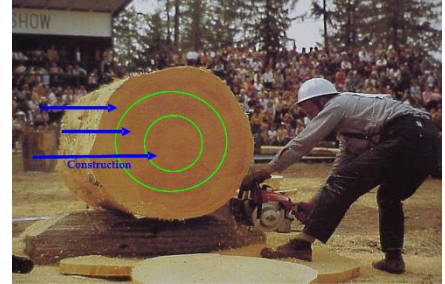


# R List Dimension - Lesson 16

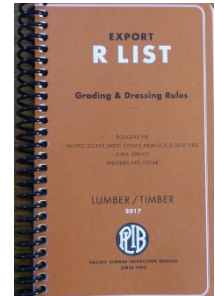
## I. General Information

- Usage:** Lumber containing large knots.
- Grades:** Specify minimum requirements and maximum characteristics.
- R List Grading Rule:** Prohibits combinations that reduce strength.



## II. Pacific Lumber Inspection Bureau

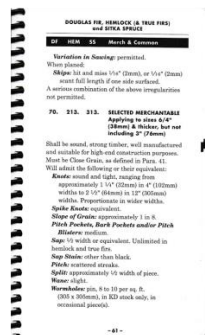
- Founded:** 1903, incorporated in 1906.
- First Products:** Graded according to the export "E" list.
- Current Rules:** Export R-list grading and dressing rules, first published in 1929 as the "N" list.



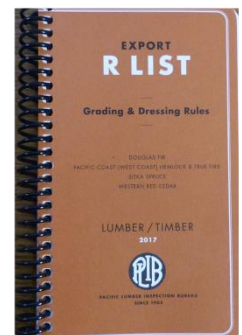
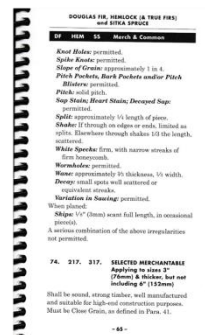
## III. Species and Grading

- Species:** Douglas Fir, Sitka Spruce, Western Hemlock, Western White Pine, Western Red Cedar.
- Separate Rules:** Western Red Cedar treated separately.
- Grading Paragraphs:**
  - Douglas Fir:** Paragraphs 70-73.
  - Western Hemlock:** Paragraphs 213-216.
  - Sitka Spruce:** Paragraphs 313-316.

### R List Dimension – 1 ½” to 3” Thick



### R List Dimension – 3” to 6” Thick



## IV. Grades of R List Dimension

- Grades:** Select Merchantable, Number One Merchantable, Number Two Merchantable, Number Three Common.
- Purpose:** Strength, all four sides and both ends must be evaluated.
- Size Classifications:**
  - 1 ½" to <3" thick:** Green table.
  - 3" to <6" thick:** Purple table.

**R List Dimension 6 ½" & thicker, not including 3"** All Species Except WRC  
WORST CHARACTERISTIC DETERMINES THE GRADE Purpose Intended: Strength

Grades	Select Merchantable	No. 1 Merchantable	No. 2 Merchantable	No. 3 Common
Face Grade	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Ends of Grains	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Pockets	Medium (10" x 5")	Medium (10" x 5")	Medium (10" x 5")	Medium (10" x 5")
Shake	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Slope of Grain	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Wane	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Splitting	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Heart Grade	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Shake	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
White Species	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Heartwood	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Unseasoned Wood	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects

**Not Permitted**

**R List Dimension 6 ½" & thicker, not including 3"** All Species Except WRC

**R List Dimension 3" & thicker, up to not including 6"** All Species Except WRC  
WORST CHARACTERISTIC DETERMINES THE GRADE Purpose Intended: Strength

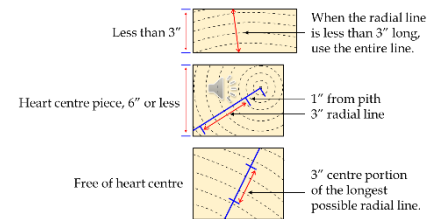
Grades	Select Merchantable	No. 1 Merchantable	No. 2 Merchantable	No. 3 Common
Face Grade	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Ends of Grains	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Pockets	Medium (10" x 5")	Medium (10" x 5")	Medium (10" x 5")	Medium (10" x 5")
Shake	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Slope of Grain	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Wane	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Splitting	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Heart Grade	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Shake	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
White Species	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Heartwood	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects
Unseasoned Wood	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects	Free of all defects and defects

**Not Permitted**

**R List Dimension 3" & thicker, up to not including 6"** All Species Except WRC

## V. Characteristics and Allowances

- Pockets:** Medium size allowed in Select Merch and Number One Merch.
- Rate of Growth:**
  - Select Merch:** Close grain, 6 rings per inch.
  - Number One Merch:** Medium grain, 4 rings per inch.
  - Number Two Merch and Number Three Common:** No restriction.
- Slope of Grain:**
  - Select Merch and Number One Merch:** 1:8 ratio.
  - Number Two Merch:** 1:6 ratio.
  - Number Three Common:** 1:4 ratio.
- Splits:**
  - Select Merch:** ½ width.
  - Number One Merch:** Width of the piece.
  - Number Two Merch:** Twice the width.
  - Number Three Common:** ¼ length.
- Wane:**
  - Select Merch:** Slight wane (pencil wane).
  - Number One Merch:** 1/6 width by 1/3 length, max ¼ width.
  - Number Two Merch:** 1/3 width, max ½ width.
  - Number Three Common:** 1/3 width full length, max ½ width.



Select Merch.	No. 1 Merch.	No. 2 Merch.	No. 3 Common
1 in 8	1 in 8	1 in 6	1 in 4



Wane is measured across the corner in Select Merch.

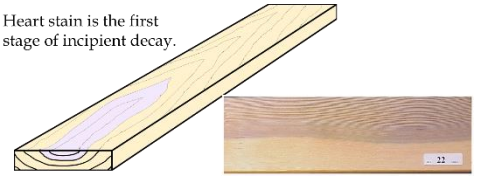


In all other grades, measure the face and edge separately.

f) **Stained Heartwood:**

- i. **Select Merch:** Not allowed.
- ii. **Number One Merch:** 25% volume.
- iii. **Number Two Merch and Number Three Common:** 100% permitted.

Heart stain is the first stage of incipient decay.



g) **Pin Holes:**

- i. **Select Merch:** Not allowed.
- ii. **Number One Merch:** 10 per square foot.
- iii. **Number Two Merch:** 30 per square foot.
- iv. **Number Three Common:** 100% allowed.

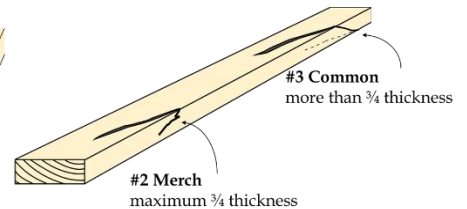
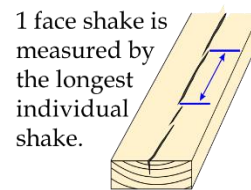
h) **Grub and Teredo Holes:**

- i. **Select Merch and Number One Merch:** Not allowed.
- ii. **Number Two Merch:** 1 per square foot.
- iii. **Number Three Common:** Any amount.



i) **Shakes:**

- i. **Number Two Merch:** Through shake max 2 feet, not through up to 1/4 length or 3 feet.
- ii. **Number Three Common:** Through shake max 1/3 length, not through full length.



j) **White Specks and Honeycomb:**

- i. **Number Two Merch:** Not through on opposite wide faces, 25% of face.
- ii. **Number Three Common:** No restrictions, 100% firm honeycomb allowed.

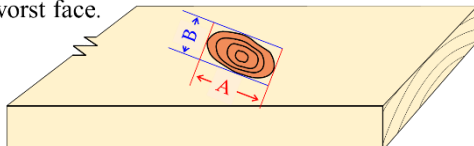
k) **Unsound Wood:**

- i. **Number Three Common:** Spots up to 1½" wide by nominal width in length, one spot per 2 feet.



## VI. Knot Evaluation

- Knot measurement - average diameter on the worst face.



a) **Measurement:** Average diameter on the worst wide face.

b) **Considerations:** Size, quality, form, and shape of knots.

## VII. Knot Characteristics

- a) **Branch Growth:** Branches originate in the pith, intergrow with trunk fibers while alive.
- b) **Branch Death:** Trunk fibers disassociate from dead branches, terminating growth.
- c) **Knot Types:**
  - i. **Firm Knot:** Solid, contains incipient decay.
  - ii. **Tight Knot:** Fixed by shape, growth, or position.
  - iii. **Unsound Knot:** Contains decay.
  - iv. **Loose Knot:** Not held tightly in place.



## VIII. Grading for Knots

- a) **Select Merch:** Only sound and tight knots permitted.
- b) **Number One Merch:** Sound and tight knots, NFF knots or loose knots up to 2/3 size of allowable knots.
- c) **Number Two Merch and Number Three Common:** Any quality of knot allowed.
- d) **Spike and Narrow Face Knots:** Measured as equivalent to round knots.
- e) **Three-Face Knots:** Ignore the third face, measure the biggest knot on the face it occurs.
- f) **Knot Holes:** Not permitted until Number Two Merch and Number Three Common, measured by average diameter on the worst wide face.

Grades	Select Merch.			No. 1 Merch.			No. 2 Merch.		No. 3 Common	
Knots	S&T	NFF	Holes	S&T	NFF	Holes	Any Quality	Holes	Any Quality	Holes
Nominal Widths 4"	1 1/4"	none	none	1 1/2"	1"	none	2"	1 1/4"	2 1/2"	2 1/2"
Nominal Widths 6"	1 1/2"	none	none	1 3/4"	1 1/16"	none	2 1/2"	1 1/4"	3"	3"
Nominal Widths 7"	1 5/8"	none	none	1 7/8"	1 1/4"	none	2 3/4"	1 5/8"	3 1/4"	3 1/4"
Nominal Widths 8"	1 3/4"	none	none	2"	1 5/16"	none	3"	2"	3 1/2"	3 1/2"
Nominal Widths 9"	1 7/8"	none	none	2 1/4"	1 1/2"	none	3 1/4"	2"	3 3/4"	3 3/4"
Nominal Widths 10"	2"	none	none	2 1/2"	1 5/8"	none	3 1/2"	2"	4"	4"
Nominal Widths 12"	2 1/2"	none	none	3"	2"	none	4"	2"	5"	5"
Spike knots = same displacement as allowable round knots										

## IX. Comparison of Size Classifications

### a) 1 ½" to <3" Thick:

- i. **Wane:** Up to 1/3 thickness in Number Two Merch.
- ii. **White Specks:** Not through in Number Two Merch.
- iii. **Knot Sizes:** Smaller.
- iv. **NFF Knots:** Not permitted until Number Two Merch.
- v. **Knot Holes:** Not permitted until Number Three Common.

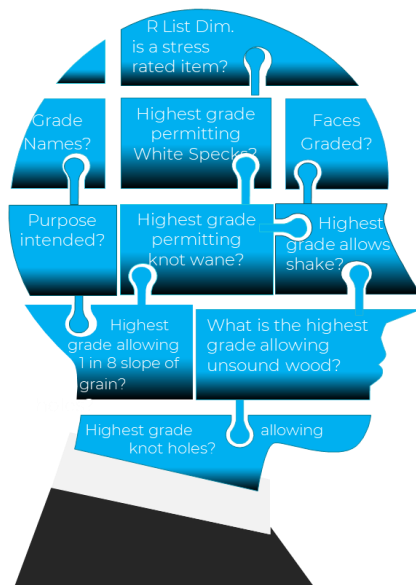
### b) 3" to <6" Thick:

- i. **Wane:** Up to 1/2 thickness in Number Two Merch.
- ii. **White Specks:** Permitted to be through in Number Two Merch.
- iii. **Knot Sizes:** Larger.
- iv. **NFF Knots:** Not permitted until Number Two Merch.
- v. **Knot Holes:** Not permitted until Number Three Common.

6/4" & thicker, not including 3"	3" & thicker, not including 6"
Wane in #2 Merch restricted to 1/3 thickness.	Wane in #2 Merch restricted to 1/2 thickness.
White specks in #2 Merch - 25% volume, not through.	White specks in #2 Merch - 25% volume, through.
Some knot sizes are smaller.	Some knot sizes are larger.
Highest grade allowing NFF knots is #1 Merch.	Highest grade allowing NFF knots is #2 Merch.
Highest grade allowing holes is #2 Merch.	Highest grade allowing holes is #3 Common.

## R List Dimension 6/4 & Thicker up to not including 6" Thick Review

### Some Thought-Provoking Concepts



- 1 R List Dimension is a stress rated item?  
**No**
- 2 Grade Names?  
**Select Merch, #1 Merch, #2 Merch, and #3 Common**
- 3 Faces Graded?  
**Worst face**
- 4 What is the highest grade allowing White Specks?  
**#2 Merch. - 25% volume**
- 5 Purpose Intended?  
**Strength**
- 6 What is the highest grade allowing wane?  
**SEL. Merch. - 1/2" across corner**
- 7 What is the highest grade allowing shake?  
**#2 Merch - thru up to 2'.**
- 8 What is the highest grade allowing 1 in 8 SOG?  
**Select Merch**
- 9 What is the highest grade permitting unsound wood?  
**#3 Common - 1 1/2" x width of piece or equivalent every 2' (worst area)**
- 10 What is the highest grade allowing knot holes?  
**6/4" - 3" = #2 Merch.  
3" to 6" = #3 Common**