


# How to Specify Engineered Wood Products



Presented by Robert Kuserk, PE

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## Webinar Attendee Survey



KB10

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<https://www.apawood.org/apawww-survey>

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## Who is APA – The Engineered Wood Association?

APA represents approximately 175 member mills in 23 states and seven provinces.


Quality Services Division




Field Services Division



Technical Services Division



Market Communications Division



- Voice of industry
- Mark of quality
- Technical support
- Free education
- Research
- Non-profit organization
- HQ in Tacoma, WA
- [www.apawood.org](http://www.apawood.org)

The leading resource for information about engineered wood products.

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**KB10** Insert your headshot here  
Karyn Beebe, 7/8/2022



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### What are Engineered Wood Products

**Engineered Wood**  
Any wood-based building material that has been improved physically by a man-made process.

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### What Are Engineered Wood Products?

**Panel Products**

- **WSP – Wood Structural Panels**
  - Plywood
  - OSB – Oriented Strand Board
- **Siding**
- **Specialty Panels**
  - Radiant Barrier
  - Formwork
  - Industrial Panels
  - Overlaid Panels
- APA OSB used as fire rated sheathing

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### What Are Engineered Wood Products?

#### Framing Products – Engineered Lumber Products

- I-Joists
- SCL – Structural Composite Lumber
  - LVL – Laminated Veneer Lumber
  - LSL – Laminated Strand Lumber
  - PSL – Parallel Strand Lumber
  - OSL – Oriented Strand Lumber
- Glulam – Glued Laminated Timber



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### What Are Engineered Wood Products?

#### Framing Product... or Panel Product

- CLT – Cross-Laminated Timber





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### Advantages of EWP

- ✓ Sustainable
- ✓ Predictable
- ✓ Performance
- ✓ Less Waste





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### Panel Products



Alternating Layer Direction  
Moisture-Resistant Adhesive  
Wet and Dry Structural Performance Tests  
Available in Exterior and Structural I Grade

**Plywood v. OSB**  
**Veneers v. Flakes**  
**Prescriptive Standard v. Performance Standard**



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### Manufacturing Standards



**PS 1: Voluntary Product Standard**  
**PRESCRIPTIVE** Standard (revised 2020)



**PS 2: Voluntary Product Standard**  
**PERFORMANCE** Standard (revised 2019)



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### Panel Products

**Siding and Specialty Panels**

- Siding
- Specialty Panels
  - Radiant Barrier
  - APA Plyform®
  - Industrial Panels
  - Overlaid Panels





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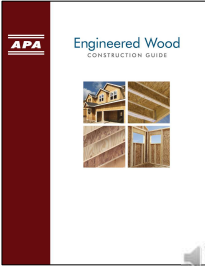
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### APA Specification Resources

#### APA Engineered Wood Construction Guide, Form E30

- Free PDF download
- Nominal cost for hard copy
- The single “go to” document for all engineered wood products
- [www.apawood.org](http://www.apawood.org)



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### Panel Specifications

- Refer to APA Engineered Wood Construction Guide, Form E30
- OSB
- Plywood
- Concrete Formwork
- Exposure 1 vs Exterior explained

#### Panel Specification Guide<sup>1</sup>

**CSF DIVISION 3—CONCRETE FORMWORK**

**A. Materials**

1. **Frame**—Formwork shall be specify appropriate grade(s):  
APA FORMWORK CLASS ETC.  
APA HIGH DENSITY OVERLAY CONCRETE FORMWORK CLASS I ETC. or  
APA MEDIUM DENSITY OVERLAY CONCRETE FORMWORK CLASS I ETC.  
Use approved fasteners sufficient to support concrete in temporary and use panels to securely brace and shore forms to prevent displacement and to safely support construction loads.

**CSF DIVISION 4—WOOD AND PLASTICS**

**A. General Provisions**

1. **Identification Requirements**—Each panel shall be identified with the appropriate trademark of APA, and shall meet the requirements of the latest edition of National Product Standard PS-1, Voluntary Product Standard PS-2 or ANSI/APA PRG-210.

2. **Materials** which have any edge or surface exposed long term to the weather shall be classed Exterior<sup>2,3</sup>.

3. **Panel Performance** Category grade and Group number or span rating shall be at least equal to that shown on the drawings.<sup>4</sup> Application shall be in accordance with recommendations of APA.<sup>5</sup>

**B. Roof Sheathing**

1. **Panel and sheathing** shall be specify appropriate grade(s):  
APA RATED SHEATHING EXP 1  
APA RATED SHEATHING EXT  
APA RATED SHEATHING/CEILING/DOCK EXP 1  
APA STRUCTURAL RATED SHEATHING EXP 1 or  
APA STRUCTURAL RATED SHEATHING EXT.  
Sheathing exposed long term to weather shall be classed Exterior<sup>2</sup>.

Install with the long dimension or strength axis of the panel across supports.  
Seal where panels meet and seal end connections and holes or penetrations. For gabled roofs, place seal surface or side with solid resistant coating up. If OSB panels are used, Water shed resistant always where panels meet and seal end and block holes of fasteners and seal all other penetrations. In areas where conditions are severe, use a separate sealant.

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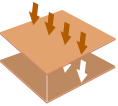
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### Span Rating



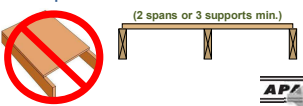
**APA**  
RATED SHEATHING  
24/16  
SIZED FOR SPACING  
EXPOSURE 1  
THICKNESS 3/4 IN.  
000  
PS-210 SHEATHING  
PRG-108 HUD-108-45  
THE CATEGORY

**Roof Span L/240**  
30 PSF live  
10 PSF dead

**Floor Span L/360**  
100 PSF live  
10 PSF dead

**Assumes**

- Strength axis perpendicular to supports
- Continuous across two or more spans



(2 spans or 3 supports min.)

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### Bond Classification

EXPOSURE 1

Exposure due to active construction

OR

EXTERIOR

Long term weather exposure

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APA

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### Bond Classification

**APA**

**RATED SHEATHING**

**24/16**

SIZED FOR SPACING

**EXPOSURE 1**

**THICKNESS 0.418 IN.**

**000**

PS 2-18 SHEATHING  
PRP-108 HUD-UM-40  
7/16 CATEGORY

OR

**APA**

**RATED SHEATHING**

**STRUCTURAL I**

**48/24**

SIZED FOR SPACING

**EXTERIOR**

**THICKNESS 0.703 IN.**

**000**

PS 1-19 C-C PRP-108  
23/32 CATEGORY

Bond Classification

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### Panel Specifications

2. FLOOR SHEATHING IS 3/4" TONGUE AND GROOVE C40 PLYWOOD (48/24 RATING) OR OSB, GLUED AND NAILED WITH 10d SCREWS 2-1/2" IN LENGTH AT 6" O.C. AT SUPPORTED EDGES, AND 10d SCREWS 3-1/2" IN LENGTH @ 6" O.C. @ INTERMEDIATE SUPPORTS. SHEATHING SHALL BE CONTINUOUS OVER TWO SPANS WITH FACE GRAIN PERPENDICULAR TO THE SUPPORTS.

3. WALL SHEATHING SHALL BE SHEAR WALL SCHEDULE FOR REQUIREMENTS OF SHEAR WALLS.

4. AT INTERIOR WALLS: PROVIDE GYPSUM WALLBOARD (SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS) EXTERIOR SIDE OF STUDOR, NAILED WITH 5d COOLER NAILS AT 7" O.C. (USE 6d COOLER NAILS FOR 5/8" WALLBOARD AT ALL SUPPORTS. PROVIDE SOLID 2x BLOCKING AT ALL SHEET EDGES. BLOCKING IS NOT REQUIRED AT NON-LOAD BEARING PARTITIONS).

5. AT EXTERIOR WALLS: SHEATH THE INTERIOR FACE OF WALLS WITH 5/8" GYPSUM WALLBOARD AS NOTED ABOVE FOR INTERIOR WALLS. SHEATH THE EXTERIOR FACE OF WALLS WITH 7/16" OSB PLYWOOD OR 7/16" O.S.B., NAILED WITH 6d RING SHANK NAILS AT 6" O.C. AT ALL EDGE SUPPORTS AND 6d RING SHANK NAILS AT 6" O.C. @ ALL INTERMEDIATE SUPPORTS. PROVIDE SOLID DOUBLE 2x BLOCKING AT ALL SHEET EDGES.

6. ROOF SHEATHING SHALL BE 13/32" C40 PLYWOOD OR OSB (48/24 RATING), NAILED PER ROOF SHEATHING FASTENING SCHEDULE. PROVIDE ONE PLYWOOD CLIP PER SPAN BETWEEN SHEET EDGES. PROVIDE SOLID 2x BLOCKING BETWEEN SUPPORTS AT ALL HIPS, RIDGES, VALLEYS, AND CHANGES IN ROOF SLOPE. PLYWOOD SHEATHING SHALL BE CONTINUOUS OVER TWO SPANS WITH FACE GRAIN PERPENDICULAR TO THE SUPPORTS. ALL ROOF SHEATHING SHALL BE RATED FOR EXPOSURE-1.

**FYI:**

- ✓ Instead of OSB or Plywood consider **"Wood Structural Panel"**
- ✓ Use the wording **"Panel Performance Category"** rather than exact panel thickness (for example 3/4")
- ✓ Just say **"NO"** to **"CDX"**. Instead use **"rated sheathing"**

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### APA Performance Panels

When specifying panels, designate: grade, span rating, bond classification, dimensions (thickness, width x length), edge, APA trademark.

**Out of Date Specifications**

- 1/2" CDX - C & D veneers, with exterior glue (when panels were made with interior & exterior glue)

**Previous Specifications**

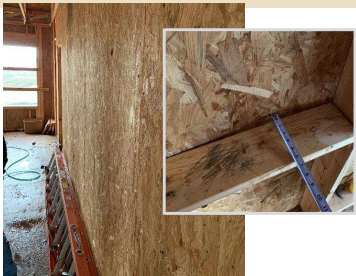
- 15/32" APA Rated Sheathing, 32/16, Exposure 1

**New Terminology** [www.apawood.org/apatrademark](http://www.apawood.org/apatrademark)

- 15/32 Performance Category, APA Rated Sheathing, 32/16, Exposure 1, nominal 4'x8' (either T&G for tongue and groove or square edge)

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### Panel Specifications



**Consider adding to specs.:**

- 1/8" gap all panel edges
- Fasteners 3/8" from panel edges
- Wet weather installation

**Refer to APA Publications:**  
X501 – Questions on Panel...Moisture...  
D481 – TN Minimizing Buckling of WSP

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### APA Stamp in the Field



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### Framing Products

- **I-Joists**
- **SCL – Structural Composite Lumber**
  - LVL – Laminated Veneer Lumber
  - LSL – Laminated Strand Lumber
  - OSL – Oriented Strand Lumber
  - PSL – Parallel Strand Lumber
- **Glulam – Glued Laminated Timber**



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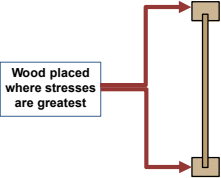
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### I-Joist Advantages

**Engineered design = More efficient**



- **46% less than lumber at 16" vs. I-joist at 19.2"**
- **36% less when both are at 16"**



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### I-Joist Specifications

- **Refer to:**
  - APA Form E30
  - APA PRI-400 (residential)
  - APA PRI-405 (commercial)
  - **Proprietary manufacturer published specifications**



**APA Performance Rated I-Joist Specification Guide**

The following is a guide for specifying APA Performance Rated I-Joists (PRI) to be used in residential floor applications. These structural products are available in net depths of 9 1/2", 11 7/8", 14" and 16 inches and can be used in single- or multiple-span floor construction. Exercise care in use of wood joists in other floor dry conditions, is not recommended.

**A. General**

1. I-Joists shall be furnished and installed as shown by the approved building plans and installation instructions.
2. The designation of APA PRI shall be based on the applicable loading, joist spacing and spans shown in the plans. When not indicated, use Tables 1 and 2. For non-uniform loading conditions requiring an engineering analysis, see Table 3 of APA Performance Rated I-Joists, Form E30, for PRI joist design properties. The specification for joists required for a specific floor application shall include joist depth, designation, length and number of pieces required.
- Example: 21 pieces - APA 9 1/2" PRI-405 30' long
3. All necessary products such as joist blocking, girders, rim boards, upch blocks, web stiffeners, etc., shall be provided and installed in accordance with the applicable installation details shown in APA Performance Rated I-Joists, Form E30.
4. APA multilaminated structural glued laminated timber (glulam) or approved structural composite lumber (SCL) shall be furnished for load bearing joist headers. The depth of these components shall be specified to match the joist depth when flush framing is required.

The connector shall use approved connector hardware (not lagged or specified in the plans). Such hardware shall be compatible with the width and depth of APA PRI, furnished, to provide flush nailing surfaces of adjoining members and to prevent rotation.

**B. Manufacture**

1. Materials, Manufacture and Quality Assurance - Product quality shall conform to the manufacturer's documented quality control system. All materials and components used in the manufacture of APA PRI shall conform to the APA PRI specification.

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### Rim Board


Typical Rim Board Trademarks

APA  
RIM BOARD  
EXPOSURE 1  
THICKNESS 3/4 IN

MILL 000  
PRO-401  
ANSI/APA PRG 410 C2  
1 IN CATEGORY

APA  
RIM BOARD  
EXPOSURE 1  
THICKNESS 1.091 IN

MILL 000  
PRO-401  
ANSI/APA PRG 410 B2  
1 IN CATEGORY



Various EW products used as a rim board and typical thickness:

- ❑ Glulam (typ. 3-1/2")
- ❑ LSL (typ. 1-1/8", 1-1/4", 1-1/2", 1-3/4", 3-1/2")
- ❑ LVL (typ. 1-1/4", 1-1/2", 1-3/4", 3-1/2")
- ❑ OSB (typ. 1", 1-1/8")
- ❑ OSL (typ. 1-1/4", 1-3/4")

Use 100% EWP in the floor system. Do not use a mix of sawn lumber with EWP because shrinkage and dimensional differences can be problematic.

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### Engineered Floor Systems

**Engineered design = Better systems**  
Flatter surfaces, stronger, quieter floors, fewer problems



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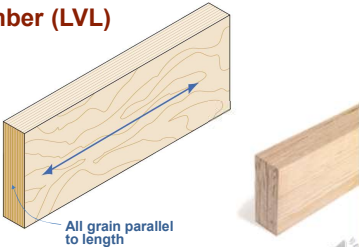
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### Structural Composite Lumber

**Laminated Veneer Lumber (LVL)**

- Common uses
  - Beams
  - Headers
  - Rafters
  - Scaffold planking



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### Structural Composite Lumber

#### Parallel Strand Lumber (PSL)

- Common uses: headers, beams, load-bearing columns
- Veneers clipped into long strands varying length 300 to 1 or 24" to 96" long
- Parallel strand placement
- Specs are published on a proprietary basis by the manufacturer and recognized in evaluation reports.



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### Structural Composite Lumber

#### Laminated Strand Lumber (LSL)

- Flaked strands length to thickness ratio about 150 to 1 or 12" long
- Common uses: rim boards, studs, columns and headers

#### Oriented Strand Lumber (OSL)

- Flaked strands length to thickness ratio about 75 to 1 or 6" long
- Common uses: studs



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### SCL Specifications

- Refer to:
  - APA Form E30
  - Proprietary manufacturer published specifications
- SCL Includes:
  - LVL
  - LSL
  - OSL
  - PSL



#### Structural Composite Lumber (SCL) Specification Guide

**A. General**

- SCL shall be furnished and installed as shown on the approved building plans and in accordance with the specifications of the SCL manufacturer.
- The contractor shall use approved hardware and connections as specified in the plans.

**B. Manufacture**

- Materials, Manufacture and Quality Assurance**—Product quality shall conform to the manufacturer's approved quality manual, with quality assurance inspection services provided by APA in accordance with building code requirements and the applicable APA Product Report or code evaluation report.
- Trademarks**—SCL shall be marked with the APA trademark, indicating conformance with the manufacturer's APA Product Report or code evaluation report.
- Job Site Shipment**—SCL shall be protected from direct exposure to weather prior to installation.
- Protection for Shipment**—Members shall be protected with a water-resistant covering for shipment.

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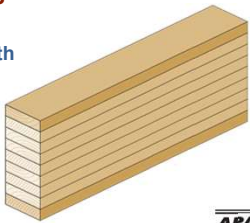
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### Glued Laminated Timbers (Glulam)

**Dimension lumber laminations**

- Wood laminations bonded together
- Wood grain runs parallel to the length
- May or may not be homogeneous
- Common uses: beams, headers and columns



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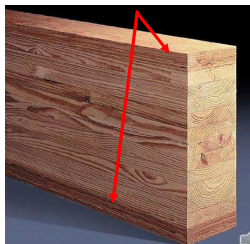
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### High Strength Glulam Beams

**LVL Hybrid Glulam with LVL Outer Laminations**

- Full length with no finger joints required
- LVL has greater tensile strength compared to lumber
- 30F-2.1E stress level achieved
- Direct substitute for many SCL products

LVL Laminations



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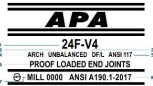
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### Glulam Specifications

**Refer to:**

- APA Engineered Wood Construction Guide, Form E30
- ANSI A190.1-2022: Product Standard for Structural Glued Laminated Timber



**Glulam Specification Guide**

The following is a guide for preparing specifications for structural glued laminated timber (timber) for building construction. It is intended to be used in conjunction with the APA Engineered Wood Construction Guide, Form E30.

**A. General**

1. Structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

2. The structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

3. The structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

4. The structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

5. The structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

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7. The structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

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9. The structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

10. The structural glued laminated timber shall be fabricated in accordance with the requirements of the APA Engineered Wood Construction Guide, Form E30.

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### Glulam Specifications


**Glulam Beam Combination Symbols**

1. Allowable Design Stress
2. Appearance Classification
3. Grading = Visual (V) or Mechanical (E)
4. Assigned combination number of lumber used to assign the design stresses
  - Shear, Modulus of Elasticity, etc.
5. Wood Species: Commonly DF or SP

**Common Beam Combinations:**

- 24F-V4/DF or 24F-V8/DF –  $F_{bx}$  = 2,400 psi, or Combination 2/DF –  $F_{bx}$  = 1,700 psi
- 24F-V3/SP or 24F-V5/SP –  $F_{bx}$  = 2,400 psi, or Combination 47/SP –  $F_{bx}$  = 1,400 psi
- High strength 30F-E1/SP or 30F-E2/SP –  $F_{bx}$  = 3,000 psi

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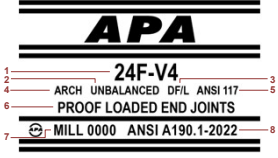
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### Glulam Specifications

**Glulam Trademark**



1. Combination symbol
2. Unbalanced layup
3. The species or species group of lumber used
4. Designation of appearance classification
5. Applicable design and manufacturing specification
6. Indicates the member has the required laminations proof loaded
7. Mill number
8. Identification of ANSI A190.1, *Standard for Wood Products – Structural Glued Laminated Timber*.

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### CLT

**Cross-Laminated Timber (CLT)**

- Applications: long span walls, floors, roof panels
- Typical Sizing: 2-10' wide, ≤ 60' lengths, ≤ 20" thicknesses
- Publications: 2018 IBC, 2018 NDS, ANSI/APA PRG 320



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### CLT Panels

**Cross-laminated timber (CLT) is a large-scale, prefabricated, solid engineered wood panel.**

- Lightweight & strong
- Excellent acoustic, fire, seismic and thermal performance
- Easy to install
- Little site waste
- Green product & Biophilia effect
- Alternative to concrete, masonry or steel



**TYPICAL CLT TRADEMARK**

1. Grade qualified in accordance with ANSI/APA PRG 320.	2. Product thickness.
3. APA mill number.	4. Referenced product standard.

1. V2 6 7/8"

2. MILL NO. ANSI/APA PRG 320-2017

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PHOTO COURTESY OF NORDIC STRUCT

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### CLT Specifications

- **Refer to:**
  - APA Form E30
  - ANSI/APA PRG 320 (basic CLT grades)
  - APA Product Reports (custom CLT grades)



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#### Cross-Laminated Timber (CLT) Specification Guide

**A. General**  
CLT shall be furnished and installed in accordance with the recommendations provided by the CLT manufacturer and the engineering drawing approved by the engineer of record. Permissible details shall be in accordance with the engineering drawing.

**B. Manufacture**

1. **Materials, Manufacture and Quality Assurance**—Product quality shall conform to ANSI/APA PRG 320, Standard for Performance-Rated Cross-Laminated Timber.
2. **Trademarks**—CLT products conforming to ANSI/APA PRG 320, Standard for Performance-Rated Cross-Laminated Timber, shall be marked with CLT grade, CLT thickness or identification, mill name or identification number, the APA logo and "ANSI/APA PRG 320." The top face of custom CLT panels with unbalanced layup used for roof or floor shall be marked with "TOP" stamp.
3. **Protection for Shipment**—Members shall be protected with a water-resistant covering for shipment.

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### Code Recognized

**Proprietary vs Non-Proprietary**

- Lab Tested
- ES Reports
- I-Joists
- Structural Composite Lumber (SCL)
- Lab Tested
- Code Design Values
- Plywood
- Oriented Strand Board
- Glulam
- Cross-Laminated Timber (CLT)



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### APA Product Reports

- Report indicates that product meets the intention of the listed codes when used as stated and within the specified limitations.
- Design properties are included.
- Available for download at [www.apawood.org](http://www.apawood.org)



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### Engineered Wood: A Green Choice

[www.apawood.org/green-verification-reports](http://www.apawood.org/green-verification-reports)



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### [www.apawood.org/newsletters](http://www.apawood.org/newsletters)

- Go to [www.apawood.org/newsletters](http://www.apawood.org/newsletters)
- Register with APA
- Follow instructions for newsletter sign up
- Registering gives you access to APA publications, webinars and newsletters



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### Field Services Division Territories

Robert Kuserk, PE  
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### Thank you!

www.apawood.org  
www.apawood.org/help

www.woodworks.org  
www.woodworks.org/project-assistance

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