STRUCTURAL MATERIAL

Extract from "Recommended American Lumber Standards Softwood Lumber" Reported to the United States Department of Commerce by the Central Committee on Lumber Standards, Washington, D.C.

Adopted by the General Conference of Manufacturers Distributors and Consumers May 1, 1925
Washington, D.C.
(Extract from pages 8 to 10 "Recommended American Lumber Standards Softwood Lumber" - Reported to the United State Department of Commerce by the Central Committee on Lumber Standards, Washington, D. C. Adopted by the General Conference of Manufacturers Distributors and Consumers May 1, 1925, at the Department of Commerce, Washington, D. C.)

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IV. (40a and b) - BASIC PROVISIONS FOR THE SELECTION AND INSPECTION OF SOFTWOOD DIMENSION AND TIMBERS WHERE WORKING STRESSES ARE REQUIRED.

The following basic provisions are to be used as bases for the preparation of grading rules for structural material by the Manufacturers, to be submitted by the Central Committee on Lumber Standards for consideration as American Lumber Standards at the next General Conference in 1926.

1. GRADES AND CLASSIFICATIONS

61. Grades: (a) Dense Select
(b) Select
(c) Common

62. Uses: (a) Joist and Plank
Joists, Rafters, Scaffold Plank, Factory Flooring, etc.
(b) Beams and Stringers
Beams, Jirders, Stringers, etc.
(c) Posts and Timbers
Posts, Caps, Sills, Timbers, etc.

R610 - 1 -
63. All grades shall contain only sound wood, unless decay is specifically permitted.

64. The measurement of a knot shall be made on the section of the knot appearing on the surface under consideration.

65. In Post and Timber grades, and on the wide faces of Joist and Plank, the measure of a knot shall be on the mean or average diameter.

66. On the narrow faces of Joist and Plank and Beams and Stringers, the size of a knot shall be taken as its width between lines parallel to the edges of the timber.

67. On the wide or vertical faces of Beams and Stringers, the smallest diameter of a knot shall be taken as its size.

68. Knots on the edges of wide faces of Beams and Stringers are limited to the same size as on the adjacent narrow faces.

69. Knots on narrow faces and edges of wide faces of Joist and Plank and Beams and Stringers, may increase proportionately from the size allowed in the middle third to twice that size at the ends of the piece.

70. The size of knots on the wide faces of Joist and Plank and Beams and Stringers, may increase proportionately from the size allowed at the edge to that allowed at the center line.

71. Cluster knots and knots in groups are not permitted.

72. Knot holes and holes from other causes than knots shall be limited as provided for knots.

73. Shake shall be measured on the ends of a piece, and its size shall be taken as its width between lines parallel to the wide faces of the piece. Checks and splits shall be limited as provided for shakes. No checks or combinations of checks with shakes which would reduce the strength to a greater extent than the allowable shake shall be permitted.

74. No combination of wane and knots is permitted which would reduce the strength more than the maximum allowable knot.

75. No pieces of exceptionally light weight shall be permitted in any grade, except that very light pieces otherwise of Select grade may be accepted in the Common grade.

76. No heartwood requirements are provided in these grades. Heartwood requirements when ordered should be specified in terms of heartwood required on the girth or on each face, side or edge. Girth shall be measured at the point where the greatest amount of sapwood occurs.

77. Methods of measurement of Douglas fir and southern pine for rate of growth and density are given for use with the Dense Select and Select Grades.

78. Wane is permitted in all grades, but square edges may be specified when appearance or use requires.
3. SELECTION FOR RATE OF GROWTH

Douglas Fir or Southern Pine

70. Douglas Fir or Southern Pine selected for close main shall average on either one end or the other not less than six nor more than twenty annual rings per inch, measured over a three-inch portion of a radial line representative of the average growth on the cross-section located as described below.

When such radial line is not representative, it shall be shifted sufficiently to present a fair average, but the distance from the pith of the three-inch portion of the line shall not be changed.

In case of disagreement two radial lines shall be chosen, and the number of rings shall be the average of these lines.

Location of Radial Line

80. Douglas Fir. In side cut pieces the line shall be at a right angle to the annual rings and the center of the three-inch portion of the line shall be at the center of the end of the piece.

In boxed heart pieces the line shall run from the pith to the corner farthest from the pith. When the least dimension is six inches or less the three-inch portion of the line shall begin at a distance of one inch from the pith. When the least dimension is more than six inches the three-inch portion of the line shall begin at a distance from the pith equal to two inches less than one-half the least dimension of the piece.

If a three-inch portion of the radial line cannot be obtained the measurement shall be made over as much of the three-inch portion as is available.

81. Southern Pine. In boxed heart pieces the rate of growth shall be counted over the third, fourth, and fifth inches from the pith along the radial line.

In cases where timbers do not contain the pith, and it is impossible to locate it with any degree of accuracy, the same inspection shall be made over three inches on an approximate radial line beginning at the edge nearest the pith in timbers over three inches in thickness and on the second inch nearest to the pith in timbers three inches or less in thickness.

In material containing the pith but not a five-inch radial line, which is less than two inches by eight inches in section or less than eight inches in width, that does
not show over sixteen square inches on the cross-section, the inspection shall apply to the second inch from the pith. In larger material that does not show a five-inch radial line the inspection shall apply to the three inches farthest from the pith.

4. SELECTION FOR DENSITY

**Douglas Fir or Southern Pine**

32. Douglas Fir or Southern Pine selected for density shall average on either one end or the other not less than six annual rings per inch and in addition one-third, or more, summerwood, over the same portion of a radial line as provided for selection for rate of growth. Coarse-grained material excluded by this rule shall be accepted as dense if averaging one-half, or more, summerwood.

The contrast in color between summerwood and springwood shall be sharp and the summerwood shall be dark in color, except in pieces having considerably above the minimum requirement for summerwood.

In case of disagreement two radial lines shall be chosen and the summerwood and number of rings shall be the average of these lines.

5. JOIST AND PLANK

Joists, Rafters, Scaffold Plank, Factory Flooring, etc.

83. Nominal thicknesses: 2" to 4".
Nominal widths: 4" and wider.
Standard thicknesses, S1S or S2S: 3/8" off.
Extra Standard thickness, 2", S1S or S2S: 1/4" off.
Standard widths, 2" to 7", S1E or S2E: 3/8" off.
8" and wider, S1E or S2E: 1/2" off.
Standard lengths: Multiples of two feet.
84. Knots on Wide Faces

<table>
<thead>
<tr>
<th>Width of Face</th>
<th>Dense Select &amp; Select</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>On or near edge</td>
<td>Center line</td>
<td>On or near edge</td>
</tr>
<tr>
<td>of face</td>
<td>of middle third</td>
<td>of face</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3/4&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1-3/8&quot;</td>
<td>2-5/8&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>1-3/4&quot;</td>
<td>3-1/4&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2-1/8&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>14&quot;</td>
<td>2-3/8&quot;</td>
<td>4-1/4&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>2-1/2&quot;</td>
<td>4-5/8&quot;</td>
</tr>
</tbody>
</table>

85. Knots on Narrow Faces of Boxed Heart Pieces, Middle Third of Length

<table>
<thead>
<tr>
<th>Thickness of piece</th>
<th>Select</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;</td>
<td>5/8&quot;</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1&quot;</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>1-1/4&quot;</td>
<td>1-3/4&quot;</td>
</tr>
</tbody>
</table>

86. Sum of Diameters of Knots. Center Half of Length on Any Face, Not to Exceed

Dense Select & Select
1-1/2 times width of face

Common
Two times width of face

87. Shakes and Checks

Dense Select & Select
Green ------ 1/4 width of end
Seasoned ---- 1/3 width of end

Common
4/10 width of end
4/9 width of end

88. Angle of Grain, Center Half of Length

Dense Select & Select
1 in 12

Common
1 in 10

R810 -5-
90. Douglas fir or southern pine Select grade to be selected for rate of growth. 
Douglas fir or southern pine of Dense Select grade to be selected for density.

3. BEAMS AND STRINGERS

Beams, Girders, Stringers, etc.

91. Nominal thicknesses: 5" and thicker. 
Nominal widths: 8" and wider. 
Standard lengths: Multiples of two feet. 
S1S, S1E, S2S or S4S: 1/2" off each way.

92. Knots

<table>
<thead>
<tr>
<th>Width</th>
<th>Dense Select &amp; Select</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>5&quot;</td>
<td>1 1/4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1 1/2&quot;</td>
<td>2 3/8&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1 3/4&quot;</td>
<td>3 1/8&quot;</td>
</tr>
<tr>
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<td>2&quot;</td>
<td>3 5/8&quot;</td>
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<tr>
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<td>3 5/8&quot;</td>
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<td>16&quot;</td>
<td>2 3/8&quot;</td>
<td>3 7/8&quot;</td>
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<td>18&quot;</td>
<td>3 5/8&quot;</td>
<td>5 1/2&quot;</td>
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<td>20&quot;</td>
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<td>5 7/8&quot;</td>
</tr>
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<td>22&quot;</td>
<td>4&quot;</td>
<td>6 1/2&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>4 1/4&quot;</td>
<td>6 3/4&quot;</td>
</tr>
</tbody>
</table>
93. Sum of Diameters of Knots, Center Half of Length on Any Face. Not to Exceed

Dense Select & Select Common

Width of face 1 1/2 times width of face

Shakes and Chocks

Dense Select & Select Common

Green --------- 1/4 width of end 1/10 width of end
Scanned --------- 1/3 width of end 4/9 width of end

95. Angle of Grain, Center Half of Length

Dense Select & Select Common

1 in 15 1 in 10

96. Wane

Dense Select & Select Common

1/8 thickness and/or width 1/4 thickness and/or width

97. Douglas fir or southern pine Select grade to be selected for rate of growth.
Douglas fir or southern pine of Dense Select grade to be selected for density.

7. POSTS AND TIMBERS

Posts, Caps, Sills, Timbers, etc.

98. Nominal sizes: 6" x 6" and larger.
Standard lengths: Multiples of two feet.
S1S, S1E, S2S or S4S: 1/2" off each way.
### Size of knots

<table>
<thead>
<tr>
<th>Width of face</th>
<th>Dense Select &amp; Select</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>1 1/2&quot;</td>
<td>2 3/8&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>7/8&quot;</td>
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<tr>
<td>24&quot;</td>
<td>4 1/4&quot;</td>
<td>6 3/4&quot;</td>
</tr>
</tbody>
</table>

100. Sum of diameters of all knots within any 6" of length not to exceed twice size of maximum knot allowable; nor to be two of maximum allowable knots in same 6" of length on any one face.

101. **Shakes and Checks**

<table>
<thead>
<tr>
<th>Dense Select &amp; Select</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>4/10 width of end</td>
</tr>
<tr>
<td>Seasoned</td>
<td>1/2 width of end</td>
</tr>
</tbody>
</table>

102. **Angle of Grain**

<table>
<thead>
<tr>
<th>Dense Select &amp; Select</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in 10</td>
<td>1 in 8</td>
</tr>
</tbody>
</table>

103. **Wane**

<table>
<thead>
<tr>
<th>Dense Select &amp; Select</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8 thickness and/or width</td>
<td>1/4 thickness and/or width</td>
</tr>
</tbody>
</table>

104. Douglas fir or southern pine Select grade to be selected for rate of growth.
Douglas fir or southern pine of Dense Select grade to be selected for density.