

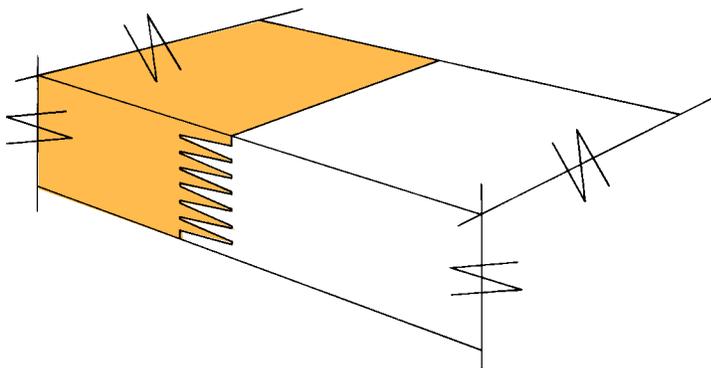
Structural-glued Dimension Lumber

Structural-glued dimension lumber has gained wide acceptance in the building and construction industry. It is accepted for use under all model building codes and is interchangeable with solid-sawn dimension lumber of the same size, grade and species, and is grade-marked accordingly.

The material makes efficient use of available wood resources and can be manufactured in long lengths. Because it is typically fabricated from dry material, it is exceptionally dimensionally stable. This is a benefit in performance and makes it easy to hold in inventory.

Structural-glued products are commonly manufactured from lumber that has been seasoned to below 19% moisture content and are gradestamped "S- DRY" or "KD". Some finger-jointed products are manufactured from unseasoned lumber and may be gradestamped "S-GRN".

These products may be glued together in three ways: end-jointed, where "fingers" (see diagram) are cut into the ends of the pieces before they are joined, hence the nickname "finger-jointed" lumber; edge glued; or face glued. Structural-glued products are avail-



WWPA's quality control procedures for structural-glued end-jointed (i.e. finger-jointed) lumber ensure that it will meet the performance capabilities of solid-sawn lumber recognized under all model building codes. End-jointed lumber can be used interchangeably with solid-sawn lumber of the same size, grade and species.

able in a variety of species, grades and sizes for both general and specifically-intended end uses.

I. Structural End- or Finger-jointed Lumber

WWPA is approved by the American Lumber Standard Committee, Inc. (ALSC), under the Department of Commerce, to certify structural-glued products in all species and species combinations. And while end-jointed (finger-jointed) structural-glued Western Lumber products may be manufactured in any species, products are most commonly available in:

- Douglas Fir-Larch
- Hem-Fir
- Spruce-Pine-Fir (South)
- Western Woods

Structural finger-jointed lumber is graded in accordance with the **National Grading Rule for Dimension Lumber (NGR)**, with additional limitations applying to the characteristics allowed in the joint area. These limitations are governed by Section 1.70 of the WWPA **Western Lumber Grading Rules**, as approved by the Board of Review of the ALSC. Dimension lumber grades, sizes, design values (in base values), and routine adjustment factors apply.

Because structural finger-jointed lumber products are graded using the same rules applied to solid-sawn dimension lumber, the design values for structural-glued, finger-jointed lumber are the same as those of conventional, solid-sawn lumber.

While STUD and No. 2&BTR are the most widely available, other grades of structural end- or finger-jointed lumber are produced including:

- STUD
- SELECT STRUCTURAL
- No.1
- No.2
- STANDARD & BETTER

Structural finger-jointed lumber is manufactured to meet the requirements of two different types of end-use applications. The first category is basically an all-purpose product, indicated by CERT EXT JNTS on the grade stamp. The second category is appropriate for use where the primary loading will be in compression, indicated by VERTICAL USE ONLY on the grade stamp.

End-jointed Structural-glued Lumber "CERT EXT JNTS"

Finger-jointed products, grade-stamped CERT EXT JNTS are intended for all structural applications. This lumber is assembled with a waterproof, exterior-type adhesive, meeting the requirements of ASTM *Product Standard D2559* and conforming to WWPA's *Glued Products Procedures for Mill Certification & Quality Control, C/QC 101*. Limitations on knot size and placement near joints are highly restrictive. Testing and quality control procedures are rigorous (see "WWPA Quality Control Procedures.")

The exterior-type adhesives for CERT EXT JNTS products are suitable for bonding structural end-jointed and laminated wood products for use in general construction



Grade stamp facsimile

where a high-strength, waterproof adhesive bond is required.

These products may be 2x2 through 2x12 (with the bulk of production in sizes 2x4, 2x6, 2x8, and 2x10), in any length. Extra-long lengths are often available. Long lengths, up to 32' or more, are one of the distinct advantages of structural-glued finger-jointed products.

CERT EXT JNTS products may be used interchangeably with any solid-sawn lumber product of the same species and grades. The lumber may be used as beams, joists, rafters, studs, plates, or in any other exterior or interior framing application.

End-jointed Structural-glued Lumber "VERTICAL USE ONLY"

This type of finger-jointed product is appropriate for carrying loads in compression as vertical framing members. These products are gradestamped VERTICAL USE ONLY (previously stamped and known as STUD USE ONLY).



Grade stamp facsimile

VERTICAL USE ONLY finger-jointed lumber is manufactured to meet the performance capabilities of solid sawn, end-loaded bearing members where short-term bending or tension loads from lateral forces such as wind, seismic and impact may be present, but where forces from the conditions of long-term, sustained-bending or tension loading are not present.

These products are typically assembled with a water-resistant

adhesive (indicated on the grade stamp as CERT GLUED JNTS) that conforms to *WWPA's Glued Products Procedures for Mill Certification & Quality Control, C/QC 101*. VERTICAL USE ONLY products indicated as CERT GLUED JNTS are limited to conditions where the glued joint will not be exposed to repeated wetting and the moisture content of the wood will not exceed 19% in use.

VERTICAL USE ONLY finger-jointed lumber production is limited to 2x2 through 2x6, with lengths limited to 12 feet. The term VERTICAL USE ONLY is recognized in daily selling conversation. CERT GLUED JNTS is not typically referenced.

Handling advisory for CERT GLUED JNTS:

Although structural finger-jointed lumber grade stamped VERTICAL USE ONLY-CERT GLUED JNTS is assembled with water-resistant adhesives, these products should not be stored where water might collect in a stack of lumber for an extended period. If lumber does get wet during storage or delivery, it should be separated so it will dry, or be installed so it may dry in place.

Grade stamps for structural-glued, end- (finger-) jointed products indicate the type of adhesive used. As noted earlier, VERTICAL USE ONLY products are usually qualified as CERT GLUED JNTS in the grade mark.

However, customers occasionally may find VERTICAL USE ONLY products indicated as CERT EXT JNTS in the marketplace. This occurs when a mill manufactures VERTICAL USE ONLY lumber under WWPA's CERT EXT JNTS program using waterproof exterior-type adhesives.

II. Structural Face- or Edge-glued Lumber

WWPA is authorized to certify the gluing process on a variety of structural-laminated products (face-laminated, run-to-pattern laminated decking and several other products) in sizes ranging from 2x6 through



Grade stamp facsimile

5x8, in the species listed on page 1 plus Western Red Cedar and Ponderosa Pine.

These products are most commonly used for structural roof or floor decking in industrial, commercial or residential applications, often with one side exposed for appearance.

When structural face- and/or edge-glued Western lumber products have been assembled with a waterproof, exterior-type adhesive meeting all of the requirements of ASTM Product Standard D2559 and subjected to *WWPA's Glued Products Procedures for Mill Certification & Quality Control, C/QC 101*, the WWPA stamp will indicate CERTIFIED EDGE GLUING or CERTIFIED FACE GLUING.

For these products, WWPA's certification mark is for the gluing process—the performance capability of the glue line—and not necessarily for the grade of the product.

Face- and/or edge-glued products are usually manufactured in proprietary grades. Thus, while WWPA may provide quality control and inspection services for manufacturers by certifying the bonding process, or the shear strength of the glue line for these products, other design values such as bending and tension for proprietary grades are the responsibility of the manufacturer.

III. WWPA Quality Control Procedures

WWPA gradestamped structural-glued lumber is subjected to rigorous quality control and testing during production.

Test procedures are governed by *WWPA's Glued Products Procedures for Mill Certification & Quality Control C/QC 101*. These procedures comply with criteria established by the *ALSC's Glued Lumber Policy*. Under WWPA pro-

cedures, samples are regularly selected from normal production, including samples for certification and hourly samples, for continuous quality control.

All structural-glued lumber products are subjected to a durability-cycle or cyclic-delamination test. These tests are designed to simulate long-term, end-use conditions by subjecting the glued joints to changes in moisture content that cause wood to shrink or swell.

All structural-glued lumber products are also subjected to strength tests. Depending upon the product, specimens are tested under static-bending, tension or shear forces equal to or exceeding the published design values for solid-sawn lumber. Corrective actions are taken if any specimens fail strength or cyclic-delamination tests.

Full-size samples of finger-jointed (end-jointed) lumber stamped CERT EXT JNTS are tested in tension to verify joint strength. Tension testing applies a uniform stress across the joint so that joint strength will equal or exceed the published tensile-strength design values for the grade being produced.

Finger-jointed lumber stamped VERTICAL USE ONLY is subjected to bending tests. Because stud walls are often subjected to bending from short-term lateral forces such as wind, earthquakes and impact, tests are conducted to check the structural integrity of the glued joints under such conditions.

Following the durability-cycle test, specimens are subjected to fiber stress in bending forces to ensure joint strength equals or exceeds the published bending-strength design values for solid-sawn lumber of the same grade and species.

Both face- and edge-glued lumber are tested in shear to verify joint strength. Because glue lines are subjected to shear stresses in end-use applications, test specimens are selected and subjected to a durability cycle, then further tested to ensure the strength equals or exceeds the published horizontal-shear design value for the product.

WWPA's ongoing quality control program ensures the end user that

WWPA gradestamped glued products can be used interchangeably with solid-sawn lumber in full confidence.

WWPA: an Approved Quality Control Agency

Western Wood Products Association is approved by the American Lumber Standard Committee, Inc. to supervise solid-sawn, glued and machine stress-rated lumber production in accordance with the procedures of the U.S. Department of Commerce Voluntary Product Standard PS-20. WWPA also writes and publishes the *Western Lumber Grading Rules*, which are approved by the Board of Review of the ALSC according to the procedures of PS-20. WWPA's *Glued Products Procedures for Mill Certification & Quality Control C/QC 101* comply with the *ALSC Glued Lumber Policy*.

Only those products stamped with a WWPA grade mark, have been subjected to WWPA's rigorous quality control and inspection services.

IV. Acceptance by Model Building Codes

Structural-glued lumber is accepted by all model building codes:

■ 2000 International Building Code (published by the International Code Council) Section 2303.1.1:

"Approved end-jointed lumber is permitted to be used interchangeably with solid-sawn members of the same species and grade."

■ 2000 International Residential Code for One- and Two-Family Dwellings (published by the International Code Council) contains three separate references.

Floor Framing, Section R502.1.3:

"Approved end-jointed lumber identified by a grade mark conforming to Section R501.2 may be used interchangeably with solid-sawn members of the same species and grade."

Wall Framing, Section R602.1.1:

"Approved end-jointed lumber identified by a grade mark conforming to Section R602.1 may be used interchangeably with solid-sawn members of the same species and grade."

Roof Framing, Section R802.1.2:

"Approved end-jointed lumber identified by a grade mark conforming to Section R802.1 may be used interchangeably with solid-sawn members of the same species and grade."

■ 1997 Uniform Building Code (published by International Conference of Building Officials) Section 2304.2:

"Approved end-jointed lumber may be used interchangeably with solid-sawn members of the same species and grade."

■ 1999 Basic/National Building Code (published by Building Officials and Code Administrators International) Section 2303.3:

"Structural end-jointed or edge-glued lumber shall be permitted to be used interchangeably with solid-sawn members of the same species and grade when identified by a label indicating compliance with end-jointed or edge-glued grading rules."

■ 1997 Standard Building Code (published by Southern Building Code Congress International) Section 2301.6:

"End-jointed lumber may be used interchangeably with solid-sawn lumber of the same grade and species."

■ 1995 One and Two Family Dwelling Code (published by Council of American Building Officials—ICBO, BOCAI and SBCCI) Sections 502.1.3, 602.1, 802.1:

"Approved end-jointed lumber may be used interchangeably with solid-sawn members of the same species and grade."

Additional reference

■ Structural-glued lumber is also referenced in the 1997 *National Design Specification for Wood Construction (NDS)* published by the American Forest & Paper Association, Section 4.1.6:

“Design values for sawn lumber are applicable to structural end-jointed or edge-glued lumber of the same species and grade. Such use shall include, but not be limited to light framing, studs, joists, planks and decking. When finger jointed lumber is marked “STUD USE ONLY” or “VERT USE ONLY” such lumber shall be limited to use where any bending or tension stresses are of short duration.”

V. Specifying Structural-glued Lumber

Structural-glued finger-jointed (i.e. end-jointed) lumber is specified in the same manner as solid-sawn dimension lumber.

For example, when ordering structural-glued lumber, specify as **structural-glued** (or finger-jointed) **gradestamped** lumber, and list the required **grade, species, size(s)** and **seasoning** requirements. When applicable or necessary, specify Fb and E Base Values as well.

Structural-glued lumber specification example:

Floor joists shall be No.2, DF, 2x10 WWPA gradestamped Structural Finger-jointed Lumber, dried to the S-Dry standard (with a minimum Base Fb= 900 psi and minimum E= 1,600,000).

A specification should include all species suited to the job. This broadens availability and reduces costs. Consider all grades suitable

for the intended use, remembering that VERTICAL USE ONLY products are limited in size up to 6" in width and 12' in length. To maximize economy, specify the lowest grade suited to a job. Verify availability of species and grades with local suppliers.

A specification for structural face-glued products is similar; however, the grades are often proprietary and should be verified with the product's manufacturer.

For sources of WWPA grade-stamped glued lumber products, visit the Association's Lumber Buyers Guide online at www.wwpa.org.

Additional information and titles referenced in this publication are available for purchase from WWPA.

For a full description of technical publications available and a printable order form, go to the WWPA Internet site at www.wwpa.org.



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