



Eco D-Fence™ III Treated Fence Picket Protection

TER No. 1703-14

Issue Date: May 16, 2017

Updated: September 5, 2018

Subject to Renewal: July 1, 2019

Eco Building Products, Inc.

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DIVISION: 06 00 00 – WOOD, PLASTICS, AND COMPOSITES

Section: 06 05 83 – Shop-Applied Wood Coatings

Section: 06 11 00 – Wood Framing

Additional Listees:

Alta Forest Products, Inc.
7127 US HWY 101
Amanda Park, WA 98526

1. Product Lines Evaluated:

- 1.1. Eco D-Fence™ III treated fence picket protection
- 1.2. 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.
- 1.3. 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](#).
- 1.4. 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.

DrJ is a Professional Engineering Approved Source

Learn more about DrJ's Accreditation

- DrJ is an ISO/IEC 17065 accredited product certification body through ANSI Accreditation Services.
- DrJ provides certified evaluations that are signed and sealed by a P.E.
- DrJ's work is backed up by professional liability insurance.
- DrJ is fully compliant with IBC Section 1703.

Technical Evaluation Report (TER)

- 1.5. 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.
- 1.6. DrJ's code compliance work:
 - 1.6.1. Conforms to code language adopted into law by individual states and any relevant consensus based standard such as an ANSI or ASTM standard.
 - 1.6.2. Complies with accepted engineering practice, all professional engineering laws and by providing an engineer's seal DrJ takes professional responsibility for its specified scope of work.

2. Applicable Codes and Standards:¹

- 2.1. 2012, 2015 and 2018 International Building Code (IBC)
- 2.2. 2012, 2015 and 2018 International Residential Code (IRC)
- 2.3. ANSI/AWC NDS-2015 – NDS National Design Specification 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 D5590 – Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay
- 2.8. AWWA E1 – Laboratory Methods for Evaluating the Termite Resistance of Wood-based Materials: Choice and No-choice Tests
- 2.9. AWWA E10 – Laboratory Method for Evaluating the Decay Resistance of Wood-Based Materials Against Pure Basidiomycete Cultures: Soil/Block Test
- 2.10. AWWA E12 – Standard Method of Determining Corrosion of Metal in Contact with Treated Wood
- 2.11. AWWA E21 – Standard Field Test for Evaluation of Wood Preservatives to be Used for Interior Applications (UC1 and UC2); Full-size Commodity Termite Test
- 2.12. AWWA M4 – Standard for the Care of Preservative-Treated Wood Products
- 2.13. AWWA U1 – Use Category System: User Specification for Treated Wood

3. Performance Evaluation:

- 3.1. Eco D-Fence™ III has been evaluated to determine its suitability to treat fence picket 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 2303.1.9](#) and [IRC Section R317](#) and [Section R318](#).
 - 3.1.2. Resistance to fungal decay as required by [IBC Section 2304.12](#)² and [IRC Section R317](#).
 - 3.1.3. Inhibition of mold growth in accordance with ASTM D3273 and D5590.
 - 3.1.4. Protection from subterranean termites (including Formosan) where required by [IBC Section 2304.12](#)² and [IRC Section R318](#).
 - 3.1.5. Flexure (MOR/MOE) of solid sawn lumber after treating in accordance with ASTM D198.
- 3.2. Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

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](#).

² 2012 IBC Section 2304.11

Technical Evaluation Report (TER)

4. Product Description and Materials:

- 4.1. Eco D-Fence™ III is a factory applied wood protection treatment that uses disodium octaborate tetrahydrate (DOT), Biocides, pre-stain concentrate and a water repellent additive to treat wood fence pickets.

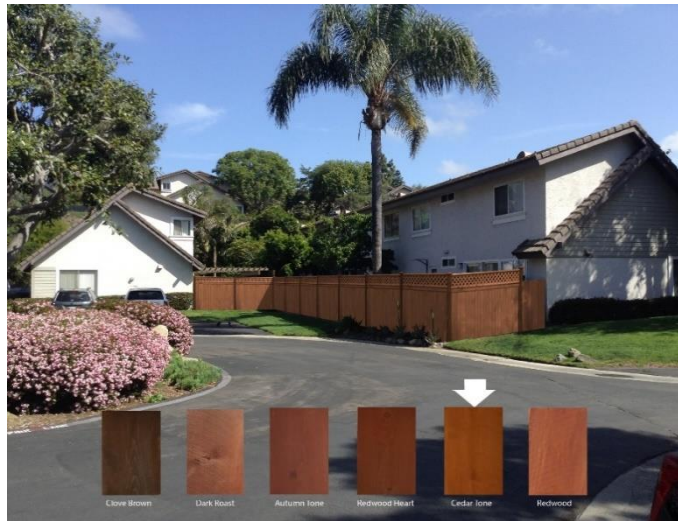


Figure 1: Eco D-Fence™ III Product



Figure 2: Eco D-Fence III Acceptable Product Stamp – Example

- 4.2. The wood products covered in this TER include:

4.2.1. Dimensional wood fence pickets and timber species including mixed Southern Pine, Spruce Pine Fir, Hem-Fir, and Doug-Fir.

- 4.3. Eco D-Fence™ III provides a minimum DOT loading of 0.0072 g/in² (minimum application rate) and a minimum total coating coverage of 0.054 g/in².

- 4.4. Eco D-Fence™ III protected products are acceptable for use in the following AWWPA Use Categories:³

4.4.1. UC1 Interior/Dry construction: millwork and finishing

4.4.2. UC2 Interior/Damp construction: interior beams, timbers, flooring, framing, millwork, and sill plates

³These are AWWPA designated wood preservation systems and retentions (pressure impregnation processes only) that have been determined to be effective in protecting wood products under specified exposure conditions. The use of Eco Red Shield™ protective wood treatments, while purposely not included in the AWWPA's specification, satisfies and complies with the intent of the building code and is a treated material equivalent in quality, strength, effectiveness, durability and safety. Therefore, Eco Red Shield™ protective wood treatment treated articles are deemed to be non-AWWPA 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.

Technical Evaluation Report (TER)

4.4.3. UC3A Above Ground (Exterior) Protected: coated millwork, siding, fence pickets and trim in a vertical state

- 4.5. Eco D-Fence™ III incorporates a stain available currently in seven colors and other additives, which provide a protective coating to the treated lumber. Additional coating is permitted but is not required.
- 4.6. Eco D-Fence™ III wood protection treatment is supplied by Eco Building Products, Inc. and is used by the additional listee(s) above to treat wood fence pickets in accordance with the manufacturer's requirements.

5. Applications:

- 5.1. Eco D-Fence™ III is a preservative and protective treatment for fence pickets.
- 5.1.1. Applications include, but are not limited to, use as fence pickets in a vertically installed state.
- 5.1.2. Use in above ground applications exposed to all weather cycles, including intermittent wetting and in direct contact with concrete or masonry is approved.
- 5.2. Products protected by Eco D-Fence™ III meet the requirements of *ASTM D3279* and *ASTM D5590* where protection against decay is required.
- 5.3. Products protected by Eco D-Fence™ III meet the requirements of *AWPA E1* where protection against termite attack is required.
- 5.4. 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](#).
- 5.5. Design
- 5.5.1. Allowable design stresses for Eco D-Fence™ III protected products for dry conditions of use are the same as the wood product before treatment.
- 5.5.2. Because Eco D-Fence™ III is a topically applied treatment, not a pressure treatment, the wood is not incised. Therefore, the *ANSI/AWC NDS* Incising Factor (Section 4.3.8) is not applicable.
- 5.5.3. Duration of load design stress increase shall be in accordance with Section 2.3.2 of *ANSI/AWC NDS*.
- 5.5.4. The design provisions for wood construction noted in [IBC Section 2301.2](#) and [IRC Section R301.1.3](#) apply to Eco D-Fence™ III protected products unless otherwise noted in this report.
- 5.5.5. Connections
- 5.5.5.1. Lateral loads for nails, screws, and bolts, and withdrawal loads for nails and screws installed in Eco D-Fence™ III protected products shall be in accordance with *ANSI/AWC NDS* using the species specific gravity.
- 5.5.6. Fasteners
- 5.5.6.1. Fasteners used with Eco D-Fence™ III protected products shall be stainless steel, aluminum, hot-dipped galvanized or electro-galvanized in accordance with [IBC Section 2304.10.5⁴](#) and [IRC Section R317.3](#).
- 5.5.7. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment.

6. Installation:

- 6.1. Products treated with Eco D-Fence™ III 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 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.

⁴[2012 IBC Section 2304.9.5](#)

Technical Evaluation Report (TER)

7. Test and Engineering Substantiating Data:

- 7.1. Test reports and data support the following properties:
 - 7.1.1. Fungal decay in accordance with *AWPA E10* by the Wood Durability Lab (WDL) at the LSU Agricultural Center.
 - 7.1.2. Mold growth inhibition in accordance with *ASTM D3273* and *D5590* by Siva Microbiological Solutions.
 - 7.1.3. Termite resistance in accordance with *AWPA E1* by the Wood Durability Lab (WDL) at the LSU Agricultural Center.
 - 7.1.4. Reaction with metals in accordance with *AWPA E12* by the Wood Durability Lab (WDL) at the LSU Agricultural Center.
 - 7.1.5. Flexure (MOR/MOE) of LVL/EWP in accordance with *ASTM D198* by the Wood Durability Lab (WDL) at the LSU Agricultural Center.
 - 7.1.6. Termite resistance in accordance with *AWPA E21* by the Wood Durability Lab at LSU Agricultural Center-2nd year assessment.
- 7.2. 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.
- 7.3. 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.
- 7.4. 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.
- 7.5. 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.
- 7.6. DrJ's responsibility for data provided by approved sources conforms with [IBC Section 1703](#) and any relevant professional engineering law.
- 7.7. 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 in 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, Eco D-Fence™ III protected products comply with, or provide a suitable alternative to, the requirements of [IBC Chapter 23](#) and [IRC Chapters 5, 6 and 8](#) as follows:
 - 8.1.1. Eco D-Fence™ III protection does not affect the allowable design stresses for lumber, OSB, Plywood, LVL, GLB and PSL.
 - 8.1.2. Use in direct contact with concrete or masonry is approved.
 - 8.1.3. Eco D-Fence™ III protected products are suitable for above ground applications exposed to all weather cycles, including intermittent wetting.
 - 8.1.4. When used in exterior applications, products treated with Eco D-Fence™ III must be installed in a vertical application.
 - 8.1.5. Mold growth inhibition in accordance with *ASTM D3273* and *D5590* by Siva Microbiological Solutions.

Technical Evaluation Report (TER)

- 8.1.6. Products protected with Eco D-Fence™ III meet the requirements of [IBC Section 2304.12⁵](#) and [IRC Section R317](#) where protection against decay is required.
- 8.1.7. Products protected with Eco D-Fence™ III meet the requirements of [IBC Section 2304.12⁵](#) 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. ... 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 with 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 report, 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.
- 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. Eco D-Fence™ III 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:
- 9.4.1. The service conditions for Eco D-Fence™ III are any above ground application exposed to all weather cycles, including intermittent wetting.
- 9.4.2. Fastener design values shall be determined using the specific gravity of the lumber species used in the treated product.
- 9.4.3. Cutting and notching of Eco D-Fence™ III preservative treated 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.
- 9.4.3.1. Field cuts, notches, or bored holes must be site treated in accordance with the manufacturer's instructions and AWPA M4 in accordance with [IRC Sections R317.1.1](#) and [R318.1.2](#).
- 9.4.4. 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.
- 9.4.5. Eco D-Fence™ III wood protection treatment is provided by the listee's on Page 1 of this TER with quality control inspections by an approved third-party quality control inspection agency.
- 9.4.6. Products treated with Eco D-Fence™ III shall be kept free from prolonged exposure to soil, vegetation, leaf litter or other debris that may build up along the fence line.

⁵[2012 IBC Section 2304.11](#)

Technical Evaluation Report (TER)

- 9.4.7. Products treated with Eco D-Fence™ III shall be installed with a 6" clearance between the ground and the bottom of the picket and shall not be installed in direct contact with permeable materials that are installed in direct contact with the ground.
- 9.4.8. Products treated with Eco D-Fence™ III shall not be installed in direct contact with non-durable, untreated wood or older construction showing evidence of decay.
- 9.4.9. Products treated with Eco D-Fence™ III shall be protected from frequent or recurrent wetting such as from watering systems. Exposure to incidental wetting from typical rain fall is approved.
- 9.4.10. Use in tropical climate zones is not approved.

9.5. Design

9.5.1. Building Designer Responsibility

- 9.5.1.1. 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](#).
- 9.5.1.2. 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](#).

9.5.2. Construction Documents

- 9.5.2.1. 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.

9.6. Responsibilities

- 9.6.1. 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.
- 9.6.2. DrJ TERs provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated sections.
- 9.6.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.
- 9.6.4. 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](#).
- 9.6.5. 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.
- 9.6.6. 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. Products treated with Eco D-Fence™ III described in this TER are identified by a label on the material itself or the packaging material bearing the manufacturer's name, product name, TER number, Quality assurance agency name and other information to confirm code compliance.
- 10.2. Products treated with Eco D-Fence™ III shall be identified with "D-Fence" or "Premium Treated Picket" on the label or otherwise marked on the product.
 - 10.2.1. For an example of acceptable product stamp, see [Figure 2](#).
- 10.3. When intended for use where Formosan subterranean 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.

Technical Evaluation Report (TER)

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](#).



- [Mission and Professional Responsibilities](#)
- [Product Evaluation Policies](#)
- [Product Approval – Building Code, Administrative Law, and P.E. Law](#)