



APA

How to Specify Engineered Wood Products




Presented by Larry Oenning, P.E.

Webinar Attendee Survey



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

APA


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

APA Panel Trademark



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

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The leading resource for information about engineered wood products.

APA




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

- I-Joists
- SCL – Structural Composite Lumber
 - PSL – Parallel Strand Lumber
 - LVL – Laminated Veneer Lumber
 - LSL – Laminated 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)




Panel Products

Siding and Specialty Panels

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





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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

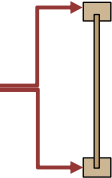


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I-Joist Advantages


Engineered design = More efficient

Wood placed where stresses are greatest




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

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Rim Board


TYPICAL RIM BOARD TRADEMARKS



RIM BOARD
EXPOSURE 1
THICKNESS 3/8 IN




RIM BOARD
EXPOSURE 1
THICKNESS 1/2 IN



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")

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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



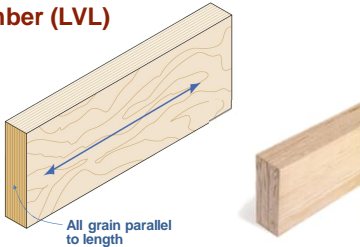
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Structural Composite Lumber

Laminated Veneer Lumber (LVL)

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



All grain parallel to length

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Structural Composite Lumber

Laminated Strand Lumber (LSL)

- Flaked strand length-to-thickness ratio is around 150
- Common uses: rim board, studs, stair stringer and headers

Oriented Strand Lumber (OSL)

- Flaked strand length-to-thickness ratio is around 75
- Common uses: studs and stair stringer



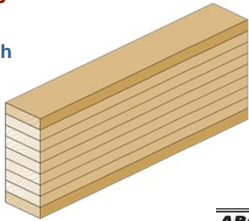
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Glued Laminated Timbers (Glulam)

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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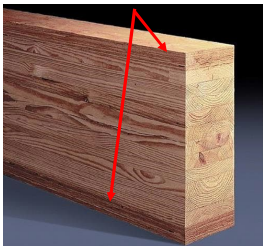


High Strength Glulam Beams

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

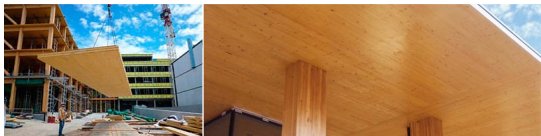


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CLT

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

APA

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"

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PHOTO COURTESY OF HECG STRUCTURES

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)

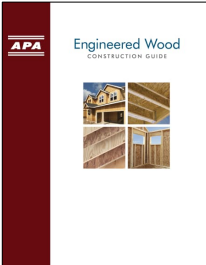


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APA Specification Resources

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



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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 Guide¹

C30[®] DIVISION 3—CONCRETE FORMWORK

A. Materials

1. **Forme**—Formwork materials shall be specify appropriate grade:¹

- APA FORMWORK CLASS EXT.
- APA HIGH DENSITY OVERLAY CONCRETE FORMWORK CLASS EXT. or
- APA HIGH DENSITY OVERLAY CONCRETE FORMWORK CLASS EXT.

(Use different thicknesses sufficient to support concrete at temperature and rate specified; securely brace and shore forms to prevent displacement and to safely support construction loads.)

C30[®] 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 Voluntary Product Standard (VPS), Voluntary Product Standard (VPS) or Voluntary Product Standard (VPS).

2. All panels which have any edge or surface exposed long term to the weather shall be classed Exterior.^{1,2}

3. Panel Performance Category, grade and Group number or span rating shall be at least equal to that shown on the drawings. Exceptions shall be in accordance with recommendations of APA.

B. Roof Sheathing

1. **Panel and Sheathing** shall be specify appropriate grade:¹

- APA RATED SHEATHING EXP 1
- APA RATED SHEATHING EXT
- APA RATED SHEATHING EXT (DECK EXP 1)
- APA STRUCTURAL RATED SHEATHING EXP 1, or
- APA STRUCTURAL RATED SHEATHING EXT

APA STRUCTURAL RATED SHEATHING EXT

Sheathing exposed long term to weather shall be classed Exterior.¹

Install with the long dimension or strength axis of the panel across supports, except where noted, and with end conditions over two or more spans. For gabled roofs, where exposed surface or side with end resistant coating is, FOSB panels are used. When end resistant shows when installing end conditions and faces end face of FOSB panels and end face of end conditions, the end conditions.

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Panel Specifications

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"

7. 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 2-1/2" IN LENGTH @ 6" O.C. @ JOISTS. FLOOR SHEATHING SHALL BE CONTINUOUS OVER TWO SPANS WITH FACE GRAIN PERPENDICULAR TO THE SUPPORTS.

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

8.1 AT INTERIOR WALLS, PROVIDE 3/4" GYPSUM WALLBOARD (SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS EXCEPT SIDE OF STUDS). NAILED WITH 5d COOLER NAILS AT 7" O.C. @ 5d COOLER NAILS FOR 5/8" WALLBOARD AT ALL SUPPORTS. PROVIDE SOLID 2x4 BRACING AT ALL SHEET JOISTS. BRACING IS NOT REQUIRED BETWEEN JOISTS OR BEARING PARTITIONS.

8.2 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" CDX PLYWOOD (OR 7/16" OSB), NAILED WITH 16d RING SHANK NAILS AT 6" O.C. AT ALL EDGE SUPPORTS AND 16d RING SHANK NAILS AT 6" O.C. @ ALL INTERMEDIATE SUPPORTS. PROVIDE SOLID DOUBLE 2x4 BRACING AT ALL SHEET EDGES.

8.3 ROOF SHEATHING SHALL BE 13/32" C40 PLYWOOD OR OSB (48/24 RATING), NAILED PER ROOF SHEATHING FASTENING SCHEDULE. PROVIDE ONE PLYWOOD OR OSB SHEET PER SPAN BETWEEN SHEET EDGES. PROVIDE SOLID 2x4 BRACING 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

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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

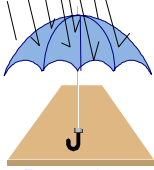
New Terminology www.apawood.org/apa-trademark

- 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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Bond Classification

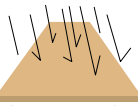
EXPOSURE 1



Exposure due to active construction


OR

EXTERIOR




Long term weather exposure


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Bond Classification


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



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



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



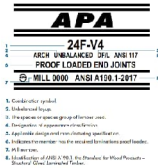
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APA Stamp in the Field



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 guide is intended to provide a general overview of the glulam specification and to provide a general overview of the glulam specification and to provide a general overview of the glulam specification.

1. General

1.1. The glulam specification is intended to provide a general overview of the glulam specification and to provide a general overview of the glulam specification.

2. Materials

2.1. The glulam specification is intended to provide a general overview of the glulam specification and to provide a general overview of the glulam specification.

3. Design

3.1. The glulam specification is intended to provide a general overview of the glulam specification and to provide a general overview of the glulam specification.

4. Construction

4.1. The glulam specification is intended to provide a general overview of the glulam specification and to provide a general overview of the glulam specification.

5. Inspection

5.1. The glulam specification is intended to provide a general overview of the glulam specification and to provide a general overview of the glulam specification.

6. Maintenance

6.1. The glulam specification is intended to provide a general overview of the glulam specification and to provide a general overview of the glulam specification.

Glulam Specifications

- Glulam Beam Combination Symbols**
- Allowable Design Stress
 - Appearance Classification
 - Grading = Visual (V) or Mechanical (E)
 - Assigned combination number of lumber used to assign the design stresses
 - Shear, Modulus of Elasticity, etc.
 - 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



Glulam Specifications

Glulam Trademark

1

2

3

4

5

6

7

8

APA

24F-V4

ARCH UNBALANCED DFIL ANSI 117

PROOF LOADED END JOINTS

MILL 0000 ANSI A190.1-2022

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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SCL Specifications

Refer to:

APA Form E30

Proprietary manufacturer published specifications

SCL Includes:

LVL

LSL

OSL

PSL

APA

3100F-2.0E

APA PR-XXXX C2NG XXXX-H

ICC ESR-XXXX AETM 1545E

1. Structural SCL grade (see table for manufacturing designations)

2. APA mill number

3. Finish, construction, marks

4. Product specification for SCL

Structural Composite Lumber (SCL) Specification Guide

A. General

1. SCL shall be furnished and installed as shown on the approved building plans and in accordance with the specifications of the SCL manufacturer.

2. The contractor shall use approved hardware and connectors as specified in the plans.

B. Manufacture

1. 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.

2. Trademark—SCL shall be marked with the APA trademark, indicating conformance with the manufacturer's APA Product Report or code evaluation report.

3. Job Site Shipment—SCL shall be protected from direct exposure to weather prior to installation.

4. Protection for Shipment—Members shall be protected with a water-resistant covering for shipment.

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

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, joint spacing and spans shown in the plans. PRI may be selected using Tables 1 and 12. For non-uniform loading conditions requiring an engineering analysis, see Table 8 of APA Performance Rated I-Joists, Form 2722, for PRI joint design properties. The specification for joists required for a specific floor application shall include joint depth, designation, length and number of joists required.

Example: 21 joists—APA 5-12 PRI-405 X20 feet long.

2. All joisting products used with joist blocking products, rim boards, spacers, blocks, web stiffeners, etc., shall be provided and installed in accordance with the applicable installation details shown in APA Performance Rated I-Joists, Form 2722.

4. APA manufactured structural glued laminated timber (glulam) or approved structural composite lumber (SCL) shall be furnished for load bearing and headers. The depth of these components shall be specified to match the I-joist depth when flush framing is required.

The contractor shall use approved connector hardware (not lagged or spiked) as specified in the plans. Such hardware shall be compatible with the width and depth of APA PRI, furnished to provide flush nailing surfaces on existing members and to provide ridges.

B. Manufacture

1. Materials, Manufacture and Quality Assurance—Product quality shall conform to the manufacturer's approved quality manual or code evaluation report and shall be in accordance with the APA Performance Rated I-Joist Specification Guide.

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3. **Protection for Shipment**—Members shall be protected with a water-resistant covering for shipment.

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APA UPDATE

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APA Update e-Newsletter
The APA Update e-Newsletter highlights new and updated resources from APA. Distributed monthly to those who request it when registering for access to APA publications.

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FOR BUILDING PROFESSIONALS

APA Designers Circle e-Newsletter
The Designers Circle e-Newsletter for architects, engineers and building design professionals features the latest information about commercial wood-frame construction engineering and design. Distributed quarterly. It includes case studies, feature articles, accounting events and more.

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Field Services Division Territories

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