1. Product Lines Evaluated:
   1.1. WoodProTech 4000™
   1.2. Eco Red Shield™ Advanced Framing Lumber (AFL) wood protection coating.
   1.3. Wherever WoodProTech 4000™ is referenced in this TER, the provisions shall be equally applicable to Eco Red Shield™ Advanced Framing Lumber (AFL) wood protection coating.
   
   1.3.1. This product is intended for use when fire-resistant treated lumber is not required by the applicable code but an extra level of protection is desired.

   1.4. For the most recent version of this Technical Evaluation Report (TER), visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.
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1.5. This TER can be used to obtain product approval in any country that is an IAF MLA Signatory (all countries found here) and covered by an IAF MLA Evaluation per the Purpose of the MLA (as an example, see letter to ANSI from the Standards Council of Canada). Manufacturers can go to jurisdictions in the U.S., Canada and other IAF MLA Signatory Countries and have their products readily approved by authorities having jurisdiction using DrJ’s ANSI accreditation.

1.6. Building code regulations require that evaluation reports are provided by an approved agency meeting specific requirements, such as those found in IBC Section 1703. Any agency accredited in accordance with ANSI ISO/IEC 17065 meets this requirement within ANSI’s scope of accreditation. For a list of accredited agencies, visit ANSI’s website. For more information, see drjcertification.org.

1.7. Requiring an evaluation report from a specific private company (i.e. ICC-ES, IAPMO, CCMC, DrJ, etc.) can be viewed as discriminatory and is a violation of international, federal, state, provincial and local anti-trust and free trade regulations.

1.8. DrJ’s code compliance work:

1.8.1. Conforms to code language adopted into law by individual states and any relevant consensus based standard such as an ANSI or ASTM standard.

1.8.2. Complies with accepted engineering practice, all professional engineering laws and by providing an engineer’s seal DrJ take professional responsibility for its specified scope of work.

2. Applicable Codes and Standards:


2.2. 2012, 2015 and 2018 International Residential Code (IRC)

2.3. ANSI/AWC – National Design Specification (NDS) for Wood Construction

2.4. ASTM D198 – Standard Test Methods of Static Tests of Lumber in Structural Sizes

2.5. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

2.6. ASTM D4587 – Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings

2.7. ASTM D5116 – Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products

2.8. ASTM D5197 – Standard Test Method for Determination of Formaldehyde and other Carbonyl Compounds in Air (Active Sampler Methodology)


2.11. ASTM E2768 – Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials

2.12. AWPA E1 – Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites

2.13. AWPA E10 – Standard Method of Testing Wood Preservatives by Laboratory Soil-Block Cultures

2.14. AWPA E12 – Standard Method of Determining Corrosion of Metal in Contact with Treated Wood

2.15. AWPA E21 – Standard Field Test Method for the Evaluation of Wood Preservatives to be Used for Interior Applications (UC1 and UC2); Full-size Commodity Termite Test

2.16. AWPA M4 – Standard for the Care of Preservative-Treated Wood Products

2.17. AWPA U1 – Use Category System: User Specification for Treated Wood

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1 Unless otherwise noted, all references in this code compliant technical evaluation report (TER) are from the 2018 version of the codes and the standards referenced therein, including, but not limited to, ASCE 7, SDPWS and WFCM. This product also complies with the 2000-2015 versions of the IBC and IRC and the standards referenced therein. As required by law, where this TER is not approved, the building official shall respond in writing, stating the reasons this TER was not approved. For variations in state and local codes, if any, see Section 8.
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2.18. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials
2.19. NIST PS-1 – Structural Plywood
2.20. NIST PS-2 – Performance Standard for Wood-Based Structural-Use Panels
2.22. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials
2.23. UL 2818 – 2013 GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

3. Performance Evaluation:
3.1. WoodProTech 4000™ has been evaluated to determine its suitability to treat structural wood products used in above ground applications where they are required by code to provide the following:
   3.1.1. Preservative-treated wood as required by IBC Section 2303.1.8 and IRC Section R317 and Section R318.
   3.1.2. Resist Fungal Decay where required by IBC Section 2304.12 and IRC Section R317.
   3.1.3. Mold growth inhibition in accordance with ASTM D5590 and D3273.
   3.1.4. Protection from Subterranean Termites (including Formosan) where required by IBC Section 2304.12 and IRC Section R318.
   3.1.5. Flame spread and smoke developed indexes as specified in Table 1, in accordance with ASTM E84 10 minute testing, as reference of added value performance properties.
   3.1.6. Reaction with metals in accordance with AWPA E12.
   3.1.7. Flexure (MOR/MOE) of solid sawn and engineered lumber after treating in accordance with ASTM D198.

3.2. Low emissions of volatile organic compounds in compliance with UL 2818 for indoor commercial, educational, residential and healthcare environments. Tested in accordance to ASTM D5116 – Small Scale Environmental Chamber Determinations of Organic Emissions from indoor Materials and D5197 – Test Method for Determination of Formaldehyde and other Carbonyl Compounds in Air. Meets California 01350 limits for formaldehyde emissions. Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

4. Product Description and Materials:

Figure 1: WoodProTech 4000™ Product

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2 2012 IBC Section 2303.1.8
3 2012 IRC Section 2304.12
4.1. WoodProTech 4000™ is a factory applied wood protection coating that uses disodium octaborate tetrahydrate (DOT), biocides for mold abatement and a fire-retardant additive to coat wood members.

4.2. The wood products covered in this TER include:
   4.2.1. Kiln Dried or Green dimensional lumber species up to 30% moisture content including mixed Southern Pine, Spruce Pine Fir, Hem-Fir, and Doug-Fir.
   4.2.2. Laminated Veneer Lumber (LVL)
   4.2.3. Glued Laminated Beams (GLB)
   4.2.4. Parallel Strand Lumber (PSL)
   4.2.5. Oriented Strand Board (OSB) Rimboard
   4.2.6. Plywood complying with PS-1
   4.2.7. OSB complying with PS-2

4.3. WoodProTech 4000™ provides a minimum DOT loading of 0.00975 g/in² (minimum application rate) and a minimum total coating coverage of 0.075 g/in².

4.4. WoodProTech 4000™ protected products are acceptable for use in the following AWPA⁴ Use Categories:
   4.4.1. UC1 – Interior/Dry – millwork and finishings
   4.4.2. UC2 – Interior/Damp – interior beams, timbers, flooring, framing, millwork and sill plates
   4.4.3. UC3A – Above Ground (Exterior) Protected – Coated millwork, siding and trim

4.5. WoodProTech 4000™ wood protection coating is supplied by Wood Protection Technologies, Inc. and is used by the additional listees above to coat wood members in accordance with the manufacturer’s requirements.

5. Applications:
   5.1. WoodProTech 4000™ is a protective coating for solid sawn and engineered wood products used as floor, roof and wall structural members.
       5.1.1. Structural applications include but are not limited to use as structural panels (OSB, plywood), beams, columns, headers, joists, rafters, chords and webs of trusses, I-joist flanges, rim boards and wall studs.
       5.1.2. Use as sill plates in direct contact with concrete or masonry is approved.

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⁴ These are AWPA designated wood preservation systems and retentions (pressure impregnation processes only) which have been determined to be effective in protecting wood products under specified exposure conditions. The use of WoodProTech protective wood coatings, while purposely not included in the AWPA’s specification, satisfies and complies with the intent of the Building Code, and is an equivalent treated material in quality, strength, effectiveness, durability and safety. Therefore, WoodProTech protective wood coatings treated articles are deemed to be Non-AWPA Standardized; however, the intent of the building code has been satisfied and is adequately supported by third-party verified data and accredited testing protocols. See 2012 IBC Section 104.11 for methods of obtaining “Alternative Materials Approval” via Building Official Authority.
5.1.3. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment.

5.2. WoodProTech 4000™ protected wood products are suitable for above ground applications not subject to contact with liquid water.

5.2.1. When used in exterior applications, products treated with WoodProTech 4000™ must be protected from direct wetting. Flashing required for horizontal applications. A minimum of one coat of primer and two coats of finish paint, or equivalent shall be used.

5.3. Products protected by WoodProTech 4000™ meet the requirements of IBC Section 2304.125 and IRC Section R317 where protection against decay is required.

5.4. Products protected by WoodProTech 4000™ meet the requirements of IBC Section 2304.12 and IRC Section R318 where protection against termite attack is required.

5.5. Products protected by WoodProTech 4000™ meet the flame spread index and smoke developed index in accordance with ASTM E84, UL 723, NFPA 255, UBC 8-1, or ASTM E2768 (10 Minute Testing) as shown in Table 1.

<table>
<thead>
<tr>
<th>Wood Products</th>
<th>Untreated Materials</th>
<th>Materials treated with WoodProTech 4000™</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Substrate1</td>
<td>Flame Spread</td>
</tr>
<tr>
<td>Dimensional Spruce Pine Fir (SPF)</td>
<td>Western Spruce1</td>
<td>100</td>
</tr>
<tr>
<td>Dimensional Douglas Fir (DF)</td>
<td>Douglas Fir1</td>
<td>70-1001</td>
</tr>
<tr>
<td>Dimensional So. Yellow Pine (SYP)</td>
<td>SYP1</td>
<td>130-195</td>
</tr>
<tr>
<td>Laminated Veneer Lumber (LVL)</td>
<td>LVL2</td>
<td>50</td>
</tr>
<tr>
<td>Laminated Strand Lumber (LSL)</td>
<td>TimberStrand® LSL2</td>
<td>70</td>
</tr>
<tr>
<td>Plywood (Pine)</td>
<td>Plywood Southern Pine1</td>
<td>90</td>
</tr>
<tr>
<td>Oriented Strand Board (OSB)</td>
<td>OSB</td>
<td>147-1581</td>
</tr>
</tbody>
</table>

1. Design for Code Acceptance (DCA1) - Flame Spread Performance of Wood Products from The American Forest & Paper Association, Inc.
2. Test data obtained from Level Fire Facts Guide #1500, 2008 Weyerhaeuser Company.

Table 1: WoodProTech 4000™ Fire Ratings per ASTM E84 - 10 minute test

5.6. Field cuts, notches or bored holes must be site treated in accordance with the manufacturer’s instructions and AWPA M4 in accordance with IRC Section R317.1.1 and Section R318.1.2.

5.7. Design

5.7.1. Allowable design stresses for WoodProTech 4000™ protected products for dry conditions of use are the same as the wood product before treatment.

5.7.2. Since WoodProTech 4000™ is a topically applied coating treatment, not a pressure treatment; the wood is not incised, so the ANSI/AWC NDS Incising Factor (Section 4.3.8) is not applicable.

5.7.3. Maximum duration of load design stress increase shall not exceed 1.6. Duration of load design stress increase equal to or less than 1.6 shall be in accordance with Section 2.3.4 of ANSI/AWC NDS.

5 2012 IBC Section 2304.11
5.7.4. The design provisions for wood construction noted in IBC Section 2301.2 and IRC Section R301.1.3 apply to WoodProTech 4000™ protected products unless otherwise noted in this report.

5.7.5. Connections

5.7.5.1. Lateral loads for nails, screws, bolts, and withdrawal loads for nails and screws, installed in WoodProTech 4000™ protected products shall be in accordance with ANSI/AWC NDS using the species specific gravity.

5.7.6. Fasteners

5.7.6.1. Fasteners used with WoodProTech 4000™ protected products shall be in accordance with IBC Section 2304.10.5 and IRC Section R317.3, except that aluminum fasteners are permitted when the products are used in interior applications.

5.7.6.2. Exception: As noted in IBC Section 2304.10.5.1, plain carbon steel fasteners, including nuts and washers are permitted in SBX/DOT and zinc borate preservative-treated wood in an interior, dry environment.

6. Installation:

6.1. Products treated with WoodProTech 4000™ shall be installed in accordance with the applicable code, the approved construction documents, this TER, the manufacturer’s instructions and standard framing practice as applied to solid-sawn or engineered lumber, as applicable.

6.1.1. In the event of a conflict between any of the above and this TER, the more restrictive shall govern.

7. Test and Engineering Substantiating Data:

7.1. Test reports and data supporting the following properties:

7.1.1. Flame spread index and smoke developed index in accordance with ASTM E84, UL 723, NFPA 255, UBC 8-1, or ASTM E2768 (10 Minute Testing) by QAI Laboratories.

7.1.2. Fungal decay in accordance with AWPA E10 by the Wood Durability Lab (SDL) at the LSU Agricultural Center.

7.1.3. Mold growth inhibition in accordance with ASTM D5590 and D3273 by Siva Microbiological Solutions.

7.1.4. Termite resistance in accordance with AWPA E1 by Wood Durability Lab (SDL) at the LSU Agricultural Center.

7.1.5. Reaction with metals in accordance with AWPA E12 by Wood Durability Lab (SDL) at the LSU Agricultural Center.

7.1.6. Flexure (MOR/MOE) of LVL in accordance with ASTM D198 by Wood Durability Lab (SDL) at the LSU Agricultural Center.


7.3. The product(s) evaluated by this TER fall within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.

7.4. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineering mechanics based means of compliance. This TER assesses compliance with defined standards, accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.

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\[^6\] 2012 IBC Section 2304.9.5

\[^7\] 2012 IBC Section 2304.9.5.1
7.5. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate, as it undertakes its engineering analysis.

7.6. DrJ has reviewed and found the data provided by other professional sources are credible. The information in this TER conforms with DrJ’s procedure for acceptance of data from approved sources.

7.7. DrJ’s responsibility for data provided by approved sources conforms with IBC Section 1703 and any relevant professional engineering law.

7.8. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., IRC, WFCM, IBC, SDPWS, NDS, ACI, AISI, PS-20, PS-2, etc.). This includes review of code provisions and any related test data that aids comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g. lumber, steel, concrete, etc), DrJ relies upon grade/properties provided by the raw material supplier to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8. Findings:

8.1. When used in accordance with the manufacturer’s installation instructions and this TER, WoodProTech 4000™ protected products comply with, or are a suitable alternative to, the requirements of IBC Chapter 23; IRC Chapter 5, 6 and 8 as follows:

8.1.1. WoodProTech 4000™ protection does not affect the allowable design stresses allowed for lumber, LVL, GLB, I Joist, plywood, OSB, OSB Rimboard and PSL.

8.1.2. Use as sill plates in direct contact with concrete or masonry is approved.

8.1.3. WoodProTech 4000™ protected products are suitable for above ground applications not subject to continuous contact with liquid water.

8.1.4. When used in exterior applications, products coated with WoodProTech 4000™ must be protected from direct wetting. Flashing required for horizontal applications. A minimum of one coat of primer and two coats of finish paint, or equivalent shall be used.

8.1.5. Mold growth inhibition in accordance with ASTM D5590 and D3273 by Siva Microbiological Solutions.

8.1.6. Products protected with WoodProTech 4000™ meet the requirements of IBC Section 2304.12 and IRC Section R317 where protection against decay is required.

8.1.7. Products protected with WoodProTech 4000™ meet the requirements of IBC Section 2304.12 and IRC Section R318 where protection against termite attack is required.

8.2. IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code. \( \ldots \) Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

8.3. This product has been evaluated in the context of the codes listed in Section 2, and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:

8.3.1. No known variations

8.4. This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ’s professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

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*2012 IBC Section 2304.11*
9. **Conditions of Use:**

9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.

9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.

9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the Building Designer (e.g., Owner, Registered Design Professional, etc.).

9.4. Products treated with WoodProTech 4000™ shall be installed in accordance with the applicable code, the approved construction documents, this TER and the manufacturer's installation instructions. If there is a conflict between this report and the manufacturer's instructions, the more restrictive shall govern.

9.5. WoodProTech 4000™ complies with, or is a suitable alternative to the treatment required for engineered or solid sawn lumber as permitted by the codes listed in Section 2, subject to the following conditions:

   9.5.1. The service conditions for WoodProTech 4000™ are any above ground application not subject to exposure to liquid water, unless painted and flashed in accordance with Section 5.2.1.

   9.5.2. Fastener design values shall be determined using the specific gravity of the lumber species used in the coated product.

   9.5.3. Cutting and notching of WoodProTech 4000™ coated products is permitted where allowed by the applicable building code, the manufacturer's recommendations, this TER or where the effects of such alterations are specifically considered in the design of the member by a Registered Design Professional.

      9.5.3.1. Field cuts, notches, or bored holes must be site treated in accordance with the manufacturer’s instructions and AWPA M4 in accordance with IRC Section R317.1.1 and Section R318.1.2.

   9.5.4. Duration of load increases shall be in accordance with the limitations of the applicable building code for sawn lumber, but not greater than 1.6.

   9.5.5. WoodProTech 4000™ wood protection coating is provided by Wood Protection Technologies, Inc. in their Tacoma, WA facility or at other facilities or affiliates. All facilities shall have quality control inspections by an approved third-party quality control inspection agency.

9.6. **Design**

   9.6.1. Building Designer Responsibility

      9.6.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer for the Building and shall be in accordance with IRC Section R106 and IBC Section 107.

      9.6.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with IRC Section R301 and IBC Section 1603.

9.6.2. Construction Documents

   9.6.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.

9.7. **Responsibilities**

   9.7.1. The information contained herein is a product, material, detail, design and/or application TER evaluated in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering practice, experience and technical judgment.

   9.7.2. DrJ TERs provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated sections.

   9.7.3. The engineering evaluation was performed on the dates provided in this TER, within Dr.J's professional scope of work.

   9.7.4. This product is manufactured under a third-party quality control program in accordance with IRC Section R104.4 and R109.2 and IBC Section 104.4 and 110.4.
9.7.5. The actual design, suitability and use of this TER, for any particular building, is the responsibility of the Owner or the Owner's authorized agent, and the TER shall be reviewed for code compliance by the Building Official.

9.7.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10. Identification:

10.1. WoodProTech 4000™ wood protective coating described in this TER is identified by a label on the material itself or the packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance, as stated in IBC Section 2303.2.4.

10.2. Products treated with WoodProTech 4000™ shall be identified on the product.

10.2.1. Example of acceptable product stamp, see Figure 2.

10.3. Where intended for use where Formosan Termites are a concern, the label shall identify the product as suitable for this application as part of the product marking.

10.4. Additional technical information can be found at www.ecob.net.

11. Review Schedule:

11.1. This TER is subject to periodic review and revision. For the most recent version of this TER, visit drjengineering.org.

11.2. For information on the current status of this TER, contact DrJ Engineering.