

**TIMBERS —  
BEAMS &  
STRINGERS,  
POSTS & TIMBERS**

**6**

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## TIMBERS

EASTERN SPRUCE	SPRUCE—PINE—FIR(s)
EASTERN HEMLOCK— TAMARACK	*RED MAPLE *MIXED MAPLE
BALSAM FIR	*BEECH—BIRCH— HICKORY
NORTHERN WHITE CEDAR	*MIXED OAK
NORTHERN PINE	*RED OAK
EASTERN WHITE PINE	*NORTHERN RED OAK
EASTERN SOFTWOODS	*WHITE OAK

\* For these species groupings, the grade description presented in para. 25.1, 25.2, 25.3, 26.1, 26.2 and 26.3 apply with the following addition. [Unsound knots up to 1/2 the size of allowable sound knot sizes are allowed provided the unsoundness does not penetrate more than 1-1/2" into the member and any associated decay is limited to the knot itself and is not present in any of the wood surrounding the knot.]

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### **25.0 BEAMS AND STRINGERS (70.00 WWPA) 5" and Thicker Width More Than 2" Greater Than Thickness**

Grades of Beams and Stringers are designed for construction uses where material larger than Joists and Planks is required. The various grades are used in all types of building — home, industrial, farm and in special engineered construction such as bridges, auditoriums, stadiums and the like. Some grades are selected for appearance and strength. Other grades are designed for serviceability with strength and appearance qualities available in graduated increments to provide reliable and economical construction.

[There are three grade choices: SELECT STRUCTURAL, NO. 1 and NO. 2 with assigned design values as shown in Table 3, Section 8. Refer to para. 25.4 for adjustment factors.]

All are graded full length. Knots appearing on narrow faces are limited to the same displacement as knots specified at the edges of wide faces.

## STANDARD SIZES FOR BEAMS AND STRINGERS

Thicknesses and Widths		
Nominal	Surfaced Dry	Surfaced Unseasoned
5"&6"	1/2"off	1/2"off
7"-15"	3/4"off	1/2" off
16" and larger	1"off nominal	1/2" off nominal

Standard lengths are 6' and longer in multiples of 1'.

### 25.1 SELECT STRUCTURAL (70.10 WWPA)

Select Structural Beams and Stringers are graded primarily for strength properties, but most pieces of this grade are suitable for exposed uses where both strength and good appearance are desired.

Characteristics and limiting provisions are:

Checks – Seasoning checks, single or opposite each other with a sum total equal to 1/4 the thickness.

Knots – Sound, tight and well-spaced, are permitted in sizes not to exceed the following or equivalent displacement:

Nominal Width	At Edge Wide Face	Centerline Wide Faces
8"	1-7/8"	2"
10"	2"	2-5/8"
12"	2-1/8"	3-1/8"
14"	2-3/8"	3-3/8"
16"	2-1/2"	3-5/8"
18"	2-3/4"	3-5/8"
20"	2-7/8"	3-7/8"
22"	3"	4"
24"	3-1/8"	4 - 1 / 4 "

The size of knots on wide faces may be increased proportionately from the size permitted at the edge to the size permitted at the centerline.

Pin Holes – Limited.

Pitch Streaks.

Pockets – Medium pitch pockets.

Shake – 1/6 the thickness on end.

Skips – Occasional skips 1/16" deep, 2' in length.

Slope of Grain – 1 in 14

Splits — Splits equal in length to 1/2 the width of the piece or equivalent of end checks.

Stain — Stained sapwood. Firm heart stain, 10% of width or equivalent.

Torn Grain — Heavy.

Wane — 1/8 of any face, or equivalent slightly more for a short distance.

## 25.2 No. 1 (70.11 WWPA)

No. 1 Beams and Stringers, like the Select Structural grade, consists of many pieces of fine appearance suitable for exposed uses. The strength qualities of this grade make it desirable for use in almost all classes of heavy construction.

Characteristics and limiting provisions are:

Checks — Seasoning checks, single or opposite each other with a sum total equal to 1/4 the thickness.

Holes — In Cedar species, holes from any cause 1/2 the size of allowable knots are permitted.

Knots — Sound, tight and well-spaced, are permitted in sizes not to exceed the following or equivalent displacement:

Nominal Width	At Edge Wide Face	Centerline Wide Faces
8"	2-5/8"	3"
10"	2-7/8"	3-3/4"
12"	3-1/4"	4-1/2"
14"	3-1/2"	5"
16"	3-3/4"	5-1/4"
18"	3-7/8"	5-5/8"
20"	4-1/8"	5-7/8"
22"	4-3/8"	6-1/4"
24"	4-1/2"	6 - 1 / 2 "

The size of knots on wide faces may increase proportionately from the size permitted at the edge to the size permitted at the centerline.

Pin Holes — Limited. Pitch Streaks.

Pockets — Pitch pockets.

Shake — 1/6 the thickness on end.

Skip — Occasional skips 1/8" deep, 2' in length.

Slope of Grain – 1 in 10.

Splits – Equal in length to the width of the piece or equivalent of end checks.

Stain – Stained sapwood. Firm stained heartwood.

Torn Grain—Heavy.

Wane – 1/4 of any face, or equivalent slightly more for a short distance.

### 25.3 No. 2 (70.12 WHPA)

No. 2 Beams and Stringers are used in all general construction. The grade is designed for the many uses where higher strength properties are not needed and where serviceability is important.

Characteristics and limiting provisions are:

Checks – Seasoning checks.

Knots – Sound, not firmly fixed or holes, well spaced, are permitted in sizes not to exceed the following or equivalent displacement:

Nominal Width	Anywhere on Wide Face
8"	4-1/2"
10"	5-5/8"
12"	6-7/8"
14"	7-1/2"
16"	8-1/8"
18"	8-5/8"
20"	9-1/8"
22"	9-1/2"
24"	10"

Unsound knots are limited to 1/2 the size of other knots.

The size of knots on wide faces may be increased proportionately from the size permitted at the edge to the size permitted at the centerline.

Pitch Streaks.

Pockets – Pitch or bark pockets.

Shake – 1/2 length, 1/2 thickness. If through at ends, limited as splits.

Skips – 1/8" deep, 2' in length, or 1/16" skip full length.

Slope of Grain – 1 in 6.

Splits – Medium or equivalent end checks.

Stain – Stained wood.

Torn Grain.

Unsound Wood – Small spots of unsound wood, well scattered, 1/6 the face width.

Wane – 1/3 of any face, or equivalent slightly more for a short distance.

White Specks – Firm, 1/3 width, or equivalent.

## 25.4 DESIGN VALUES — Adjustment Factors

In structural design for loads applied on the wide face, the fiber stress in bending and Modulus of Elasticity (MOE) values in Table 3, Section 8 should be multiplied by the factors shown in the following table.

<b>Adjustment Factors* for Beams and Stringers Subjected to Loads Applied on the Wide Face</b>			
<b>Grade</b>	<b>Extreme Fiber Stress in Bending "Fb"</b>	<b>Modulus of Elasticity "E"</b>	<b>Other Properties</b>
Select Structural	0.86	1.00	1.00
No. 1	0.74	0.90	1.00
No. 2	1.00	1.00	1.00

\*Posts and Timbers graded to para. 25.1, 25.2 and 25.3 may use the design values in Table 3, Section 8 without the above flat use adjustment factors.

## 26.0 POSTS AND TIMBERS - (WWPA 80.00)

**5" X 5" and Larger**

**Width Not More Than 2" Greater Than Thickness**

Grades of Posts and Timbers are designed for construction uses where material larger than Joists, Planks and Studs is required. The various grades are used in all types of building – home, industrial, farm and special engineered construction, such as bridges, auditoriums, stadiums, and the like. Some grades are selected for appearance and strength. Other grades are designed for serviceability with strength and appear-

ance qualities available in graduated increments to provide reliable, but economical construction.

[There are three grade choices: SELECT STRUCTURAL, NO. 1 and NO. 2.]

All are graded full length. Except as provided in the grade descriptions, knots appearing on narrow faces are limited to the same displacement as knots specified for the wide face. The Select Structural, No. 1 and No. 2 grades are assigned design values as shown in Table 4. These grades are designed to provide high compression values.

### STANDARD SIZES FOR POSTS AND TIMBERS

Thicknesses and Widths		
Nominal	Surfaced Dry	Surfaced Unseasoned
5" & 6"	1/2" off	1/2" off
7" - 15"	3/4" off	1/2" off
16" and larger	1" off nominal	1/2" off nominal

Standard lengths are 6' and longer in multiples of 1'.

#### 26.1 SELECT STRUCTURAL (80.10 WWPA)

Select Structural Posts and Timbers are graded primarily for strength properties, but most pieces of this grade are suitable for exposed uses where both strength and good appearance are desired.

Characteristics and limiting provisions are:

Checks – Seasoning checks, single or opposite each other with a sum total equal to 1/2 the thickness of the piece.

Knots – Sound, tight and well spaced. Knot size limitations are permitted in the following sizes or their equivalent displacement:

Wide Face Width	Anywhere on Wide Face
5"	1"
6"	1-1/4"
8"	1-5/8"
10"	2"
12"	2-3/8"
14"	2-1/2"
16"	2-3/4"
18"	3"



- Pin Holes – Limited.
- Pitch Streaks.
- Pockets – Medium pitch pockets.
- Shake – 1/3 the thickness on end.
- Skip – Occasional skips 1/16" deep, 2' in length.
- Slope of Grain – 1 in 12.
- Splits – Splits equal in length to 3/4 the thickness of the piece or equivalent of end checks.
- Stain – Stained sapwood. Firm heart stain, 10% of width or equivalent.
- Torn Grain – Heavy.
- Wane – 1/8 of any face, or equivalent slightly more for a short distance.

**26.2 No. 1 (80.11 WWPA)**

No. 1 Posts and Timbers, like the Select Structural grade, consist of many pieces of fine appearance suitable for exposed uses. The strength qualities of this grade make it desirable for use in almost all classes of heavy construction.



Characteristics and limiting provisions are:

- Checks – Seasoning checks, single or opposite each other with a sum total equal to 1/2 the thickness.
- Holes – In Cedar species, holes from any cause 1/2 the allowable knot size are permitted.
- Knots – Sound, tight and well spaced. Knot size limitations are permitted in the following sizes or their equivalent displacement:

Wide Face Width	Anywhere on Wide Face
5"	1-1/2"
6"	1-7/8"
8"	2-1/2"
10"	3-1/8"
12"	3-3/4"
14"	4"
16"	4-1/4"
18"	4-1/2"

- Pin Holes – Limited. Pitch Streaks.
- Pockets – Pitch pockets.

- Shake — 1/3 the thickness on end.
- Skips — Occasional skips 1/8" deep, 2' in length.
- Slope of Grain — 1 in 10.
- Split — Splits equal in length to width of the piece or equivalent of end checks.
- Stain — Stained sapwood. Firm stained heartwood.
- Torn Grain — Heavy.
- Wane — 1/4 of any face or equivalent slightly more for a short distance.

### 26.3 No. 2 (80.12 WWPA)

No. 2 Posts and Timbers are used in all general construction. The grade is designed for the many uses where heavy material is needed and where serviceability is important.

Characteristics and limiting provisions are:

- Checks — Seasoning checks.
- Knots — Sound, not firmly fixed, or holes, well spaced. Knot size limitations are permitted in the following sizes or their equivalent displacement:

Wide Face Width	Anywhere on Wide Face
5"	2-1/2"
6"	3"
8"	3-3/4"
10"	5"
12"	6"
14"	6-1/2"
16"	7"
18"	7-1/2"

Unsound knots are limited to 1/2 the size of other knots.

Pitch Streaks.

Pockets — Pitch or bark pockets.

Shake — 1/2 length, 1/2 thickness. If through at ends, limited as splits.

Skips — 1/8" deep, 2' in length, or 1/16" skip full length.

Slope of Grain — 1 in 6.

Splits — Medium or equivalent end checks.

Stain — Stained wood. Torn Grain.

Unsound Wood — Small spots of unsound wood,

- well scattered, 1/6 the face width.
- Wane – 1/3 of any face, or equivalent slightly more for a short distance.
- White Speck – Firm white specks, 1/3 width or equivalent.

## 26.4 TIMBER INTERPRETATIONS (WWPA)

Beams and Stringers (Para. 25 - 25.3)

Posts and Timbers (Para. 26 - 26.3)

- Knots – NGR Interpretations for Knots shall apply. Refer to Section 13 Interpretations of the National Grading Rule for Dimension Lumber, pages 13-6 through 13-12,
  - Select Structural and No. 1: No unsound knots or decay of any kind.
- Pin Holes — Select Structural and No. 1: Limited pin holes equal 30 per square foot.
- Saw Cuts — Select Structural: No saw cuts permitted.
  - No.1 and No.2: Equal to the depth of skip permitted on wide or narrow faces. Saw cut is measured at maximum depth. If across a corner—very slight. Use good judgment.
- Shake — No. 1: Light heart shake (similar to check) or check along the pith area, very short and shallow in the occasional piece only. Use this interpretation to save a piece in the grade - not to raise from a lower grade.
  - No. 2: Maximum shake of ½ the thickness by ½ the length or several short shakes (heart type shake) scattered along the length or shake through two faces ¼ the length. Shake on ends limited to split. No restrictions on shake outside the middle ½ of the width, however, use good judgement.
- Slope of Grain — Areas of excessive slope of grain or burl type spots equal to width or depth of wane permitted.
- Timber Breaks — Select Structural, No. 1 and No. 2:
  - Timber breaks are not allowed.
- Wane — Select Structural and No. 1: Equivalent slightly more for a short distance means next grade lower for a distance equal to the face width of the piece.

No. 2: Equivalent slightly more for a short distance means wane may be  $\frac{1}{2}$  the width for a distance equal to the face width.

Warp — Select Structural and No. 1:

Crook: 16' & shorter -  $\frac{1}{2}$ " regardless of size.

Over 16' - 1" regardless of size.

Twist: None

Bow: For Beams and Stringers — None

For Posts and Timbers — same amount as

Crook for Beams & Stringers

Ends — If the piece is trimmed to a finished length, restrict stump shot or like defects to very slight (Approx.  $\frac{1}{2}$ " or less in depth). Defects that will be removed when over length is trimmed off is permitted; use good judgment.

## 27.0 PROFILE BEAMS AND STRINGERS 5" and Thicker

Width more than 2" greater than thickness excluding profile (measurement is of width excluding profile; profile may be one or both edges). There is no limitation as to style of profile except it must be convex, not concave.

Grades of Profile Beams and Stringers are designed for construction uses in log type structures where a log cabin or rustic effect is desired outside or inside.

There are three grade choices: SELECT STRUCTURAL, No. 1 and No. 2. Grades are assigned design values as shown in Table 3, Section 8.

### STANDARD SIZES FOR PROFILE BEAMS AND STRINGERS

Thicknesses and Widths (Excluding Profile)		
Nominal	Surfaced Dry	Surfaced Unseasoned
5"&6"	1/2" off	1/2" off
7"-15"	3/4" off	1/2" off
16" and larger	1" off nominal	1/2" off nominal

Standard lengths are 6' and longer in multiples of 1'.

## 27.1 SELECT STRUCTURAL

Select Structural Profile Beams and Stringers are graded primarily for strength properties, also most pieces of this grade are suitable for exposed uses where both strength and good appearance are desired. Characteristics and limiting provisions are the same as those for Select Structural Beams and Stringers. See para. 25.1.

### 27.2 No. 1

No. 1 Profile Beams and Stringers like the Select Structural grade consists of many pieces of fine appearance suitable for exposed uses. The strength qualities of this grade make it especially desirable where headers and spans are needed with a profile. Characteristics and limiting provisions are the same as those for No. 1 Beams and Stringers. See para. 25.2.

### 27.3 No. 2

No. 2 Profile Beams and Stringers may be used in areas where higher strength properties are not needed where serviceability and a rustic look are important. Characteristics and limiting provisions are the same as those for No. 2 Beams and Stringers. See para. 25.3.

## 28.0 PROFILE POSTS AND TIMBERS 5" x 5" and Larger

Width not more than 2" greater than thickness excluding profile (measurement is of width excluding profile; profile may be on one or both edges).

There is no limitation as to the style of profile except it must be convex not concave.

Grades of Profile Posts and Timbers are designed for construction used in log type structures where a log cabin or rustic effect is desired outside or inside.

There are three grade choices: SELECT STRUCTURAL, No. 1 and No. 2 grades that are assigned design values as shown in Table 4, Section 8. These grades are designed to provide high compression values.

If the higher fiber stress in bending values applicable to Profile Beams and Stringers are desired, the SELECT STRUCTURAL, No. 1 and No. 2 grades may be graded under para. 25.1, 25.2 and 25.3 if all faces are considered narrow faces. If so graded and grade stamped, the grade stamp must show the appropriate para. number (25.1, 25.2 or 25.3).

### STANDARD SIZES FOR PROFILE POSTS AND TIMBERS

Thicknesses and Widths (Excluding Profile)		
Nominal	Surfaced Dry	Surfaced Unseasoned
5"&6"	1/2"off	1/2"off
7"-15"	3/4"off	1/2" off
16" and larger	1"off nominal	1/2" off nominal

Standard lengths are 6' and longer in multiples of 1'.

#### 28.1 SELECT STRUCTURAL

Select Structural Profile Posts and Timbers are graded primarily for strength properties, but most pieces of this grade are suitable for exposed uses where both strength and good appearance are desired. Characteristics and limiting provisions are the same as those for Select Structural Posts and Timbers, para. 26.1.

#### 28.2 No. 1

No. 1 Profile Posts and Timbers like the Select Structural, consist of many pieces of fine appearance suitable for exposed uses. The strength qualities of this grade make it especially desirable where weight bearing members with a profile are desired. Characteristics and limiting provisions are the same as those for No. 1 Posts and Timbers, para. 26.2.

#### 28.3 No. 2

No. 2 Profile Posts and Timbers are used in all general construction areas where heavy material is needed with a rustic effect. Characteristics and limiting provisions are the same as those for No. 2 Posts and Timbers, para. 26.3.