength properties after weathering, and dimensional stability. Additionally, data on fastener performance and the effect of weathering on appearance could be included. Where appropriate, examples of preferred composite product methods are listed in Table 2.

6. Jurisdiction

6.1 Technical Committee T-11 collaborates with other Technical Committees to determine which composite properties or parameters need to be evaluated for a particular use category.

6.2 Commodities recognized by Technical Committee T-8 are addressed in AWPAs Standards U1 and T1.

Table 1. Summary of data suggested in a data package used to support a proposal to list a new treated wood composite system or process in the AWWA Standards, make major or minor modifications to an AWWA-listed system, or expand the applications for a listed system into new use categories. This table refers users to Guidance Document A for general evaluation and test methods, but in some instances the user is referred to Table 2 of this document for information on some composite-product specific test methods.

(M = Mandatory, R = Recommended)

TESTING REQUIREMENTS	Guidance Document A-Section	UC1	UC2	UC3A	UC3B	UC4A-C	UC5A-C
<i>Treated Composite Efficacy</i>							
Laboratory Efficacy Testing							
Soil Block	5.2.1.1		M	M	M	M	M
Soft-Rot	5.2.1.2					M	M
Termite	5.2.1.3	M	M	M	M	M	M
Soil Bed	5.2.2.1			R	R	R	R
Field Efficacy Testing							
Field Stakes	5.2.3.1			R	R	M	M
Post	5.2.3.2					R	R
Above-Ground	5.2.3.3		M	M	M		
Termite	5.2.3.4	M	M	M	M	M	M
Marine Panels	5.2.3.5						M
<i>Treated Composite Depletion</i>							
Laboratory Depletion Testing							
Water Leach	5.3.1.1		R	M	M	M	M
Soil Leach	5.3.1.2					M	M
Evaporative Aging ^a	5.3.1.3	M	M	M	M	M	M
Field Depletion Testing							
Field Stake	5.3.2.1					M	M
Above-Ground	5.3.2.2		R	M	M		
Marine Panels	5.3.2.3						M
<i>Physical Properties of Treated Composite</i>							
Strength	(Table 2) ^b	M	M	M	M	M	M
Electrical Conductivity ^c	5.4.2				M	M	M
Hygroscopicity	5.4.3	M	M	M	M	M	M
<i>Corrosivity of Treated Composite</i>							
Treating Solution ^d	5.5	R	R	R	R	R	R
Modified Wood	5.4.4	M	M	M	M	M	M

^a Evaporative aging is applicable to treated wood composite systems or processes where one or more of the active ingredients are organic compounds with a significant vapor pressure.

^b Different performance test methods apply to different composite types (See Table 2 of this document for specific details).

^c This highly recommended test applies only to components of utility line structures and railway ties.

^d The treating solution is often known to be corrosive and data are required only for listing processes, not the product.

Table 2. This table refers users to information on some composite-product specific test methods.

Product	Use Category	Reference Document or Standard	Performance Attribute / Physical and Mechanical Property	Preferred Test Method ¹
Composite Wood Siding	UC3A	ANSI A135.6	Water Absorption, max %	ASTM D1037, Part B, Section 36
			Thickness Swelling, max %	ASTM D1037, Part B, Section 36
			Weathering of Substrate, max percent residual swell	ANSI A135.6-2012, Section 4.1
			Weathering of Primed Substrate	ANSI A135.6-2012, Section 4.2
			Linear Expansion 30 - 80% RH, max %	ASTM D1037, Section 24
			Nail-head pull-through, min avg per panel	ASTM D1037, Section 15
			Lateral nail resistance, min avg per panel	ASTM D1037, Section 13
			Modulus of Rupture (MPa), minimum avg per panel	ASTM D1037, Section 33
			Hardness, min avg per panel	ASTM D1037, Section 17
			Impact (mm), min avg per panel	ASTM D1037, Section 21
			Moisture Content, %	ASTM D1037, Section 37
Composite Wood Trim	UC3A	ANSI A135.7	Water Absorption, max %	ASTM D1037, Part B, Section 36
			Thickness Swelling, max %	ASTM D1037, Part B, Section 36
			Weathering of Substrate, max percent residual swell	ANSI A135.7-2012, Section 4.1
			Weathering of Primed Substrate	ANSI A135.7-2012, Section 4.2
			Linear Expansion 30 - 80% RH, max %	ASTM D1037, Section 24
			Nail-head pull-through, min avg per panel	ASTM D1037, Section 15
			Modulus of Rupture (MPa), minimum avg per panel	ASTM D1037, Section 33
			Moisture Content, %	ASTM D1037, Section 37
Glue line durability - following boil	ANSI A135.7-2012, Section 4.3			
Structural-Use Panels	UC2	ANSI PS-02, ASTM D7857	All attributes identified in ANSI PS-02	All methods required in ANSI PS-02 and tested per ASTM D7857 ²
Composite Lumber	UC2	ASTM D5456	All attributes identified in ASTM D5456	All methods required in ASTM D5456

¹ Reference to specific sections in referenced Standards sometimes change as standards are revised/updated. Always consult the latest version.

² Note: Structural-Use Panels not intended to be used in roof sheathing (so not exposed to elevated in-service temperatures) do not need to be evaluated using high-temperature exposure methods listed in ASTM D7857.