

## NET-3 Section 4.XX. Softwood Lumber

### 4.XX. Softwood Lumber

#### 4.XX.1. Test Equipment

- 304 mm (12 in) caliper with 0.01 mm (0.0005 in) graduations (or digital equivalent) for labeled dimensions up to 304 mm (12 in).
- Set of precision gage blocks.
- For labeled dimensions exceeding 304 mm (12 in), a steel linear measure with 1 mm ( $\frac{1}{16}$  in or 0.062 in) graduations.
- Calculator
- Dimensional Lumber Worksheet
- Wood moisture meter (i.e., A meter equipped with a probe or dual probes and a hammer head handle for inserting the probes into the sample and that can have the moisture values manually or automatically corrected for different species of wood.)
- The latest version of U.S. Department of Commerce (DOC), Voluntary Product Standard PS 20 “American Softwood Lumber Standard.”

#### 4.XX.2. Test Procedure

This procedure may be used to verify the width, length, and thickness of regularly shaped dimensional lumber. Software lumber is generally represented by both the nominal dimension and the minimum dressed sizes. Testing is based on the minimum dressed sizes for both unseasoned (green) and dry lumber as found in the latest version of the U.S. DOC, Voluntary Product Standard PS 20 “American Lumber Softwood Standard.” Lumber substitutes (i.e., composite) are not covered under PS 20 and must be labeled by actual dimensions.

NOTE: Lumber substitutes must be labeled by their actual dimensions.

1. Follow Section 2.3.1. “Define the Inspection Lot.” Use a “Category A” sampling plan in the inspection; select a random sample.
  - The lot must be sorted by like items (i.e., species, grade, dry) including dimensions and mill number. Identify the nominal size of each piece (e.g., 38 mm × 89 mm [2 in × 4 in], 38 mm × 286 mm [2 in × 12 in], or 19 mm × 140 mm [1 in × 6 in]) and the minimum dressed size (from U.S. DOC, Voluntary Product Standards PS-20).
  - Remove any outer pieces (top, sides) that have been exposed to the elements (e.g., weather, rain, moisture, sun) from the lot.
2. Set up in an area away from foot traffic or material moving equipment. Place the piece of wood to be measured on a solid flat surface.
3. Verify the accuracy of the calipers using the gage blocks. Use the calipers to measure thickness and width and record the actual dimensions on the “Worksheet for Softwood Lumber.”

- For commodities labeled 3 m (10 ft) or less in length, take a minimum of three measurements across the thickness and three measurements across the width. Measurements should be evenly spaced at equal intervals (i.e., at locations approximately  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  across the thickness and width). Calculate the average thickness and width measurement of each piece of wood.
- For commodities labeled greater than 3 m (10 ft) in length, take one additional measurement per every additional 1.8 m (6 ft) or portion thereof.

Note: Do not take measurements within 150 mm (6 in) from the ends or in areas where the lumber has a knot or damage would affect the measurement.

4. Use a steel linear measure to determine the length of the piece of wood and record the actual length on the worksheet.
  - Take a minimum of three measurements across the length. Measurements should be evenly spaced at equal intervals (i.e., at locations across the length at approximate intervals of  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  distance). Calculate the average length measurement of each piece of wood.

Note: Do not take measurements in areas where the lumber has a knot or damage, which would affect the measurement.

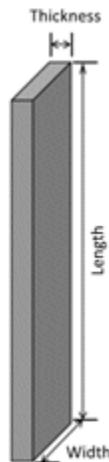


Figure 1. Example of lumber dimensions measured.

#### 4.XX.2.1. Shrinkage Allowance

Lumber is a product that shrinks and swells with changes in moisture content. The size of the lumber changes approximately 1 % for each 4 % change in moisture content.

##### a. Dry Lumber

The latest version of U.S. DOC, Voluntary Product Standard PS 20 defines dry lumber as being 19 % or less in moisture content.

1. Compare the actual dimensions of thickness, width, and length of each piece to the minimum dressed sizes in NIST Handbook 130, “Uniform Regulation for the Method of Sale of Commodities” Table 1. “Softwood Lumber Sizes” and record the differences as errors on the worksheet.

2. Calculate the average errors for thickness, width, and length. The dressed sized can exceed the nominal value for an individual piece.
  3. If the average error is a minus value, perform a moisture test on each piece using a wood moisture meter.
    - If the moisture content of the piece is equal to or greater than 19 %, the sample piece fails. No moisture loss allowance is provided.
    - If the moisture content of the piece is equal to or greater than 15 % and less than 19 %, allow 1 % for shrinkage in each dimension. (Allow 0.7 % for shrinkage for Redwood, Western Red Cedar, and Northern White Cedar.)
    - If the moisture content of the piece is equal to or greater than 11 % and less than 15 %, allow 2 % for shrinkage in each dimension. (Allow 1.4 % for shrinkage for Redwood, Western Red Cedar, and Northern White Cedar).
    - If the moisture content is less than 11 %, continue to apply an additional 1 % for shrinkage for every 4 % in moisture as referenced above.
- b. Unseasoned (Green) Lumber

The latest version of the U.S. DOC Voluntary Product Standard PS 20 defines unseasoned (green) lumber as being over 19 % in moisture content.

1. Compare the actual dimensions of thickness, width, and length of each piece to the minimum dressed sizes in NIST Handbook 130, “Uniform Regulation for the Method of Sale of Commodities,” Table 1. “Softwood Lumber Sizes” and record the differences as errors on the worksheet.
2. Calculate the average errors for thickness, width, and length. The dressed size can exceed the nominal value for an individual piece.
3. If the average error is a minus value, perform a moisture test on each piece.
  - If the moisture content of the piece is equal to or greater than 30 % the sample piece fails. No moisture allowance is provided.
  - If the moisture content of the piece is equal to or greater than 26 % and less than 30 % moisture, allow 1 % for shrinkage in each dimension.
  - If the moisture content of a piece is equal to or greater than 22 % and less than 26 %, allow 2 % for shrinkage in each dimension. 2 (Allow 1.4 % for shrinkage for Redwood, Western Red Cedar, and Northern White Cedar).
  - If the moisture content is less than 22 %, continue to apply an additional 1 % shrinkage for every 4 % loss in moisture as referenced above.

#### 4.XX.3. Evaluation of Results

1. To determine lot conformance, return to Section 2.3.7. “Evaluate for Compliance.”
2. If the sample pieces do not meet the average and MAV requirement based on the minimum dressed sizes after the shrinkage (moisture) allowances are considered, the lot fails. Place the Inspection Lot on hold.

**\*Inspectors should notify the American Lumber Standard Committee (ALSC) of any lots that fail compliance. ALSC may be able to provide further evaluation.**

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**(Added 20XX)**

### Worksheet for Softwood Lumber

<b>Product:</b>		<b>Manufacturer/Mill Number:</b>						
<b>Labeled Dimensions:</b>		<b>Address:</b>			<b>City/State/Zip:</b>			
<b>Length:</b>								
<b>Width:</b>		<b>Brand/Grade/Surface:</b>			<b>Testing Location:</b>			
<b>Thickness:</b>								
<b>Piece Number</b>	<b>Average Length</b>	<b>Average Width</b>	<b>Average Thickness</b>		<b>Piece Number</b>	<b>Average Length</b>	<b>Average Width</b>	<b>Average Thickness</b>
1.					7.			
<b>Error:</b>					<b>Error:</b>			
2.					8.			
<b>Error:</b>					<b>Error:</b>			
3.					9.			
<b>Error:</b>					<b>Error:</b>			
4.					10.			
<b>Error:</b>					<b>Error:</b>			
5.					11.			
<b>Error:</b>					<b>Error:</b>			
6.					12.			
<b>Error:</b>					<b>Error:</b>			
<b>Total Average:</b>								
<b>Average Error:</b>								

**Worksheet for Software Lumber**

**MAV for Packages Labeled by Length, Width, or Area (Table 2-8)**

- 1 m (1 yd) or less in 3 % of labeled quantity.
- More than 1 m (1 yd) to 43 m (48 yd) is 1.5 % of labeled quantity.

**Section 1. Compliance with Maximum Allowable Variation**

1. Calculate the MAV for labeled thickness = \_\_\_\_\_. Do any of the minus errors for thickness exceed the MAV?
  - a. If yes, go to Section 5.
  - b. If no, go to Section 2.
2. Calculate the MAV for length = \_\_\_\_\_. Do any of the minus errors for width exceed the MAV?
  - a. If yes, go to Section 5.
  - b. If no, go to Section 3.
3. Calculate the MAV for labeled width = \_\_\_\_\_. Do any of the minus errors for length exceed the MAV?
  - a. If yes, go to Section 5.
  - b. If no, go to Section 4.

**Section 2. Compliance with the Average Requirement – Thickness**

4. Calculate the Average Error for labeled thickness \_\_\_\_\_. The sample passes this requirement if the Average Error is zero or a positive number. Go to Section 3. If the Average Error is a negative number, go to Step 5.
5. Calculate the Sample Standard Deviation (*s*) and multiply (*s*) by the Sample Correction Factor (*SCF*) for the sample size to obtain the Sample Error Limit (*SEL*). Go to Step 6.  
$$(s) \times (SCF) = SEL$$
6. Disregarding the signs, is the *SEL* in Step 5 larger than the Average Error in Step 4? If yes, the lot passes on thickness. If no, go to Section 3.

**Section 3. Compliance with the Average Requirement – Length**

7. Calculate the Average Error for labeled length \_\_\_\_\_. The sample passes this requirement if the Average Error is zero or a positive number. Go to Section 4. If the Average Error is a negative number, go to Step 8.
8. Calculate the Sample Standard Deviation (*s*) and multiply (*s*) by the Sample Correction Factor (*SCF*) for the sample size to obtain the Sample Error Limit (*SEL*). Go to Step 9.  
$$(s) \times (SCF) = SEL$$
9. Disregarding the signs, is the *SEL* in Step 8 larger than the Average Error in Step 7? If yes, the lot passes on length. If no, go to Section 4.

**Worksheet for Software Lumber**

**Section 4. Compliance with the Average Requirement – Width**

**10.** Calculate the Average Error for labeled width \_\_\_\_\_. The sample passes this requirement if the Average Error is zero or a positive number. Go to Section 6. If the Average Error is a negative number, go to Step 11.

**11.** Calculate the Sample Standard Deviation (*s*) and multiply (*s*) by the Sample Correction Factor (*SCF*) for the sample size to obtain the Sample Error Limit (*SEL*). Go to Step 12.

$$(s) \text{_____} \times (SCF) \text{_____} = SEL \text{_____}$$

**12.** Disregarding the signs, is the *SEL* in Step 11 larger than the Average Error in Step 10? If yes, approve the lot. If no, go to Section 5.

**Section 5. Determine Shrink Allowance**

If the average error for any dimension (thickness, length, width) is a minus value, or if the MAV is exceeded for any piece, perform a moisture test on each piece to determine if a shrinkage allowance should be applied. Apply the appropriate allowance to each piece, then re-calculate the average error and re-determine compliance with the MAV.

Piece Number	Moisture Content	Shrinkage Allowance		Piece Number	Moisture Content	Shrinkage Allowance
1.				7.		
2.				8.		
3.				9.		
4.				10.		
5.				11.		
6.				12.		

**Section 6. Action Taken:**     Lot Rejected     Lot Approved

<b>Comments:</b>	<b>Official Name/Signature:</b>
	<b>Date:</b>

**Random Numbers:** Enter the numbers as you select them in the top row and reorder them in the bottom row.
