Wood is naturally susceptible to attack by wood-destroying fungi and insects. Therefore, it requires preservative treatment under certain end-use conditions, including some dry-service applications where wood-destroying insects are present or where the wood comes in direct contact with concrete or masonry.

This technical resource sheet explains common applications and end-use conditions that require preservative-treated products, and describes the current preservative treatments used to protect Trus Joist® structural composite lumber products—including Parallam® PSL, TimberStrand® LSL, Microllam® LVL, and TJI® joists—against decay and insects. Contact your Weyerhaeuser representative if you have any questions that are not covered by this resource sheet.

Use Categories and Service Levels
The American Wood Protection Association’s (AWPA) Use Category System (UCS) characterizes the end-use conditions that require treated wood products. Weyerhaeuser has simplified product design and specification by grouping these AWPA categories into Service Levels (SL) based on anticipated in-service moisture content ranges. A design professional must determine the appropriate wet or dry service conditions for the application. The following table can be used to determine the applicable Service Level.

<table>
<thead>
<tr>
<th>Service Level</th>
<th>AWPA Use Category</th>
<th>Application Environment</th>
<th>Products and Typical End Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL 1 MC ≤ 16%</td>
<td>UC1</td>
<td>Dry, above ground; continuously protected from weather or other sources of moisture</td>
<td>TimberStrand® LSL, TJI® joists, Microllam® LVL, Parallam® PSL, and Parallam® Plus PSL products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry, but risk of insect (termite) damage</td>
<td>Trus Joist® products treated with TRU-CORE® I or TRIB II® (see compatibility table on following page); StrandGuard® TimberStrand® LSL, and Parallam® Plus PSL products</td>
</tr>
<tr>
<td>SL 2 MC &gt; 16% and ≤ 28%</td>
<td>UC2</td>
<td>Damp, above ground; protected from weather but subject to occasional sources of moisture or direct contact with concrete or masonry</td>
<td>Trus Joist® products treated with TRU-CORE® I; and StrandGuard® TimberStrand® LSL, and Parallam® Plus PSL products</td>
</tr>
<tr>
<td>SL 3 MC &gt; 28%</td>
<td>UC3A(1)</td>
<td>Above ground, exterior construction with coating or other design feature that prevents prolonged wetting</td>
<td>Parallam® Plus PSL beams, headers, and columns</td>
</tr>
<tr>
<td></td>
<td>UC3B</td>
<td>Above ground, exterior construction; exposed to all weather cycles; prolonged wetting</td>
<td>Parallam® Plus PSL beams, headers, and columns</td>
</tr>
<tr>
<td></td>
<td>UC4A</td>
<td>Typical ground or fresh water contact; exposed to all weather cycles</td>
<td>Parallam® Plus PSL beams, headers, and columns</td>
</tr>
<tr>
<td></td>
<td>UC4B</td>
<td>High decay potential, ground contact, and saltwater splash applications; exposed to all weather cycles</td>
<td>Parallam® Plus PSL columns</td>
</tr>
</tbody>
</table>

Parallam® Plus PSL is the only Trus Joist® product meeting the requirements for exterior, exposed applications.

(1) May be defined as Service Level 1 if dry-service conditions (16% maximum moisture content (MC)) exist.
Preservative Treatment Descriptions
Wood preservative treatments commonly consist of a fungicide and/or insecticide that is either applied during the manufacturing process, or applied later at a treater using a commercial pressure-treating process.

StrandGuard® TimberStrand® LSL and Parallam® Plus PSL with Wolmanized® preservative protection are stocked at Weyerhaeuser distributors. Other treated Trus Joist® products may be custom ordered and may require lead times.

See the compatibility table above for more information about the preservative treatments used for protecting Trus Joist® products against insect attack and fungal decay.

Wet Service and Dry Service Definitions
The definitions of wet and dry service vary. The NDS® defines dry service for structural composite lumber products as an in-service moisture content of less than 16%. CSA O86 defines dry service as a climatic condition in which the average equilibrium moisture content (EMC) of sawn lumber over a year’s time is 15% or less and at no time exceeds 19%.

The EMC of wood is a function of the relative humidity and temperature of the surrounding environment. Not all exterior applications are necessarily a wet-service condition and, conversely, not all interior applications are a dry-service condition.

Considerations for Treated Applications
For applications with treated products several issues should be considered to help ensure a structure will perform properly. Improperly detailed column bases and connections in saddles can cause water to collect and may prevent members from drying out readily. The ensuing high moisture content can cause degradation in these areas.

Architectural Design and Detailing: Proper architectural design and detailing are critical to help ensure that treated wood members will perform satisfactorily when exposed to moisture. These may include the following:

- Protect members with roof overhangs and proper flashing.
- Elevate column bases to keep them out of standing water and snow.
- Avoid connections that might trap water.
- Allow water to drain off members.
- Provide adequate airflow to help dry out members and connections.
- Prevent continuous wood framing from breaching the building envelope.

- When using solvent-based treatments (e.g., TRIB II®), allow sufficient time for the solvent to dissipate, or provide adequate ventilation, before closing in the structure.

Hardware Recommendations: Due to the high moisture content typically present where Parallam® Plus PSL is used, it is very important to use corrosion-resistant fasteners and connectors for all applications. Fasteners include nails, screws, and bolts. Connectors include joist hangers, post bases, and hurricane or mudsill anchors.

Fasteners and connectors must have a coating that will provide the required level of corrosion resistance for the treatment types, retention levels, and end-use conditions for Parallam® Plus PSL. Follow the hardware manufacturer’s recommendations for CA-C (no ammonia) with a retention level of 0.15 pcf. If recommendations for CA-C are not provided, those for CA-B (no ammonia) with a retention level of 0.21 pcf may be used.

Maintenance: The building’s owner can reduce the effects caused by exposure through regular maintenance and routine inspection of exterior components.
Preservative Treatments Approved for Trus Joist® Engineered Wood Products

Reduction Factors
Treated material should be used in all wet-service applications and in dry-service applications where wood-destroying insects are present or wood comes into direct contact with concrete or masonry. When designing with treated products, Weyerhaeuser allowable design stresses must be adjusted for the selected treatment and service level as shown in the Adjustment Factors table below. These adjustment factors combine wet-service and treatment-process reductions, and should be used in place of the NDS® or CSA O86 wet-service adjustment factors.

Surface Applied Sealers or Coatings
Sealers or coatings are not effective replacements for preservative pressure treatment, even if they contain a preservative. Current commercially available coatings that contain a preservative do not meet the intended end-use requirements for pressure-treated or in-process-treated Trus Joist® products. In addition, low-quality, damaged, or improperly applied coatings can trap moisture and retard the drying of exposed timbers, especially where the coating is breached by nails, bolts, joints, etc. Trapped moisture provides an ideal environment for decay fungi and insect activity.

Adjustment Factors for Allowable Design Stresses

<table>
<thead>
<tr>
<th>Design Property</th>
<th>Copper Azole and CCA</th>
<th>Zinc Borate</th>
<th>TRIB® II</th>
<th>Microlam® LVL, Parallam® PSL, and TJI® Joists</th>
<th>TimberStrand® LSL</th>
<th>Microlam® LVL</th>
<th>Parallam® PSL</th>
<th>TJI® Joists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallam® Plus PSL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SL 1</td>
<td>0.83</td>
<td>0.73</td>
<td>0.67</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>SL 2</td>
<td>0.83</td>
<td>0.73</td>
<td>0.67</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>SL 3</td>
<td>0.83</td>
<td>0.73</td>
<td>0.67</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Flexural stress, ( F_b )</td>
<td>0.73</td>
<td>0.63</td>
<td>0.56</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Tension stress, ( F_t )</td>
<td>0.75</td>
<td>0.69</td>
<td>0.66</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Compression perpendicular to grain, ( F_{c\perp} )</td>
<td>0.71</td>
<td>0.49</td>
<td>0.35</td>
<td>1.0</td>
<td>1.0</td>
<td>0.89</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Compression parallel to grain, ( F_{c\parallel} )</td>
<td>0.50</td>
<td>0.35</td>
<td>0.26</td>
<td>1.0</td>
<td>– (1)</td>
<td>0.75</td>
<td>0.95</td>
<td>0.85</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain, ( F_v )</td>
<td>0.70</td>
<td>0.52</td>
<td>0.41</td>
<td>1.0</td>
<td>1.0</td>
<td>0.90</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Creep factor, ( C_{RP} )</td>
<td>0.83</td>
<td>0.68</td>
<td>0.59</td>
<td>1.0</td>
<td>1.0</td>
<td>0.90</td>
<td>0.95</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(1) See the Trus Joist® Treated Sill Plates, Columns, and Sduds Specifier’s Guide (Reorder #TJ-8100) for allowable design stresses and more information.
(2) Contact Weyerhaeuser for more information.
(3) For more information on creep in dry service conditions, refer to the NDS® or CSA O86.

How to Use This Table
1. Select the appropriate preservative treatment.
2. Select the Trus Joist® product to be treated.
3. Determine the appropriate Service Level from the first page.
4. Multiply the allowable design stresses of the selected Trus Joist® product (as shown in current product literature), by the adjustment factors shown in the appropriate column.
5. Use the creep factor (CRP) shown in the appropriate column of the table and the formula under General Notes to approximate the creep deflection under total load.

General Notes
• Table is applicable for products used in beam orientation. For plank orientation adjustment factors contact your Weyerhaeuser representative.
• The following formula approximates the total load deflection, including creep deflection (\( \Delta_{CD} \)):

\[
\Delta_{TL} = \Delta_{UL} + \Delta_{DL} + \Delta_{CD}
\]

where:
\[
\Delta_{CD} = \left[ \Delta_{DL} + \Delta_{UL} (F) \right] C_{RP}
\]

\( F = 0.2 \) for floors; \( 0.3 \) for roofs

Nominal Connection Design Value Adjustment Factors for Parallam® Plus PSL

<table>
<thead>
<tr>
<th>Service Level</th>
<th>Moisture Content at Connection</th>
<th>Lateral Connections</th>
<th>Withdrawal Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL1 or SL2</td>
<td>( \leq 28% )</td>
<td>0.7</td>
<td>0.25</td>
</tr>
<tr>
<td>SL3</td>
<td>( \leq 28% )</td>
<td>0.7</td>
<td>N.R. (1)</td>
</tr>
<tr>
<td></td>
<td>( &gt; 28% )</td>
<td>0.4</td>
<td>N.R. (1)</td>
</tr>
</tbody>
</table>

(1) Withdrawal connections in Service Level 3 applications are not recommended (N.R.).
Preservative Treatments Approved for Trus Joist® Engineered Wood Products

Field-Applied Surface Treatments
Field-applied preservative treatment products are intended for re-treating (coating) the surfaces of previously pressure-treated wood that has been cut, drilled or otherwise machined in the field. The use of field-applied preservative products as a substitute for properly pressure-treated Parallam® Plus PSL will not provide similar long term protection and is not covered by the Weyerhaeuser and Arch Wood Protection, Inc. 30-year limited warranties.

Painting or Staining Treated Products
Customers may choose to paint or stain treated wood to even out the color variations of the treatment process. Products protected with water-based treatments, such as Parallam® Plus PSL, Strandguard®, TimberStrand® LSL, or TRU-CORE® I can be painted or stained using a quality water-based product. However, these finishes may not hide inherent surface irregularities, and the final color may be affected by the tint of the treatment.

For Trus Joist® products treated with light-organic solvent preservatives (LOSP), such as TRIB II® (used in Hawaii), oil-based stains or paints have been used successfully to achieve a uniform appearance. Water-based paints, latex, shellac, or varnish-type sealers are not recommended because those products may peel off as the solvent carrier evaporates from the product. A quality brand of oil-based stain will allow the solvent carrier to evaporate through the stain. Delaying the application of a paint or stain to allow complete evaporation of the solvent carrier will improve results.

Preservative treatment does not protect the wood product against weathering effects such as swelling, discoloration, checking, warping, or splitting. Appropriate maintenance, such as the application of quality exterior stains and paints, will help reduce the extent of these weathering effects.

Preservative Treatments and Adhesives in Engineered Wood Products
The adhesives used in Trus Joist® engineered wood products have been qualified in accordance with ASTM 2559 for wet-use conditions by the adhesive manufacturer. These adhesives are not susceptible to degradation from either the preservative chemicals or their carriers.

Weyerhaeuser-Approved Treaters
Weyerhaeuser works with specific, approved treating partners to ensure a high-quality end product. This process helps ensure that the type of treatment used and how it is applied are compatible with the wood product.

Warranties
The Weyerhaeuser Trus Joist® limited product warranties are void if product is treated at an unapproved facility. Weyerhaeuser warranties are available at woodbywy.com.

Additional Information About Preservative Treatments

StrandGuard® TimberStrand® LSL:
- Treated Sill Plates, Columns, and Studs Specifier's Guide (Reorder #TJ-8100) available at woodbywy.com
- SDS available at weyerhaeuser.com/download_file/31577

Parallam® Plus PSL:
- Parallam® Plus PSL Specifier's Guide (Reorder #TJ-7102) available at woodbywy.com
- Consumer Safety Sheet for Parallam® Plus PSL (Reorder #TJ-1021) available at woodbywy.com
- SDS for columns available at weyerhaeuser.com/download_file/31561
- SDS for beams/headers available at weyerhaeuser.com/download_file/31560

TRIB II® and TRU-CORE® I:
Available from Honolulu Wood Treating, LLC, hwthawaii.com
- SDSs for TRIB II® and TRU-CORE® I are available through Honolulu Wood Treating or at hwthawaii.com

WARNING: Drilling, sawing, sanding or machining wood products generates wood dust. The paint and/or coatings on this product may contain titanium dioxide. Wood dust and titanium dioxide are substances known to the State of California to cause cancer. For more information on Proposition 65, visit wy.com/inform.

Contact Us | 1.888.453.8358 | woodbywy.com/contact

June 2016 • Reorder TJ-1020

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