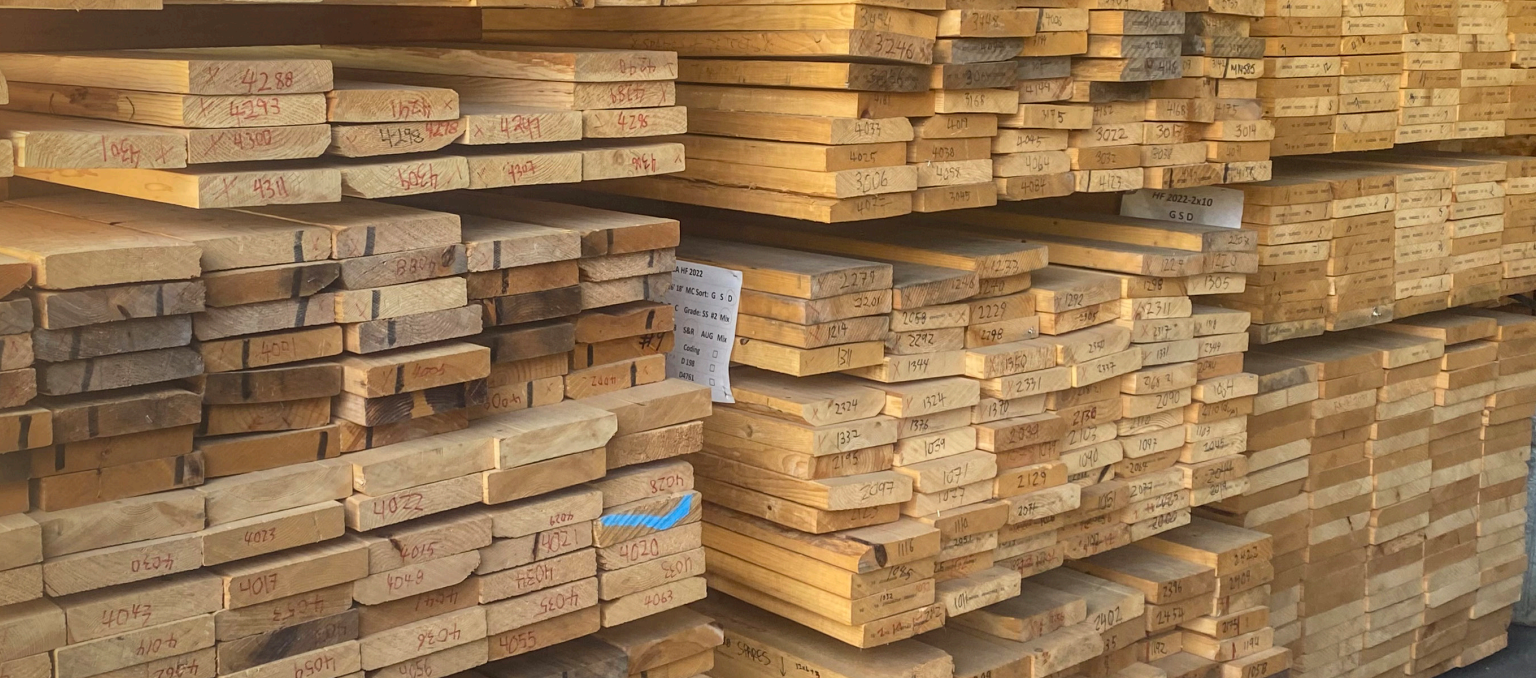


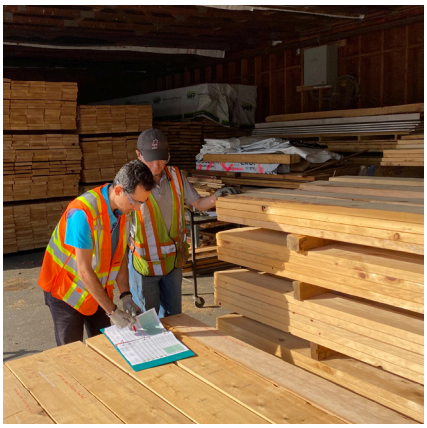
U.S. MARKET

Reassessment of Reference Design Values for Hem-Fir (N) Dimension Lumber

The reference design values for visually graded and mechanically graded Hem-Fir (N) dimension lumber have been updated in response to the routine assessment of strength and stiffness to ensure reliable performance in structural applications.

These updates take effect on April 1, 2025, and are published in the NLGA Standard Grading Rules for Canadian Lumber and the National Design Specification® (NDS®) Supplement for Wood Construction, developed by the American Wood Council. Within the NDS® Supplement, these updates specifically apply to Tables 4A and 4C, with additional impacts on Table 4G.

The following Frequently Asked Questions provide detailed information about the updated reference design values, their implementation, and practical implications. This content is provided as general information only and is not intended to be relied upon for design decisions. For actual use and design implications, users of Hem-Fir (N) should consult the applicable design guides or specifications (e.g., the AWC National Design Specifications® (NDS).



Minimal Practical Impact:

The reference design value updates should not result in significant changes to practical use of Hem-Fir (N) in the majority of applications, maintaining continuity and confidence for builders and designers.

Consistent Performance:

Hem-Fir (N) remains a trusted and dependable choice for both residential and commercial construction, with updated reference design values that closely align with previous standards for the majority of applications.

NLGA NATIONAL LUMBER GRADES AUTHORITY

CANADIAN WOOD COUNCIL
CONSEIL CANADIEN DU BOIS

BACKGROUND

Q1: Why did the reference design values change?

The reference design values for Hem-Fir (N) have changed as part of the routine monitoring and assessment process conducted by the National Lumber Grades Authority (NLGA). This process ensures the integrity of structural performance and aligns design values with current data on lumber properties.

Q2: Who is responsible for the assessment, development and approval of reference design values?

The NLGA is responsible for the regular assessment of the major Canadian species groups and the subsequent development of reference design values.

In the United States, approval of reference design values is the responsibility of the American Lumber Standard Committee's Board of Review.

Q3: How are reference design values derived?

Reference design values for stiffness and strength properties like bending, tension, and compression parallel to grain are derived through testing of full-size samples[1] from commercially produced structural lumber.

The collected data from the samples is analyzed in accordance with approved standards, consistent with all major species used in the United States.

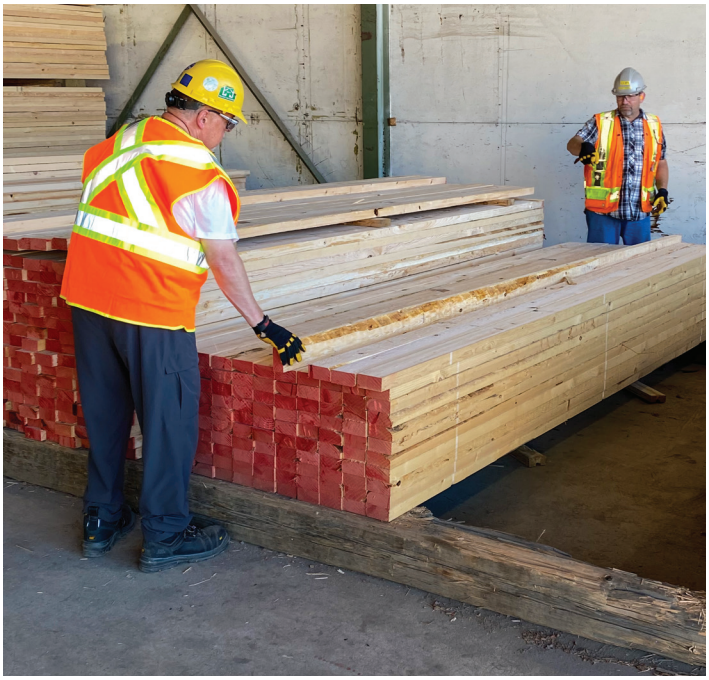
Q4: Do the updated reference design values for Hem-Fir (N) affect existing construction?

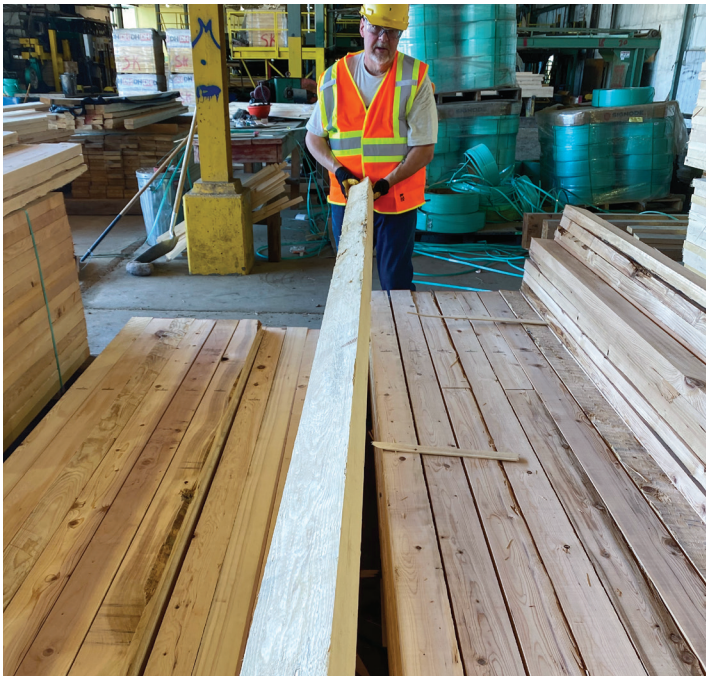
No, the updated reference design values for Hem-Fir (N) do not affect existing construction. Existing structures remain compliant if they followed the building codes that were in effect at the time they were built.

Q5: Should I continue to use Hem-Fir (N)?

Yes, Hem-Fir (N) remains a trusted and dependable choice for both residential and commercial construction, with updated reference design values that closely align with the previously published values for the majority of applications.

1 As defined in ASTM D1990.





GENERAL IMPACT

Q6: Which lumber properties have updated reference design values?

The updated reference design values apply to the following lumber properties. However, for the majority of applications these updates do not significantly impact the practical use of Hem-Fir (N).

For visually graded lumber, the following lumber properties were updated:

- Bending (F_b)
- Tension parallel to grain (F_t)
- Compression parallel to grain (F_c)
- Modulus of Elasticity (E and E_{min})
- Specific Gravity (G)

For mechanically graded lumber, only the following lumber property was updated:

- Specific Gravity (G)

Q7: Which lumber properties have the same reference design values?

Two lumber properties remain unaffected by the updates:

- Shear parallel to grain (F_v)
- Compression perpendicular to grain ($F_{c\perp}$)

Q8: What visual grades are impacted?

The reference design value updates apply to all grades of visually graded Hem-Fir (N) dimension lumber (2 to 4 inches thick):

- Select Structural
- No. 1/ No. 2
- No. 3
- Stud
- Construction
- Standard
- Utility

Q9: Why is Grade No. 1 & Btr not on the list of impacted visual grades?

The NLGA has decided not to maintain the No. 1 & Btr reference design values for Hem-Fir (N) in the American Wood Council's National Design Specification® (NDS®) Supplement for Wood Construction because commercial volumes of this grade are no longer being produced as a separate grade combination.

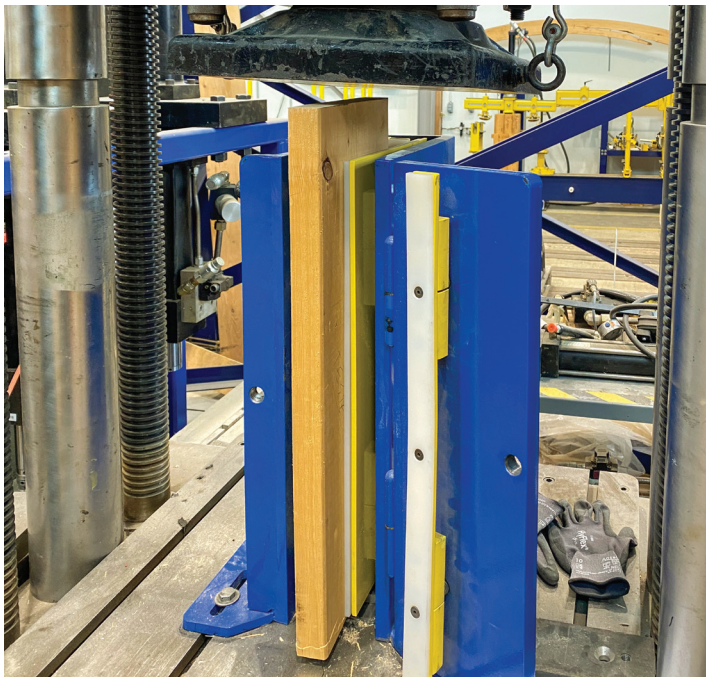
Q10: Which lumber sizes are impacted by the updates?

The updated reference design values apply to all Hem-Fir (N) dimension lumber products with a nominal thickness of 2 to 4 inches.

Q11: Have the reference design values for other Hem-Fir (N) lumber products changed?

No, the reference design values for other Hem-Fir (N) products such as boards, decking, and timbers covered by the NLGA Standard Grading Rules remain unchanged.

Reference design values for mechanically graded lumber, glulam and cross-laminated timber (CLT) are determined using other product standards.



GENERAL IMPACT

Q12: How will the updated reference design values affect applications? Can the same sizes be used to span the same distances?

In most cases, the updated reference design values do not result in significant practical changes. Typically, the same sizes can be used to span the same distances without issue.

Additionally, U.S. market applications are often based on the reference design values for the U.S. Hem-Fir species group, which are lower than those for Hem-Fir (N). As a result, U.S. designers typically do not leverage the higher reference design values associated with the Canadian product.

Q13: How can more information be obtained about the specific changes to the Hem-Fir (N) reference design values?

Detailed tables outlining the updated Hem-Fir (N) reference design values are provided at the end of this document. Table 1 shows the updated values. Table 2 provides a comparison of the previous and updated values. Additional information and clarification can be found in the American Wood Council's National Design Specification® (NDS®) Supplement for Wood Construction.

Q14: When will the updated reference design values come into effect?

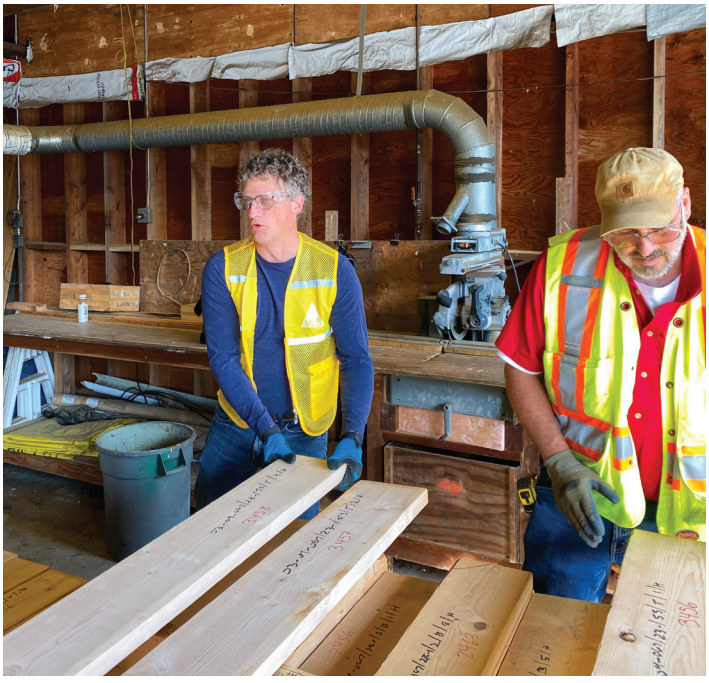
The updated reference design values are effective as of April 1, 2025, and are published in the NLGA Standard Grading Rules for Canadian Lumber and the National Design Specification® (NDS®) Supplement for Wood Construction.

Q15: How are reference design values implemented into building codes?

In the United States, reference design values are implemented through the International Building Code (IBC), which references the National Design Specification® (NDS®) for Wood Construction, developed by the American Wood Council (AWC). Engineers and designers use these resources to ensure structural components meet building code requirements.

Q16: Have lumber grades or grade stamps changed?

No. Lumber grades and grade stamps have not changed.



HEM-FIR (N) REFERENCE DESIGN VALUE TABLES

The updated reference design values for Hem-Fir (N) dimension lumber are published in the NLGA Standard Grading Rules for Canadian Lumber and the National Design Specification® (NDS®) Supplement for Wood Construction, developed by the American Wood Council (AWC).

The updated reference design values, as shown in **Table 1**, apply to certain lumber properties. For most applications, however, these updates do not significantly impact the practical use of Hem-Fir (N). A comparison between the previous and updated values is presented in **Table 2**.

Table 1: Updated Hem-Fir (N) Reference Design Values
Reference design values with adjustments are indicated in the shaded cells.

Grade	Design Values (in psi)							G
	F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	
Select Structural	1,200	750	145	405	1,650	1,600,000	580,000	0.44
No. 1 / No. 2	1,000	500			1,400	1,500,000	550,000	
No. 3	575	275			825	1,300,000	470,000	
Stud	775	375			900	1,300,000	470,000	
Construction	1,150	550			1,700	1,400,000	510,000	
Standard	625	300			1,450	1,300,000	470,000	
Utility	300	150			950	1,200,000	440,000	

F_b Reference bending design value
F_t Reference tension design value parallel to grain
F_v Reference shear design value parallel to grain (horizontal shear)
$F_{c\perp}$ Reference compression design value perpendicular to grain
F_c Reference compression design value parallel to grain
E Reference modulus of elasticity
E_{min} Reference modulus of elasticity for beam stability and column stability calculations
G Specific gravity

HEM-FIR (N) DESIGN VALUE TABLES

Table 2: Hem-Fir (N) Reference Design Value Comparison

Design Value	Source	Grade						
		Select Structural	No. 1 / No. 2	No. 3	Stud	Construction	Standard	Utility
F_b (psi)	Previous	1,300	1,000	575	775	1,150	650	300
	New	1,200	1,000	575	775	1,150	625	300
	Variance	100	0	0	0	0	25	0
F_t (psi)	Previous	775	575	325	450	650	350	175
	New	750	500	275	375	550	300	150
	Variance	25	75	50	75	100	50	25
F_c (psi)	Previous	1,700	1,450	850	925	1,750	1,500	975
	New	1,650	1,400	825	900	1,700	1,450	950
	Variance	50	50	25	25	50	50	25
E (psi)	Previous	1,700,000	1,600,000	1,400,000	1,400,000	1,500,000	1,400,000	1,300,000
	New	1,600,000	1,500,000	1,300,000	1,300,000	1,400,000	1,300,000	1,200,000
	Variance	100,000	100,000	100,000	100,000	100,000	100,000	100,000
E_{min} (psi)	Previous	620,000	580,000	510,000	510,000	550,000	510,000	470,000
	New	580,000	550,000	470,000	470,000	510,000	470,000	440,000
	Variance	40,000	30,000	40,000	40,000	40,000	40,000	30,000
G	Previous	0.46						
	New	0.44						
	Variance	0.02						

F_b Reference bending design value
F_t Reference tension design value parallel to grain
F_v Reference shear design value parallel to grain (horizontal shear)
$F_{c\perp}$ Reference compression design value perpendicular to grain
F_c Reference compression design value parallel to grain
E Reference modulus of elasticity
E_{min} Reference modulus of elasticity for beam stability and column stability calculations
G Specific gravity