Committee Poll 2025-C1 for ANSI 117-202x (Revision to ANSI 117-2020)

Notations: ~~Deletion~~ and Addition / Addition

Item#01:
Rationale for the changes: Editorial

Ballot:
Page ii
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New York, NY 10036

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Item#02:
Rationale for the changes: References updating

Ballot:
2 REFERENCED DOCUMENTS
This standard incorporates dated references. Subsequent amendments or revisions to these references apply to this standard only when incorporated into this standard by amendments or revisions.

2.1 U.S. Standards

ANSI A190.1-~~2017~~ 2022 ~~American National Standard for Wood Products–~~Product Standard for Structural Glued Laminated Timber

ANSI O5.2-~~2012~~ 2020 ~~American National Standard for Wood Products–~~Structural Glued Laminated Timber for Utility Structures

ANSI/AWC NDS-~~2018~~ 2024 National Design Specification for Wood Construction

ASTM D143-~~14~~ 23 Standard Test Methods for Small Clear Specimens of Timber

ASTM D2395-17(2022) Standard Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials

ASTM D2915-17(2022) Standard Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products

ASTM D3737-~~18e1~~ 18(2023)e1 Standard Practice for Establishing Allowable Properties for Structural Glued Laminated Timber (Glulam)

ASTM D4442-~~16~~ 20 Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials

ASTM D4444-13(2018) Standard Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters

ASTM D4761-19 Standard Test Methods for Mechanical Properties of Lumber and Wood-Based Structural Materials

ASTM D7341-14 21 Standard Practice for Establishing Characteristic Values for Flexural Properties of Structural Glued Laminated Timber by Full-Scale Testing

ASTM D7438-13 20 Standard Practice for Field Calibration and Application of Hand-Held Moisture Meters

ASTM D7469-16 23 Standard Test Methods for End-Joints in Structural Wood Products

2.2 References

AITC Timber Construction Manual, 2012

AITC Test Methods for Structural Glued Laminated Timber, 2007

AITC/WCLIB PLIB -200 Manufacturing Quality Control Systems Manual, 20092024

APA Quality Assurance Policy for Structural Glued Laminated Timber, 20152023

National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber, 20172022

Redwood Inspection Service (RIS) Standard Specifications for Grades of California Redwood Lumber, 2019

Northeastern Lumber Manufacturers Association (NELMA) Standard Grading Rules for Northeastern Lumber, 20172024

Southern Pine Inspection Bureau (SPIB) Southern Pine Inspection Bureau Grading Rules, 20142021

West CoastPacific Lumber Inspection Bureau (PLIB) Standard No. 17 18 Grading Rules for West Coast Lumber, 20182024

Western Wood Products Association (WWPA) Western Lumber Grading Rules, 201720215

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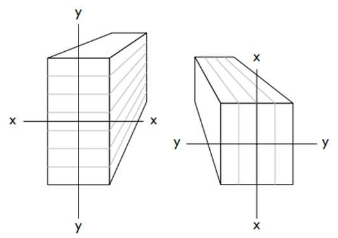
Item#03:
Rationale for the changes: Clarify the positive and negative allowable bending stress

Ballot:
4.2 Bending Design Values, F_{bx}^{+}, F_{bx}^{-}, F_{by}
Tabulated design values are provided for positive bending of horizontally laminated timbers (F_{bx}^{+}), and negative bending of horizontally laminated timbers (F_{bx}^{-}) when the laminated members are loaded in bending about the x-x axis (see Figure 4.1-1)., Positive bending causes tensile stresses at the bottom of a beam. Negative bending causes compressive stresses at the bottom of a beam. and Tabulated design values are also provided when the laminated members are loaded in bending about the y-y axis bending of vertically laminated members (F_{by}). Horizontally laminated members have bending loads applied perpendicular to the wide faces of the laminations. Vertically laminated members have bending loads applied parallel to the wide faces of the laminations. Positive bending causes tensile stresses at the bottom of a beam. Negative bending causes compressive stresses at the bottom of a beam.

Figure 4.1-1 is referenced below for convenience.

FIGURE 4.1-1

AXIS ORIENTATIONS



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Item#04:

Rationale for the changes: Clarification and adding a new note to calculate the ~~bending~~ beam stability factor

Ballot:

4.5 Modulus of Elasticity Design Values, $E_{x\ true}$, $E_{x\ app}$, $E_{x\ min}$, $E_{y\ true}$, $E_{y\ app}$, $E_{y\ min}$, E_{axial} and $E_{axial\ min}$

Design values for modulus of elasticity (E) are tabulated for bending about ~~either axis (x-x or y-y~~ x-x (E_x) and y-y (E_y) axes~~, as shown in~~ (see Figure 4.1-1). In general, the apparent moduli of elasticity, $E_{x\ app}$ and $E_{y\ app}$, are used for calculation of deflection of bending members, and $E_{x\ min}$ and $E_{y\ min}$ are used for stability calculations for columns and beams. $E_{x\ app}$ and $E_{y\ app}$ are based on a ~~span to depth~~ span-to-depth ratio of 21, including an adjustment for shear deflection. These values can be used for most designs without considering shear deflections explicitly. For span-to-depth ratios of less than 14, deflections due to shear stresses should be considered. ASTM D2915 presents one method of accounting for shear deflections.

….. (no change)

For the calculation of extensional deformations, the axial modulus of elasticity for mixed grade layup combinations provided in Tables A1 and A1-Expanded can be estimated as E_{axial} = 1.05 $E_{y\ app}$ = $E_{y\ true}$, such as for use in calculating deflection of trusses. The bending modulus of elasticity for uniform grade layup combinations provided in Table A2 can be estimated as $E_{x\ true}$ = $E_{y\ true}$ = E_{axial}, and $E_{x\ app}$ = $E_{y\ app}$ = 0.95 E_{axial}.

$E_{x\ min}$, $E_{y\ min}$, and $E_{axial\ min}$ are calculated using the following formula:

$$E_{min} = \frac{E_{app}[1 - 1.645(CoV_E)][1.05]}{1.66} = \frac{E_{app}[1 - 1.645(0.10)][1.05]}{1.66} = 0.528\,E_{app}$$

where:

E_{min} = $E_{x\ min}$, $E_{y\ min}$, or $E_{axial\ min}$ as appropriate

E_{app} = $E_{x\ app}$, $E_{y\ app}$, or 0.95 E_{axial} as appropriate

CoV_E = coefficient of variation for modulus of elasticity

NOTE 5: $E_{y\ min}$ should be used to calculate the ~~bending~~beam stability factor for members subject to loads perpendicular to wide faces of laminations (i.e., x-x bending) and $E_{x\ min}$ should be used to calculate the ~~bending~~ beam stability factor for members subject to loads parallel to wide faces of laminations (i.e., y-y bending).

Renumber the rest of the notes in the Standard.

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Item#05

Rationale for the changes: Clarification

Ballot:

6.2.1 Design Values by Analysis Only

For combinations developed by analysis only, the design values shall be established according to ASTM D3737. In addition, for ~~horizontally~~ laminated beams loaded in bending about the x-x axis (see Figure 4.1-1), the maximum outer fiber bending stress calculated according to transformed section analysis shall not exceed the nominal bending stress by more than 10% unless the end joints are qualified and maintained at a higher qualification stress level (QSL).

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Item#06:

Rationale for the changes: Update the F_{bx}^{-}, value for Southern pine glulam in Footnote (b) of Table A1 based on the listed southern pine layups in the specific stress class of 24F-1.8E. Clarify the calculation of the ~~bending~~ beam stability factor (Table A1). Editorially change Tables A2 and A3. Clarify Footnote (a) of Table A3 for the design values used in taper-cut beams.

Ballot:

Table A1

Footnote b. Negative bending stress, F_{bx}^{-}, is permitted to be increased to ~~1,950~~ 2,000 psi for southern pine for specific combinations. Designer shall specify when these increased stresses are required.

Tables A1 and A1-Expanded (Add a new footnote for $E_{x\ min}$ and $E_{y\ min}$)

$E_{y\ min}$ shall be used in calculations addressing column and lateral torsional buckling about the x-x axes. $E_{x\ min}$ shall be used in calculations addressing column and lateral torsional buckling about the y-y axes.

Table A2 (Editorially correct the typesetting error on the comma between $E_{x\ min}$, $E_{y\ min}$ or E_{axial})

$E_{x\ true}$, $E_{y\ true}$ or E_{axial} (10^6 psi)	$E_{x\ app}$ or $E_{y\ app}$ (10^6 psi)	$E_{x\ min}$, $E_{y\ min}$ or $E_{axial\ min}$ (10^6 psi)

Table A3 (Editorial)

Delete 24F-E4/DF and 24F-E1/SP

Table A3 (Editorial edit the table header)

REFERENCE DESIGN VALUES FOR STRUCTURAL GLUED LAMINATED SOFTWOOD TIMBER COMBINATIONS WITH TAPER CUTS (FIGURE ~~3.6-1~~ 5.6-1) ON THE COMPRESSION FACE[a,b]

Table A3 (Revise Footnote (a))
a. Design values are applicable to beams that have up to 2/3 of the depth on the compression side removed by taper cutting. and shall replace the corresponding design values in Table A1 or A1-Expanded for all such tapered beams. For members manufactured with taper cuts in the glulam plant with compression lamination grade requirements maintained, the design values published in Table A1 or A1-Expanded shall apply.

Table B1 (Editorial correction)
Delete 24F-E4/DF and 24F-E1/SP
24F-E11 HF (UnbalancedBalanced)
2426F-V3/SP (Unbalanced)

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Item#07:
Rationale for the changes: Clarify the current specific gravity in C4.1 as the minimum SG for dense laminae and add the SG for medium laminae based on the 0.03 difference specified in ASTM D3737. Since close-grain laminae are applicable only to DF-L, the minimum SG for close-grain laminae is added as a footnote to the table.

Ballot:
C4.1.4 Specific Gravity of Species
Density or growth rate shall be permitted to be determined by weight using the method described in Section C7. When weight is used to establish growth rate, grades requiring dense, close, and medium rate of growth shall have a minimum specific gravity above the near average specific gravity for the species as shown in the table below.

Species	Near AverageMinimum SG at 12% MC	
	Dense	Medium
AC	0.42	0.39
DF-L[a]	0.46	0.43
DF-S	0.46	0.43
HF	0.39	0.36
SP	0.49	0.46
SPF	0.35	0.31
SW	0.32	0.28

(a) The minimum SG at 12% MC shall be 0.44 for the close-grain DF-L.

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Item#08:
Rationale for the changes: Editorially update the unit conversion for consistency

Ballot:
C4.5 Species Specific Requirements—Softwoods
Reference herein to these species (SW) shall apply to any of the softwood species grown in the United States and Canada having an assigned modulus of elasticity (E) of 1,000,000 psi (6,890 MPa6.895 GPa) or more and design values in shear of 135 psi (0.93 MPa) or more for No. 3 structural joists and planks grade based on 19% moisture content.

C6.8.2 E-Rated Hem Fir

Grade	Test Value 5th Percentile, psi
302-24	4,000
302-22	3,670
302-20	3,340

For SI: 1 psi = ~~6,890~~6,895 Pa

C6.9.8.1 Tensile Strength Qualification

For qualification for a tension lamination grade, the 5th percentile tensile strength estimated with 75% confidence shall equal or exceed the values calculated as follows:

Grade	Test Value 5th Percentile, psi
302-24	4,000
302-22	3,670
302-20	3,340

For SI: 1 psi = ~~6,890~~6,895 Pa

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Item#09:

Rationale for the changes: Clarify that the intent of C4.6 is to limit the Southern pine grown in the United States only. This is consistent with the SPIB grading rules.

Ballot:

C4.6 Species Specific Requirements—Southern Pine

Reference herein to “southern pine” shall apply to the four major species of southern pines: Loblolly, Longleaf, Shortleaf and Slash grown in the United States, as defined in the *Southern Pine Inspection Bureau Grading Rules* of the Southern Pine Inspection Bureau (SPIB).

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Item#10:

Rationale for the changes: Editorially change the format of Eq C5.3.2.1. The definition for S_t contains a typo based on the previous versions of ANSI 117/AITC 117. A mathematical equation is added to C5.3.2.2 based on ASTM D3737 and the tabulated LSE_{05} values are updated based on the calculated results from the equation with consistent rounding.

Ballot:

C5.3.2 E Specifications for E-rated Lumber for Qualification

C5.3.2.1 Mean Long-Span E

If the sample size is less than 125, the mean long-span E of the lumber shall equal or exceed the specified grade mean MOE. Alternatively, if the sample size equals or exceeds 40, the mean long-span E of the sample, E_t, shall meet the following criteria:

~~$E_t \geq E_s - 1.303\ (S_t / \sqrt{n_t})$~~

$$E_t \geq E_s - 1.303\ \frac{S_t}{\sqrt{n_t}}$$

where:

S_t = the estimated population standard deviation (psi or MPa)
S_t = ~~(E_t - E_{st}) / 0.684~~ $\frac{E_t - E_{st}}{1.684}$ (psi or MPa)
n_t = sample size (≥ 40)
E_t = mean long-span E of the sample (psi or MPa)
E_s = grade long-span E (psi or MPa)
E_{st} = 5th percentile long-span E calculated from the test data (psi or MPa)

C5.3.2.2 MOE Distribution
The distribution of MOE values within an E-rated lumber grade shall be such that the 5th percentile value shall be equal to or greater than the grade 5th percentile values as shown in the table below or as calculated using the following equation.

$$LSE_{05} = 0.955\, LSE_{mean} - K_1$$

where:
LSE_{05} = 5th percentile long-span E (10^6 psi or GPa),
LSE_{mean} = average long-span E (10^6 psi or GPa), and
K_1 = 0.233 when LSE_{05} and LSE_{mean} are in 10^6 psi or K_1 = 1.607 when LSE_{05} and LSE_{mean} are in GPa

Long-Span E Specifications		
Grade	~~Mean~~ LSE_{mean} (10^6 psi)	~~5th Percentile~~ LSE_{05} (10^6 psi)
2.6E LAM	2.6	~~2.26~~2.25
2.5E LAM	2.5	~~2.16~~2.15
2.4E LAM	2.4	2.06
2.3E LAM	2.3	1.96
2.2E LAM	2.2	~~1.86~~1.87
2.1E LAM	2.1	1.77
2.0E LAM	2.0	~~1.67~~1.68
1.9E LAM	1.9	1.58
1.8E LAM	1.8	~~1.48~~1.49
1.7E LAM	1.7	1.39
1.6E LAM	1.6	~~1.30~~1.29
1.5E LAM	1.5	~~1.21~~1.20

For SI: 10^6 psi = ~~6,890 MPa~~6.895 GPa

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Item#11:
Rationale for the changes: Editorially revise C6.3.2.1 and call it "Alternate 1" and C6.3.2.2 and call it "Alternate 2", and retain all existing provisions.

Ballot:
C6.3 302-22
C6.3.1 Primary Rules (All Species)
C6.3.2 Alternate Rules
C6.3.2.1 Douglas-Fir-Larch Alternate 1
Retain all existing provisions.
C6.3.2.2 Douglas-Fir-Larch Alternate 2
Retain all existing provisions.

C6.3.2.3 E-rated
Retain all existing provisions.

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Item#12:
Rationale for the changes: Editorially correct the referenced sections in C6.9.4

Ballot:
C6.9.4 Quality Control
The quality control requirements of this alternate tension lamination material are the responsibility of the lumber producer under the supervision of a grading agency accredited by the American Lumber Standards Committee. Records for the respective quality control responsibilities shall be maintained at the facility where carried out and shall be available for periodic review by the lumber grading agency and the accredited third-party inspection agency of the laminator.

If the lumber is supplied to the laminator as meeting the requirements of Sections ~~C2, C6.7.1 and C6.7.2~~ C3, C6.9.1, and C6.9.2, all mechanical and visual inspection and quality control requirements shall be the responsibility of the machine grading facility. If lumber is supplied to the laminator as meeting only the mechanical and visual stress grading criteria of Section ~~C6.7.1~~ C6.9.1, those inspection and quality control requirements shall be the responsibility of the machine grading facility; however, the laminator shall be responsible for the additional visual grading required to meet the laminating criteria of this standard.

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Item#13:
Rationale for the changes: Add AITC Test T119 along with ASTM D7469 . AITC T119 has been used by the glulam industry for years and it is practically the same as ASTM D7469.

Ballot:

C6.9.8.2 End Joint Qualification
Manufacturers using tension laminations qualified under this alternative provision shall qualify the end joints by following procedures in ASTM D7469 or AITC Test T119 by testing 30 end joints in tension made from representative lumber from the machine-grading system.

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Item#14:
Rationale for the changes: In response to a change proposal to add Eastern Hemlock to “Softwood Species” (SW) in Table 3.2 of ANSI 117, a group of committee members familiar with the history of the standard reviewed the change proposal and recognized that Table 3.2 is closely related to both Section C4.5, which defined SW requirements in the standard, and Footnote (e) of Table A2, which has some specific requirements for MOE and Fv. To address the discrepancy between Table 3.2, C4.5, and Footnote (e) of Table A2, the revisions included in this ballot item are submitted with the following justification.

1) It is believed that C4.5 broadly defines “SW” and Table 3.2 is not inclusive of all SW species. Therefore, Table 3.2 should reference C4.5 to avoid discrepancies.

2) Eastern Hemlock dimension lumber (2x) by itself alone does not have design values published by the lumber grading agencies or NDS, i.e., Eastern Hemlock has published design values for timber only (5” x 5” or greater), but not dimension lumber (2x). On the other hand, Eastern Hemlock-Tamarack and Eastern Hemlock-Balsam Fir have published design values for dimension lumber (2x). Therefore, Footnote (e) of Table A2 should list Eastern Hemlock-Tamarack and Eastern Hemlock-Balsam Fir. Similarly, Western Cedars (North) should be removed from Footnote (e) because it does not have published dimension lumber design values (it has timber design values only). In addition, Coast Species and Western White Pine should be removed from Footnote (e) because of the low F_v that is below the C4.5 requirements.

3) To ensure Footnote (e) of Table A2 and C4.5 are consistent, exceptions are added to C4.5 to recognize (“grandfather”) those species that have slightly lower mechanical properties than the C4.5 requirements but have been published in Footnote (e) of Table A2 for so many years.

Ballot:

3.2 Species

Structural glued laminated timber can be manufactured from any suitable wood species. Wood species with similar properties are grouped for convenience. Design properties and layup information are included in this Specification for structural glued laminated timbers of the following species groups:

Species Group	Symbol	Species that may be included in the group
Alaska Cedar	AC	Alaska Cedar
Douglas-Fir-Larch	DF	Douglas-Fir, Western Larch
Eastern Spruce	ES	Black Spruce, Red Spruce, White Spruce
Hem-Fir	HF	California Red Fir, Grand Fir, Noble Fir, Pacific Silver Fir, Western Hemlock, White Fir
Port Orford Cedar	POC	Port Orford Cedar
Softwood Species	SW	~~Alpine Fir, Balsam Fir, Black Spruce, Douglas Fir, Douglas Fir South, Engelmann Spruce, Idaho White Pine, Jack Pine, Lodgepole Pine, Mountain Hemlock, Norway (Red) Pine, Norway Spruce (N)[b], Ponderosa Pine, Sitka Spruce, Sugar Pine, Red Spruce, Western Larch, Western Red Cedar, White Spruce~~ See C4.5
Southern Pine	SP	Loblolly Pine, Longleaf Pine, Shortleaf Pine, Slash Pine
Spruce-Pine-Fir[a]	SPF	Alpine Fir, Balsam Fir, Black Spruce, Engelmann Spruce, Jack Pine, Lodgepole Pine, Norway (Red) Pine, Norway Spruce~~[c]~~[b], Red Spruce, Sitka Spruce, White Spruce

(a) Including Spruce-Pine-Fir and Spruce-Pine-Fir (South).

~~(b) Norway Spruce (N) grown in Canada.~~

~~(c)~~(b) Norway Spruce grown in the U.S., as part of Spruce-Pine-Fir (South).

Footnote (e) to Table A2

e. When Eastern Hemlock-Tamarack, Eastern Hemlock-Balsam Fir, Eastern White Pine, Redwood, Western Cedars, Western Cedars (North), and Western Woods, and Redwood are used in combinations for Softwood Species (SW), the design value for modulus of elasticity shall be reduced by 100,000 psi. When Coast Sitka Spruce, Coast Species, Western White Pine, and Eastern White Pine are is used in combinations for Softwood Species (SW) tabulated design values for shear parallel to grain, F_{vx} and F_{vy}, shall be reduced by 10 psi, before applying any other adjustments.

C4.5 Species Specific Requirements—Softwoods

Reference herein to these species (SW) shall apply to any of the softwood species grown in the United States and Canada having an assigned modulus of elasticity (E) of 1,000,000 psi (6,890 MPa) or more and design values in shear of 135 psi (0.93 MPa) or more for No. 3 structural joists and planks grade based on 19% moisture content and included in the grading rules listed below.

Exception: Eastern Hemlock-Tamarack, Eastern Hemlock-Balsam Fir, Eastern White Pine, Redwood, Western Cedars, and Western Woods, and Redwood are permitted to be used provided that the tabulated design value for modulus of elasticity is reduced by 100,000 psi. Coast Sitka Spruce and Eastern White Pine are is permitted to be used provided that the tabulated design values for shear are reduced by 10 psi.

The Softwood Species are those listed in Standard Grading Rules for Western Lumber of the Western Wood Products Association, the Standard Grading Rules for West Coast Lumber of the West Coast Pacific Lumber Inspection Bureau, Standard Specifications for Grades of California Redwood Lumber of the Redwood Inspection Service, Standard Grading Rules for Northeastern Lumber of the Northeastern Lumber Manufacturers Association or the Standard Grading Rules for Canadian Lumber of the National Lumber Grades Authority in Canada.

#End of Ballot