GDK-13

AMERICAN WOOD PROTECTION ASSOCIATION

GUIDANCE DOCUMENT K: DATA REQUIREMENT GUIDELINES FOR SOLVENTS USED WITH OIL-BORNE PRESERVATIVES

Jurisdiction: AWPA Technical Committee P-3

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

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. General Information and Purpose

The purpose of this Guidance Document is to guide proponents in the type of data necessary to be included in a supporting data package to propose listing a new solvent or modify the listing of an existing one. A proponent should be familiar with the AWPA Use Category System (UCS). Refer to the AWPA Book of Standards for information on the UCS. For more specific guidance on solvent standardization, proposal sponsors are encouraged to interact with the appropriate Technical Committees early in the evaluation process. This can be initiated by asking Association Staff (see www.awpa.com for contact information) for the appropriate Technical Committee Chair to contact. This document specifies certain data requirements for consideration of new solvents for organic preservatives or modifications to the listing of existing solvent systems. While the proponent of a solvent system is expected to provide all data required by this document, it is understood that it may not be possible to develop one or more types of data in some cases. In the event required data is not developed, the proponent shall provide justification for not doing so.

2. Types of Proposals

These guidelines cover three types of solvents for use with organic preservative system proposals:

Type 1: A new solvent system AWPA Standards; or making a major modification to a previously standardized solvent. Example: New solvent systems would be new solvents with distillation ranges outside of distillation ranges currently published. Examples of major modifications are uses of new class of solvents (*i.e.* oxygenated solvents with hydrocarbon solvents where the mass ratio of oxygenated solvent is greater than 49% of the combined solvents.

Type 2: Use of AWPA standardized solvent system in a new use category or categories.

Type 3: Minor composition modification(s) to an AWPA standardized solvent system. An example of a minor modification is a change in ratios of solvents in multi-component solvent systems.

The distinction between major and minor modifications (*Type 1* and *Type 3* proposals) may be unclear at times. A proponent is encouraged to interact with the appropriate AWPA Technical Committee for guidance on how to classify a proposal (see Section 1, above). Additives are not normally considered during the review process. In commercial practice, additives are sometimes formulated with the treating solution and/or formulation to improve product acceptance (e.g. to enhance solvency or surface tension; inhibit treating plant corrosion; reduce mold growth; enhance the color, water repellency, or resistance of corrosion of fasteners in the treated product; or to generally improve the quality of the formulation). When an additive-containing formulation is supplied for use, it is the responsibility of the chemical supplier or formulator to fully document the effect of the modified formulation on preservative efficacy, treated wood strength, corrosivity, etc.

3. How to use these Guidelines

To use these guidelines, the proponent should:

1. Determine what type of proposal is being considered (see Section 2).

2. Decide in what Use Categories the treated wood product using the solvent for organic preservative(s) will be used (see Section 2 of Standard U1, this describes the different Use Categories).

3. Determine what other information should be included in the proposal and data package by referring to Section 4.

4. Depending on the proposal type and Use Categories of interest, determine the performance data requirements by referring to Table 1. This Table is used in conjunction with Section 5, Methodology for Generating Performance Data, which describes the individual data requirements in more detail.

4. Requirements for all Submissions

4.1 Information Required for All *Type 1* Submissions – All *Type 1* proposals shall include the following information:

4.1.1 Proposed wording for the preservative listing in the appropriate Standard. The proponent should model the proposed wording on what is currently used in the relevant Standard.

4.1.2 Listing of the proposed Use Categories.

4.1.3 Active ingredient composition of the wood preservative system the solvent may be used with. All active ingredients and their percentage composition in the system shall be listed. Information on acceptable variation on these specifications shall be provided.

4.1.4 Physical properties of the solvent. Pertinent information on the chemical and physical properties shall be provided. Particular emphasis should be placed on chemical and thermal stability since these factors may have an effect on the long term performance. Examples of relevant chemical and physical properties are: vapor pressure, boiling point, density, viscosity, solubility in common solvents including water, thermal stability, and hydrolytic stability.

4.1.5 MSDS(s) of biocide or wood preservative system.

4.1.6 Performance data as specified in Table 1 and Section 5.

4.2 Information Required for All *Type 2* Submissions – All *Type 2* proposals shall include information on items 1, 2, and 6 as listed in Section 4.1 above.

4.3 Information Required for All *Type 3* Submissions – All *Type 3* proposals shall include information on items 4, 5 and 6 as listed in Section 4.1 above.

4.4 Use of Control Treatments – All evaluations of solvents for use with organic preservatives performance shall include comparative information from untreated wood controls and at least one AWPA-listed solvent for use with organic preservative systems with a commercial history of use in the same Use Category or Categories as the proposed system. Comparison to two commercially used solvents is recommended.

4.5 Wood Species – If the preservative is intended for use with softwoods, southern pine sapwood is preferred for performance evaluations. If the preservative is to be used with hardwoods, representative species for the proposed commercial application(s) should be used for evaluating the performance of the preservative.

4.6 Test Retentions – Choosing solvent retention(s) to be evaluated in performance tests is a critical part of the experimental design. In all cases, it is important to include retentions at or close to the projected commercial use retentions of the solvent. For tests that evaluate the fungal and insect resistance of the preservative, it is highly desirable to include retentions that bracket the performance threshold of the biocides. See AWPA Standard E7, Section 6.4, for additional general guidance on retentions.

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 solvent. The name of the institution or company which performed the test shall 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 solvent lies with the appropriate Technical Committee. Data substitutions may be allowed by the Technical Committee. For example, extensive and long term field stake data may mean that supporting laboratory soil block data is not necessary. Appropriate field stake data may also preclude the need for above-ground data for preservatives intended for UC3B applications. 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 anti-fungal and anti-insect performance properties of the preservative.

5.1.1 Laboratory Efficacy

5.1.1.1 Soil Block

Preferred Method: AWPA E10, *Standard Method of Testing Wood Preservatives by Laboratory Soil-block Cultures*, or AWPA E22, *Standard Accelerated Laboratory Method for Testing the Efficacy of Preservatives Against Wood Decay Fungi Using Compression Strength*. Both must incorporate evaporative aging and leaching.

The soil block test is the most commonly used lab method for evaluating the performance of wood preservatives systems against basidiomycete wood decay fungi. The experiment should be designed to bracket the expected performance threshold of the preservative and also include loadings of the proposed solvent at, or close to, the proposed commercially use retentions (e.g., *0.43 kg/m^3 [7 pcf] of solvent for southern pine*).

Data from a minimum of three basidiomycete species is required. If the wood preservative is intended for use in softwoods, three brown rot species shall be used. For preservatives to be used in hardwoods, three white rot species shall be used. If the preservative is intended to be used in both softwoods and hardwoods, data from three of each fungal type shall be provided. Consult E10 for guidance on selection of fungal species and strains.

5.1.1.2 Accelerated Soil Test

Preferred Method: AWPA E23, *Accelerated Method of Evaluating Wood Preservatives in Soil Contact*, under conditions favoring soft rot attack

5.1.1.3 Accelerated Soil Test

Preferred Method: AWPA E23, *Accelerated Method of Evaluating Wood Preservatives in Soil Contact*, under conditions favoring basidiomycete attack

5.1.2 Field Testing

5.1.2.1 Field Stake

Preferred Method: AWPA E7, *Standard Method of Evaluating Wood Preservatives by Field Tests with Stakes*

Data from a minimum of two geographically separated test sites are recommended. These sites should be selected so that they provide two distinctly different climates and soil types. In known high decay hazard areas (e.g., Gulf Coast region and windward Hawaii) the minimum exposure time is three years, provided that field depletion data from the same site over the same time period is also included (Section 5.2.2.1). For areas of lower decay hazard (e.g. Wisconsin), or if depletion data

over the same exposure period is not available, longer exposure times are recommended. In these cases, the Technical Committee evaluating the proposal will determine whether the length of exposure time is adequate.

5.1.2.2 Above-Ground

Preferred Methods: AWPA Standards E9, *Standard Field Test for the Evaluation of Wood Preservatives to be used in Non-Soil Contact*; E16, *Standard Field Test for Evaluation of Wood Preservatives to be used Out of Ground Contact: Horizontal Lap-Joint Method*; or E18, *Standard Field Test for Evaluation of Wood Preservatives Intended for Use Category 3B Applications, Exposed, Out of Ground Contact, Uncoated Ground Proximity Decay Method*

E9 was designed for evaluating millwork preservatives. E16 and the Ground Proximity method are more general tests. In known high above-ground decay rate climates (e.g. windward Hawaii) the minimum exposure time is three years, provided that field depletion data from the same site over the same time period is also included (Section 5.2.2.2). For areas of lower above-ground decay hazard (e.g., Gulf Coast states) or if depletion data over the same exposure period is not available, longer exposure times are required. In these cases, the Technical Committee evaluating the proposal will determine whether the length of exposure time is adequate.

5.1.2.3 Marine Panels

Preferred Method: AWPA E5, *Standard Test Method for Accelerated Evaluation of Wood Preservatives for Marine Services by Means of Small Size Specimens* (Type A or B panels)

Test sites shall be chosen based on the proposed marine Use Category application(s). See Standard U1, Section 2, for the geographical and hazard organism specifications for the 5A, 5B, and 5C Use Categories. Also see Commodity Specification G of Standard U1 for further information. Data from a minimum of two geographically separated test sites are recommended. The minimum exposure time is two years provided that marine depletion data from the same sites over the same time period are also included (Section 5.2.2.3). If depletion data over the same exposure period is not available, longer exposure times are recommended. In these cases, the Technical Committee evaluating the proposal will determine whether the length of exposure time is adequate.

5.2 Wood Preservative Depletion

5.2.1 Laboratory Depletion

5.2.1.1 Water Leach

Preferred Method: AWPA E11, *Standard Method of Determining the Leachability of Wood Preservatives*

For solvents proposed for UC5A-C, leaching should be done using natural or artificial seawater.

5.2.1.2 Soil Leach

Preferred Method: AWPA E20, *Standard Method for Determining the Leachability of Wood Preservatives in Ground Contact*

5.2.1.3 Evaporative Aging

Preferred Method: EN 73, *Accelerated aging of treated wood prior to biological testing. Part I: Evaporative aging procedure*

Evaporative aging is applicable to solvent systems where one or more of the components are organic compounds with a significant vapor pressure. Loss of this type of solvent should be monitored in the test. It may not be necessary to generate evaporative aging data on actives with little or no volatility at typical exposure conditions.

5.2.2 Field Depletion

5.2.2.1 Field Stakes

Preferred Method: Based on AWPA E7, Section 10, a minimum of three years exposure is recommended from two test sites for the initial proposal data package. A minimum of five replicate depletion stakes should be removed and analyzed after one and three year exposures. Three cross sectional zones (outer, middle, and core) should be cut from a subsample cut from immediately below the stake groundline. In addition and at a minimum, sufficient stakes should be installed initially to allow removal and analysis of stakes after an additional 5 years of exposure (8 years total). Eight year results should be reported to the appropriate Technical Committee at the five-year review after standardization.

5.2.2.2 Above-Ground

Preferred Method: Above-ground depletion evaluation should be done using test specimens and exposure identical or similar to test specimens exposed for decay resistance - AWPA Standards E9, E16, or E18.

There are no standardized above-ground field depletion methods. In general, the above-ground field depletion method used should be similar to the method used to evaluate the field biological resistance. In all cases a matched unexposed set of specimens shall be analyzed using the same subsampling and analytical methods as the exposed specimens.

Depletion specimens should be installed at the same time that above-ground decay evaluation specimens are installed. A minimum of three years total exposure is required from two test sites for the initial proposal data package. A minimum of five replicate depletion specimens should be removed and analyzed after one and three year exposures. The exact geometry of the analytical specimens will depend on the specifications of the exposure specimen. In addition, and at a minimum, sufficient depletion specimens should be installed initially to allow removal and analysis of stakes after an additional 2 years of exposure (5 years total).

5.2.2.3 Marine Panels

Preferred Method: Marine depletion evaluation should be done using test specimens and exposure identical or similar to test specimens exposed for durability testing. (AWPA E5 Type A or B panels.)

Depletion specimens should be installed at the same time that marine evaluation specimens are installed. A minimum of two years total exposure is required from two test sites for the initial proposal data package. A minimum of five replicate depletion specimens should be removed and analyzed after one and two year exposures. The analytical subspecimens should be cut from the center region of the exposure panel. In addition, and at a minimum, sufficient depletion specimens should be installed initially to allow removal and analysis of stakes after an additional 3 years of exposure (5 years total).

5.3 Corrosivity

5.3.1 Treating Solution

Preferred Method: AWPA E17, *Standard Method for Determining Corrosion Rates of Metals in Contact with Treating Solutions*

5.3.2 Treated Wood

Preferred Method: AWPA E12, *Standard Method of Determining Corrosion of Metal in Contact with Treated Wood*

AWPA E12 is a lab test. Field testing of commercial fasteners in the treated wood is also useful. Consult with AWPA Technical Committee P-6 for typical non-standardized fastener/wood field test methods.

5.4 Thermal and Hydrolytic Stability

5.4.1 Treating Solution

Preferred Method; ASTM D974 - 08 *Standard Test Method for Acid and Base Number by Color-Indicator Titration*

This test should be run on the proposed solvent with and without the oil-borne wood preservatives and on the proposed solvent with oil-borne preservative that has been conditioned (stressed) to represent the solvent/preservative combination after use.

Table 1. Summary of data required in a data package used to support a proposal to list a new wood preservative system in the AWPA Standards, make major or minor modifications to an AWPA-listed preservative, or expand the applications for a listed wood preservative into new use categories. See Section 5.0 of these Guidelines for further information on test methods. (M = Mandatory, R = Recommended)

TESTING REQUIREMENTS	Section	UC1	UC2	UC3A	UC3B	UC4A-C	UC5A-C
Wood Preservative Efficacy							
Laboratory Efficacy Testing							
Soil Block	5.1.1.1		M	M	M	M	M
Accelerated Soil Test: Soft-Rot	5.1.1.2					M	R
Accelerated Soil Test: Basidiomycete	5.1.1.3					M	R
Field Efficacy Testing							
Field Stakes	5.1.2.1					R	R
Above-Ground	5.1.2.2		R	R	R		
Marine Panels	5.1.2.3						M
Wood Preservative Depletion							
Laboratory Depletion Testing							
Water Leach	5.2.1.1		R	M	M	M	M
Soil Leach	5.2.1.2					M	M
Evaporative Aging	5.2.1.3	M	M	M	M	M	M
Field Depletion Testing							
Field Stake	5.2.2.1					R	R
Above-Ground	5.2.2.2		R	R	R		
Marine Panels	5.2.2.3						M
Preservative Corrosivity							
Preservative Solution	5.3.1	M	M	M	M	M	M
Treated Wood	5.3.2	M	M	M	M	M	M
Thermal stability, and Hydrolytic stability							
Preservative Solution	5.4.1			R	R	M	M