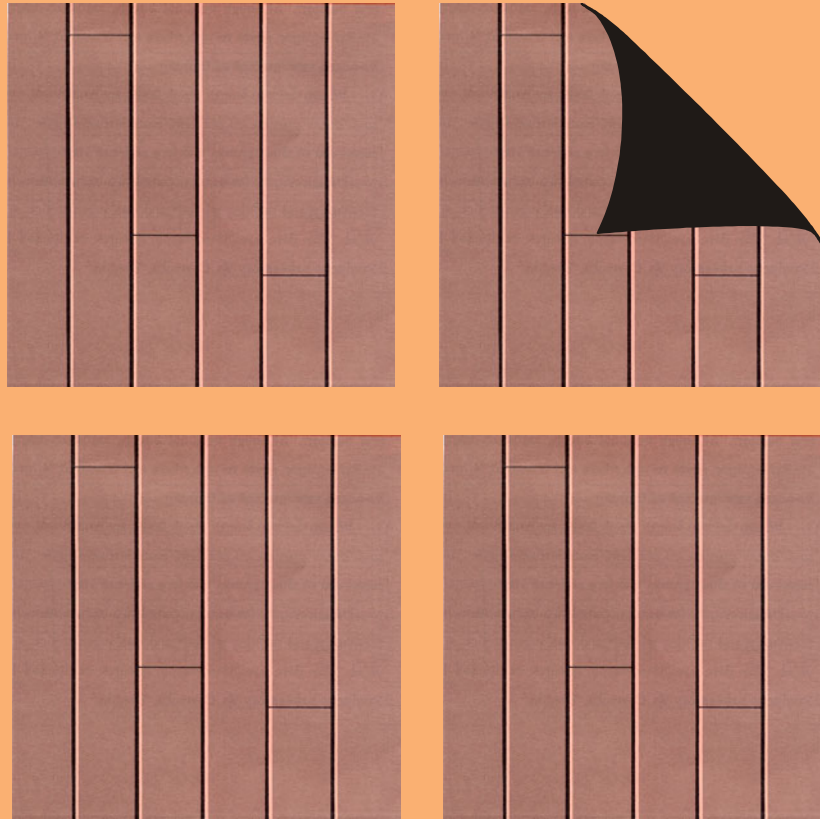


# TONGUE AND GROOVE ROOF DECKING



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## GENERAL

Timber tongue and groove decking is a specialty lumber product, constituting an important part of modern timber construction, that can be used for many applications to provide an all wood appearance. Nominal three and four inch decking is especially well adapted for use with glued laminated arches and girders and is easily and quickly erected. To be suitable for its intended purposes, timber tongue and groove decking must be well manufactured to a low moisture content.

Special effort has been made to ensure the accuracy of the information presented. It is intended that this document be used in conjunction with competent engineering design, accurate fabrication, and adequate supervision of construction. However, the American Forest and Paper Association does not assume any responsibility for errors or omissions in WCD No. 2 nor for engineering designs or plans prepared from it. The reader is encouraged to consult the current edition of the code and to consult the authority having jurisdiction.

## MATERIALS

### Decay Resistance

Structural members that are exposed to weather shall be preservatively treated or be from the heartwood of a naturally durable wood.

### Sawn Lumber

The lumber used in heavy timber framing members and roof decking shall be graded in accordance with the grading rules under which the species is customarily graded. Specific grading rules may be obtained from the respective rules writing agencies:

1. "Standard Grading Rules for Northeastern Lumber," Northeastern Lumber Manufacturers Association, 272 Tuttle Rd., PO Box 87A, Cumberland Center, ME 04021 (NELMA)
2. "Standard Specifications for Grades of California Redwood Lumber," Redwood Inspection Service, 405 Enfrente Dr., Suite 200, Novato, CA 94949 (RIS)
3. "Standard Grading Rules For Southern Pine Lumber," Southern Pine Inspection Bureau, 4709 Scenic Highway, Pensacola, FL 32504 (SPIB)
4. "Standard Grading Rules for West Coast Lumber, No. 17," West Coast Lumber Inspection Bureau, P.O. Box 23145, Portland, OR 97223 (WCLIB)
5. "Western Lumber Grading Rules," Western Wood Products Association, 522 SW Fifth, Suite 500, Portland, OR 97204 (WWPA)
6. "NLGA Standard Grading Rules for Canadian Lumber," National Lumber Grades Authority, 960 Quayside Dr., New Westminster, B.C., Canada V3M 6G2

## LENGTHS

Decking pieces may be of specified length or may be random length. All layup arrangements except controlled random layup require that the specifier indicate the required lengths.

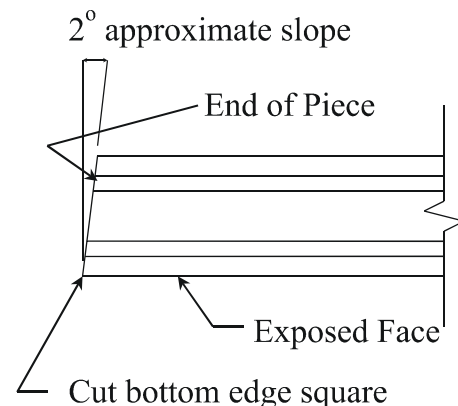
## MOISTURE CONTENT

The maximum moisture content shall be 15% for 2-inch nominal decking and 19% for 3- and 4-inch decking. Moisture content shall be determined by such methods as will assure these limitations.

## APPLICATION

Tongue-and-groove wood decking shall be installed with tongues up on sloped or pitched roofs, and outward in direction of laying on flat roofs. It is to be laid with pattern faces down and exposed on the underside. Each piece shall be square end trimmed. When random lengths are furnished, each piece must be "*square end trimmed*" across the face so that at least 90% of the pieces will be within 1/64 inches of square for each nominal 2" of width. When the end of a piece is beveled the vertical end cut may vary from square as shown in Figure 1.

**Figure 1. Beveled End Cut (optional)**



## NAILING SCHEDULES

At each support two-inch decking shall be toenailed through the tongue and face nailed with one nail, using 16d common nails.

Three and four-inch decking shall be toenailed at each support with one 40d nail and face nailed with one 60d nail. Courses for three and four inch decking shall be spiked to each other with 8 inch spikes at intervals not to exceed 30 inches through predrilled edge holes and with one spike at a distance not exceeding 10 inches from the end of each piece. See Figure 2 for drilling details.

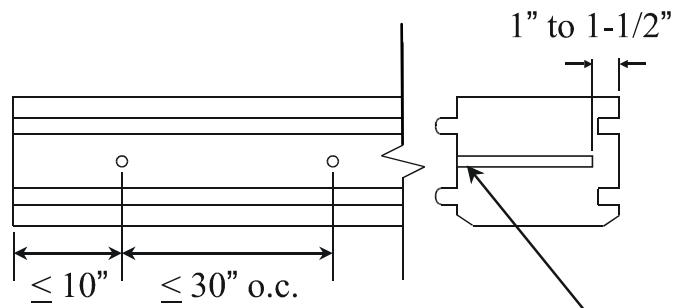
## LAYUPS

Heavy timber decking may be installed in any of the following arrangements:

### Simple Span

All pieces supported on two supports (Figure 3).

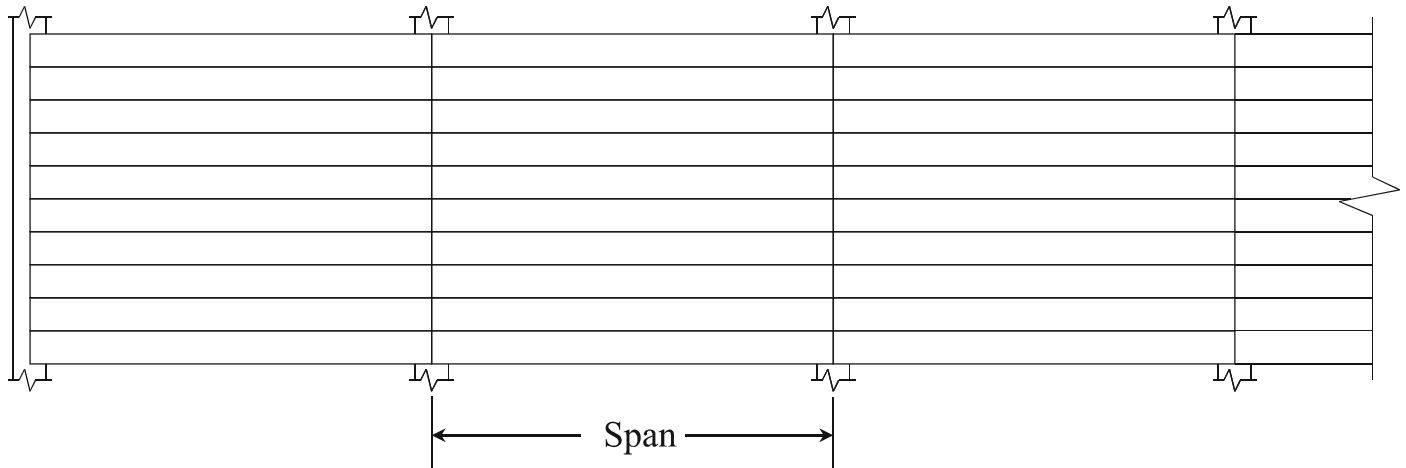
**Figure 2. Drilling Detail**



Hole diameter approximately same as nail diameter.

Locate end holes not over 10 inches from end of piece.

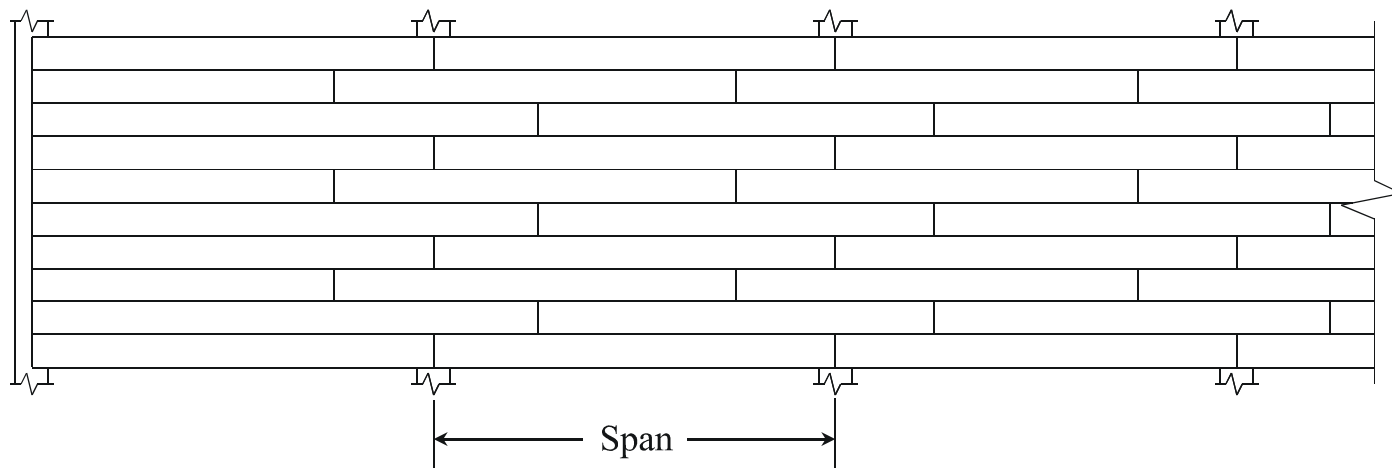
**Figure 3. Simple Span**



### Cantilevered Pieces Intermixed

This arrangement is applicable to 4 or more supports (3 or more spans). Pieces in the starter course and every third course are simple span. Pieces in other courses are cantilevered over the supports with end joints at alternate quarter or third points of the spans, and each piece rests on at least one support. A tie between supports is provided by the simple span courses of the arrangement (Figure 4).

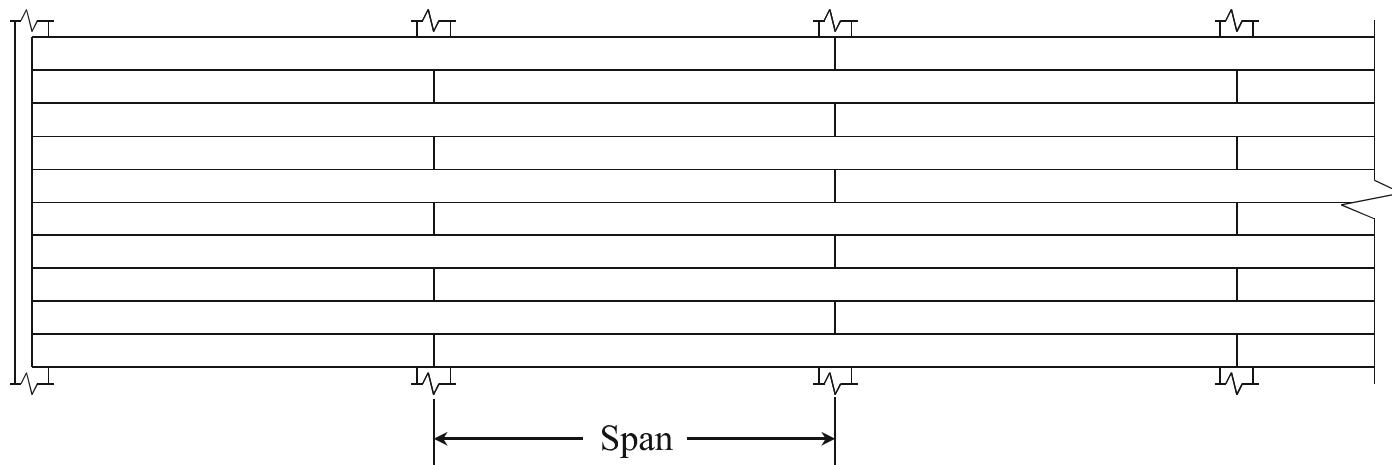
**Figure 4. Cantilevered Pieces Intermixed Layout**



### Combination Simple and Two-Span Continuous

Alternate pieces in end spans are simple span; adjacent pieces are two-span continuous. End joints are staggered in adjacent courses and occur over supports only (Figure 5).

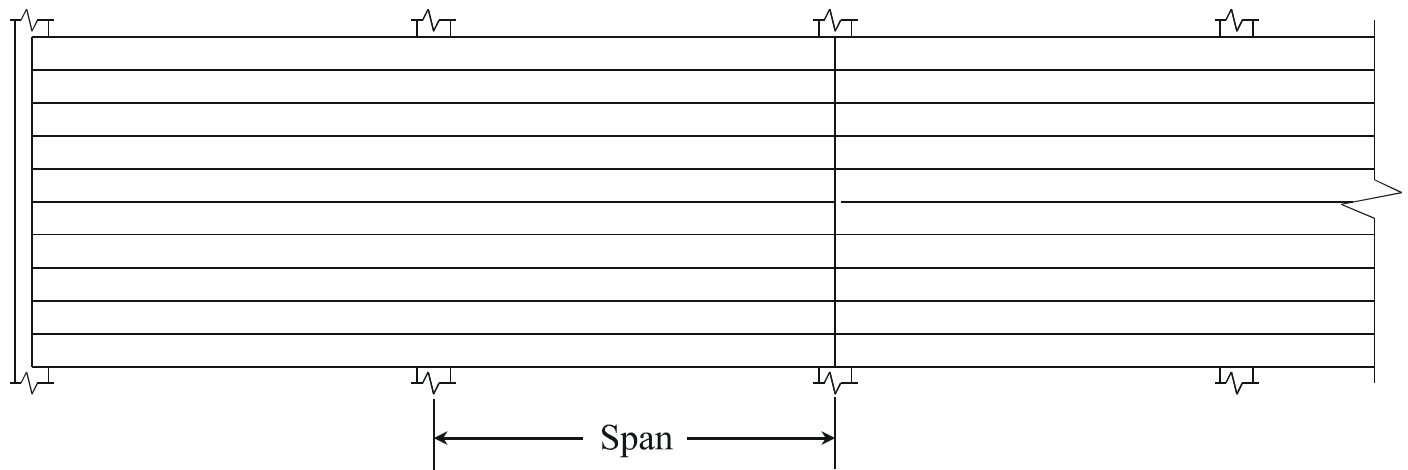
**Figure 5. Combination Simple and Two-Span Continuous Layout**



### Two-Span Continuous

All pieces are supported on three supports. All end joints occur in line on every other support (Figure 6).

**Figure 6. Two-span Continuous Layout**



### Controlled Random Layout

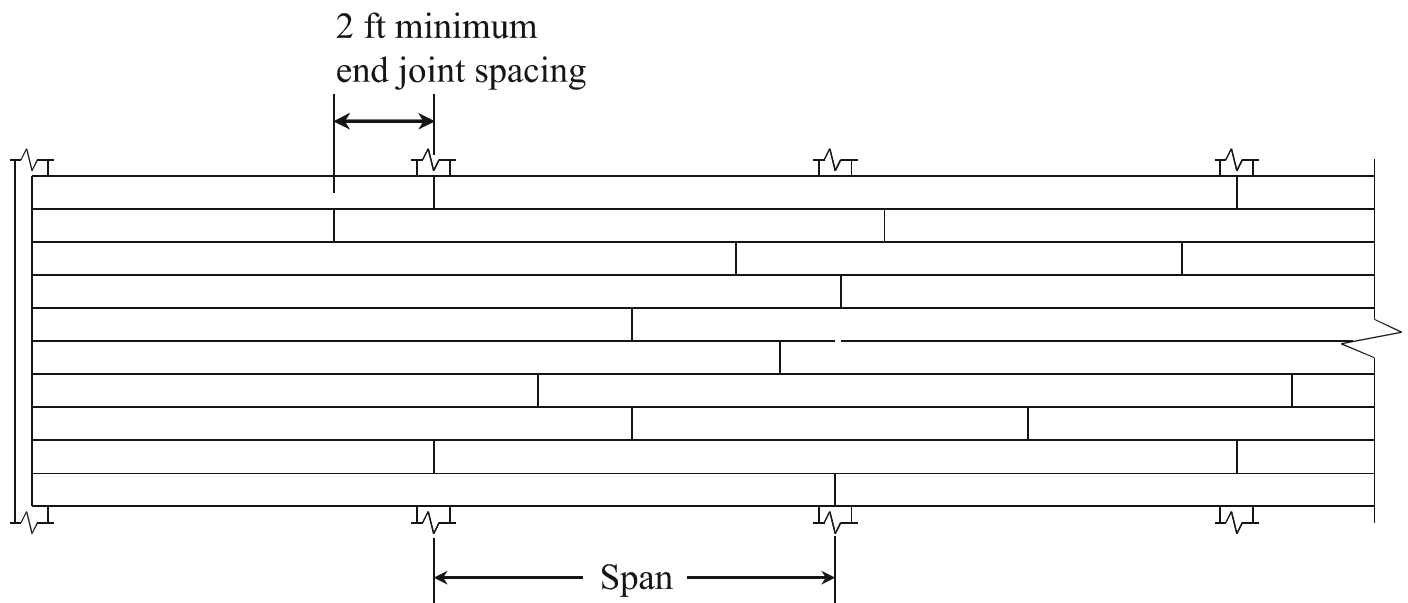
This arrangement is applicable to 4 or more supports (3 or more spans). With less than 4 supports, a special pattern requiring specified lengths must be used. Joints in the same general line (within 6 inches of being in line each way) shall be separated by at least two intervening courses. In the end bays each piece must rest on the end support or continue over the first interior support for at least 2 ft (Figure 7).

Two Inch Decking. There shall be a minimum distance of 2 feet between end joints in adjacent courses. To provide lateral restraint for the supporting member, the

pieces in at least the first and second courses must bear on at least two supports with end joints in these two courses occurring on alternate supports. A maximum of seven intervening courses is allowed before this pattern is repeated. If some other provision, such as plywood overlayment, is made to provide continuity, this pattern is not necessary.

End joints in 2 in. nominal thickness decking not occurring over supports when random length pieces are used shall (a) be matched tongued and grooved or (b) have metal splines inserted at ends so that loads may be distributed from end to end as well as across the planks.

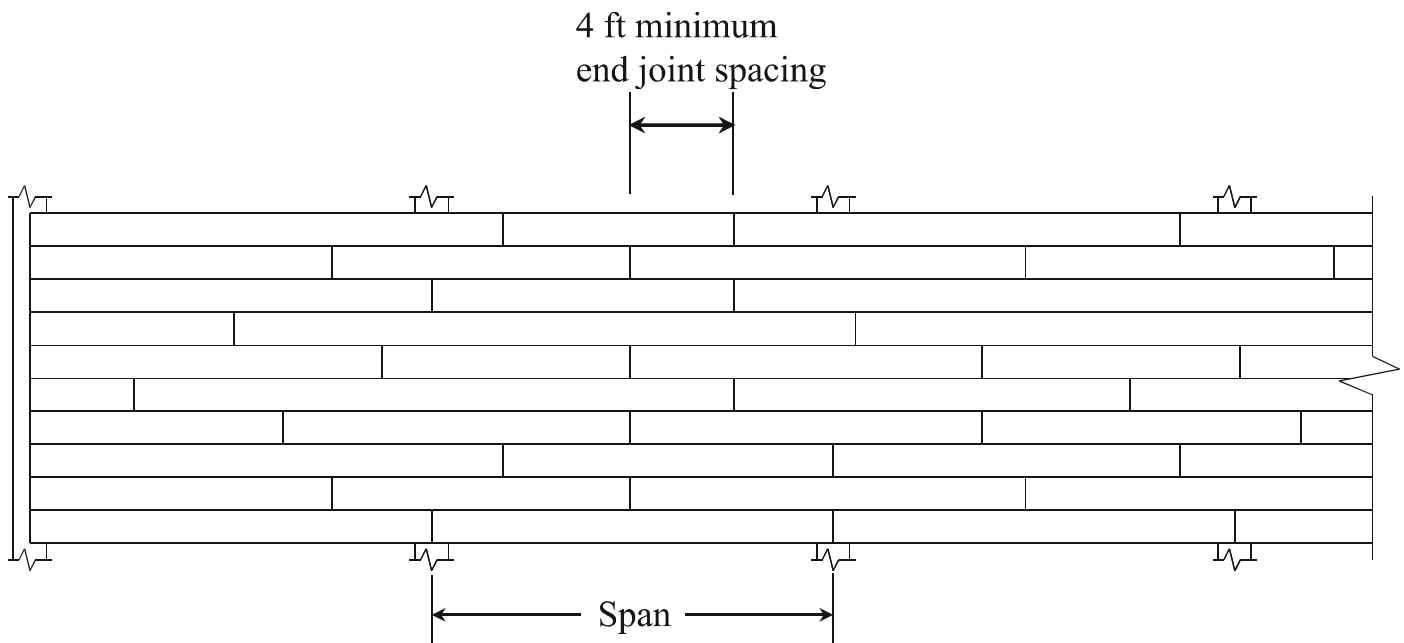
**Figure 7. Controlled Random Layout (Two-Inch Decking)**





Three and Four Inch Decking. There shall be a minimum distance of 4 feet between end joints in adjacent courses. For 3 and 4 inch decking in the interior bays, occasional pieces not resting over a support may occur provided the ends of the adjacent pieces in the same course are continued for at least 2 feet over the next support. This condition shall not occur more than once in every 6 courses in each interior bay (Figure 8).

**Figure 8. Controlled Random Layup (Three and Four Inch Decking)**



#### **Cantilever Spans With Controlled Random Layup**

When the overhang does not exceed 1-1/2 ft., 2 ft. and 3 ft. for nominal 2 inch, 3 inch, and 4 inch thick decking, respectively, no special considerations for layup are necessary. The maximum cantilever length for controlled random layup is limited to 0.3 times the length of the first adjacent interior span. For cantilever overhangs exceeding the normal overhang, but not exceeding the maximum, a structural fascia should be fastened to each decking piece to maintain a continuously straight roof line. Also, there shall be no end joints in the cantilevered portion or within 1/2 the span ( $L/2$ ) of the bay adjacent to the cantilevered span.

## MINIMUM LENGTHS

If pieces are for controlled random layup, odd or even lengths are permitted, and the minimum lengths based on board feet percentages shall be as follows:

### Two Inch Decking

- Not less than 40% to be 14 ft. and longer
- Not more than 10% to be less than 10 ft.
- Not more than 1 % to be 4 to 5 ft.
- Minimum length is limited to 75% of the span length (i.e., for 8 ft. support spacing, 6 ft.)

### Three Inch Decking

- Not less than 40% to be 14 ft. and longer with at least 20% equal to or greater in length than the maximum span.
- Not more than 10% to be less than 10 ft.
- Not more than 1% to be 4 to 5 ft.

### Four Inch Decking

- Not less than 25% to be 16 ft. and longer with at least 20% equal to or greater in length than the maximum span
- Not less than 50% to be 15 ft. and longer
- Not more than 10% to be 5 to 10 ft.
- Not more than 1% to be 4 to 5 ft.

## SPAN TABLES AND LOADS

### Allowable Loads

Allowable loads for heavy timber decking may be determined by entering Tables 1 through 5 with the appropriate bending stress and modulus of elasticity values, and using the lower of the tabulated load values from the tables for the nominal thickness and span under consideration. Bending stress and modulus of elasticity values for wood decking species shall be determined in accordance with the current edition of the *National Design Specification® Supplement: Design Values for Wood Construction*.

Allowable loads given in Tables 1 through 5 are for the simple span and controlled random layup arrangements.

The allowable load given in Tables 1 and 2 are based on a maximum moisture content of 15% for 2 inch decking. The allowable loads given in Tables 3 through 5 are based on a maximum moisture content of 19% for 3 and 4 inch decking. If the maximum moisture content is limited to 15% for 3 and 4 inches decking, the allowable bending

stress valued given in Table 3 may be multiplied by 1.08 and the modulus elasticity values in Tables 4 and 5 may be multiplied by 1.05.

### Sloped Roofs

Allowable loads given in Tables 1 through 5 are in terms of total uniformly-distributed loads on a horizontal surface. For sloped roofs, dead loads are based on area of the roof while live loads provided in the building code are in terms of horizontal projection. For low slope roofs (slopes of 3 in 12 or less), roof area dead loads and horizontally-projected live loads can be conservatively added together with little error. For higher sloped roofs, some designers may wish to convert the roof area dead load and horizontally-projected live load into two load components, normal and parallel to the roof slope, to be used with the sloped-roof span.

To convert horizontally-projected live loads to a sloped-roof area live load:

$$W_{sr} = (w_{hp}) \cos(\theta)$$

where:

$$\theta = \text{roof slope}$$

$$W_{sr} = \text{sloped roof load (live)}$$

$$W_{hp} = \text{horizontally projected load (live)}$$

To convert the total sloped-roof area load (dead + live loads) to normal and parallel load components:

$$W_{\perp} = (w_{sr}) \cos(\theta)$$

$$W_{\parallel} = (w_{sr}) \sin(\theta)$$

where:

$$W_{\perp} = \text{total load normal to roof slope}$$

$$W_{\parallel} = \text{total load parallel to roof slope}$$

$$W_{sr} = \text{total sloped roof load (dead + live)}$$

To convert horizontally-projected spans to sloped-roof spans:

$$S_{SR} = S_{hp} / \cos(\theta)$$

where:

$$S_{hp} = \text{horizontally projected roof span}$$

$$S_{SR} = \text{sloped roof span}$$

Note: The sloped roof span should be used when calculating board footage.

### Controlled Random Layup Values

The allowable loads for controlled random layup of 2 inch nominal thickness decking as given in Tables 1 and 2, are based on the standard engineering formula for a three-equal-span, continuous, uniformly-loaded member; however, only  $2/3$  of the moment of inertia for the cross section was used in calculating the loads. Loads limited by deflection as given in Table 2, are for the maximum deflections in the end spans.

The allowable loads for controlled random layup of 3 and 4 inch nominal thickness decking as given in Tables 3 through 5, are based on the standard engineering formula for a three-equal-span, continuous, uniformly-loaded member; however, only 80% of the moment of inertia for the cross section was used in calculating the loads. Loads limited by deflection, as given in Tables 4 and 5, are for the maximum deflections in the end spans.

The percentage adjustments in moment of inertia take into account the differences between continuous decking without joints and the controlled random layup of decking as specified herein. The factors of  $2/3$  for 2 inch and 80% for 3 and 4 inch decking were selected after careful evaluation of tests and previous experience.

When controlled random layup as specified herein is used for unequal spans, non-uniform loading, cantilever action, or conditions other than covered herein by the tabulated values, the same adjustment factors should be applied to the moment of inertia used in standard engineering formulas representing the actual conditions of load and span.

**Table 1. Two Inch Nominal Thickness - Allowable Roof Load Limited by Bending**

Bending Stress, psi	Allowable Uniformly Distributed Total Roof Load <sup>1,2,3,4,5</sup> , psf													
	Simple Span, ft.							Controlled Random Layup Span, ft.						
	6	7	8	9	10	11	12	6	7	8	9	10	11	12
875	73	54	41	32	26	22	18	61	45	34	27	22	18	15
950	79	58	45	35	29	24	20	66	48	37	29	24	20	16
1000	83	61	47	37	30	25	21	69	51	39	31	25	21	17
1050	88	64	49	39	32	26	22	73	54	41	32	26	22	18
1100	92	67	52	41	33	27	23	76	56	43	34	28	23	19
1150	96	70	54	43	35	29	24	80	59	45	35	29	24	20
1200	100	73	56	44	36	30	25	83	61	47	37	30	25	21
1250	104	77	59	46	38	31	26	87	64	49	39	31	26	22
1300	108	80	61	48	39	32	27	90	66	51	40	33	27	23
1350	113	83	63	50	41	33	28	94	69	53	42	34	28	23
1400	117	86	66	52	42	35	29	97	71	55	43	35	29	24
1450	121	89	68	54	44	36	30	101	74	57	45	36	30	25
1500	125	92	70	56	45	37	31	104	77	59	46	38	31	26
1550	129	95	73	57	47	38	32	108	79	61	48	39	32	27
1600	133	98	75	59	48	40	33	111	82	63	49	40	33	28
1650	138	101	77	61	50	41	34	115	84	64	51	41	34	29
1700	142	104	80	63	51	42	35	118	87	66	52	43	35	30
1750	146	107	82	65	53	43	36	122	89	68	54	44	36	30
1900	158	116	89	70	57	47	40	132	97	74	59	48	39	33
2000	167	122	94	74	60	50	42	139	102	78	62	50	41	35

<sup>1</sup> Tabulated values are based on 1-1/2 in. net thickness. For 1-7/16 in. decking multiply the tabulated allowable loads by 0.918

<sup>2</sup> To determine allowable uniformly distributed loads for other span conditions, use simple span load values for combination simple and two-span continuous, and two span continuous layouts; and use controlled random layup load values for cantilevered pieces intermixed layup.

<sup>3</sup> Duration of Load,  $C_D = 1.0$  used in this table. For other load durations, adjust by the appropriate factor.

<sup>4</sup> No increase for size effect has been applied, ( $C_F = 1.00$ ).

<sup>5</sup> Dry conditions of use.

**Table 2. Two Inch Nominal Thickness - Allowable Roof Load Limited by Deflection**

Modulus of Elasticity, psi	Deflection Limit <sup>2</sup>	Allowable Uniformly Distributed Total Roof Load <sup>1,3,4,5,6</sup> , psf													
		Simple Span, ft.						Controlled Random Layup Span, ft.							
		6	7	8	9	10	11	12	6	7	8	9	10	11	12
700000	L/180	32	20	14	10	7	5	4	41	26	17	12	9	7	5
	L/240	24	15	10	7	5	4	3	31	19	13	9	7	5	4
800000	L/180	37	23	16	11	8	6	5	47	29	20	14	10	8	6
	L/240	28	17	12	8	6	5	3	35	22	15	10	8	6	4
900000	L/180	42	26	18	12	9	7	5	53	33	22	16	11	9	7
	L/240	31	20	13	9	7	5	4	39	25	17	12	9	6	5
1000000	L/180	46	29	20	14	10	8	6	58	37	25	17	13	9	7
	L/240	35	22	15	10	8	6	4	44	28	18	13	9	7	5
1100000	L/180	51	32	21	15	11	8	6	64	40	27	19	14	10	8
	L/240	38	24	16	11	8	6	5	48	30	20	14	10	8	6
1200000	L/180	56	35	23	16	12	9	7	70	44	30	21	15	11	9
	L/240	42	26	18	12	9	7	5	53	33	22	16	11	9	7
1300000	L/180	60	38	25	18	13	10	8	76	48	32	22	16	12	9
	L/240	45	28	19	13	10	7	6	57	36	24	17	12	9	7
1400000	L/180	65	41	27	19	14	11	8	82	51	34	24	18	13	10
	L/240	49	31	21	14	11	8	6	61	39	26	18	13	10	8
1500000	L/180	69	44	29	21	15	11	9	88	55	37	26	19	14	11
	L/240	52	33	22	15	11	8	7	66	41	28	19	14	11	8
1600000	L/180	74	47	31	22	16	12	9	93	59	39	28	20	15	12
	L/240	56	35	23	16	12	9	7	70	44	30	21	15	11	9
1700000	L/180	79	50	33	23	17	13	10	99	62	42	29	21	16	12
	L/240	59	37	25	17	13	10	7	74	47	31	22	16	12	9
1800000	L/180	83	52	35	25	18	14	10	105	66	44	31	23	17	13
	L/240	63	39	26	19	14	10	8	79	50	33	23	17	13	10

<sup>1</sup> Tabulated values are based on 1-1/2 in. net thickness. For 1-7/16 in. decking multiply the tabulated allowable loads by 0.880.

<sup>2</sup> For a deflection limit of L/360, use 1/2 the tabulated value for a deflection limit of L/180.

<sup>3</sup> To determine allowable uniformly distributed loads for other span conditions, multiply controlled random layup load values by the following factors:

Cantilever pieces intermixed;	1.05
Combination simple span and two-span continuous;	1.31
Two-span continuous;	1.85

<sup>4</sup> Duration of Load,  $C_D = 1.0$  used in this table. For other load durations, adjust by the appropriate factor.

<sup>5</sup> No increase for size effect has been applied, ( $C_F = 1.00$ ).

<sup>6</sup> Dry conditions of use.

**Table 3. Three and Four Inch Nominal Thickness - Allowable Roof Load Limited by Bending - Simple Span and Controlled Random Layups (3 or More Spans)**

Bending Stress, psi	Allowable Uniformly Distributed Total Roof Load <sup>1,3,5,6,7</sup> , psf																									
	3 inch nominal thickness <sup>2</sup> , Span, ft.												4 inch nominal thickness <sup>4</sup> , Span, ft.													
	8	9	10	11	12	13	14	15	16	17	18	19	20	8	9	10	11	12	13	14	15	16	17	18	19	20
875	114	90	73	60	51	43	37	32	28	25	23	20	18	223	176	143	118	99	85	73	64	56	49	44	40	36
950	124	98	79	65	55	47	40	35	31	27	24	22	20	242	192	155	128	108	92	79	69	61	54	48	43	39
1000	130	103	83	69	58	49	43	37	33	29	26	23	21	255	202	163	135	113	97	83	73	64	57	50	45	41
1050	137	108	88	72	61	52	45	39	34	30	27	24	22	268	212	172	142	119	101	88	76	67	59	53	48	43
1100	143	113	92	76	64	54	47	41	36	32	28	25	23	281	222	180	148	125	106	92	80	70	62	55	50	45
1150	150	118	96	79	67	57	49	43	37	33	30	27	24	293	232	188	155	130	111	96	83	73	65	58	52	47
1200	156	123	100	83	69	59	51	44	39	35	31	28	25	306	242	196	162	136	116	100	87	77	68	60	54	49
1250	163	129	104	86	72	62	53	46	41	36	32	29	26	319	252	204	169	142	121	104	91	80	71	63	57	51
1300	169	134	108	90	75	64	55	48	42	37	33	30	27	332	262	212	175	147	126	108	94	83	73	66	59	53
1350	176	139	113	93	78	67	57	50	44	39	35	31	28	345	272	221	182	153	130	113	98	86	76	68	61	55
1400	182	144	117	96	81	69	60	52	46	40	36	32	29	357	282	229	189	159	135	117	102	89	79	71	63	57
1450	189	149	121	100	84	71	62	54	47	42	37	33	30	370	292	237	196	164	140	121	105	93	82	73	66	59
1500	195	154	125	103	87	74	64	56	49	43	39	35	31	383	302	245	202	170	145	125	109	96	85	76	68	61
1550	202	159	129	107	90	76	66	57	50	45	40	36	32	396	313	253	209	176	150	129	113	99	88	78	70	63
1600	208	165	133	110	93	79	68	59	52	46	41	37	33	408	323	261	216	181	155	133	116	102	90	81	72	65
1650	215	170	138	114	95	81	70	61	54	48	42	38	34	421	333	270	223	187	159	138	120	105	93	83	75	67
1700	221	175	142	117	98	84	72	63	55	49	44	39	35	434	343	278	229	193	164	142	123	108	96	86	77	69
1750	228	180	146	121	101	86	74	65	57	50	45	40	36	447	353	286	236	198	169	146	127	112	99	88	79	71
1900	247	195	158	131	110	94	81	70	62	55	49	44	40	485	383	310	256	216	184	158	138	121	107	96	86	78
2000	260	206	167	138	116	99	85	74	65	58	51	46	42	510	403	327	270	227	193	167	145	128	113	101	90	82

<sup>1</sup> These load values may also be used for cantilevered pieces intermixed, combination simple span and two-span continuous, and two-span continuous layups.

<sup>2</sup> Tabulated values are based on 2-1/2 in. net thickness. For 2-5/8 in. decking multiply the tabulated allowable loads by 1.10.

<sup>3</sup> When using controlled random layups spans greater than 14 feet for 3-inch decking and greater than 16 feet for 4-inch decking requires special ordering of additional lengths to assure that at least 20% of the decking is equal to the span length or longer.

<sup>4</sup> 3-1/2 in. net thickness

<sup>5</sup> Duration of Load,  $C_D = 1.0$  used in this table. For other load durations, adjust by the appropriate factor.

<sup>6</sup> No increase for size effect has been applied, ( $C_F = 1.00$ ).

<sup>7</sup> Dry conditions of use.

**Table 4. Three and Four Inch Nominal Thickness - Allowable Roof Load Limited by Deflection - Simple Span Layup**

Modulus of Elasticity, psi	Deflection Limit <sup>1</sup>	Allowable Uniformly Distributed Total Roof Load <sup>4,5,6</sup> , psf																					
		3 inch nominal thickness <sup>2</sup> , Span, ft.										4 inch nominal thickness <sup>3</sup> , Span, ft.											
		8	9	10	11	12	13	14	15	16	8	9	10	11	12	13	14	15	16	17	18	19	20
700000	L/180	63	44	32	24	19	15	12	10	8	174	122	89	67	51	40	32	26	22	18	15	13	11
	L/240	47	33	24	18	14	11	9	7	6	130	91	67	50	39	30	24	20	16	14	11	10	8
800000	L/180	72	51	37	28	21	17	13	11	9	198	139	102	76	59	46	37	30	25	21	17	15	13
	L/240	54	38	28	21	16	13	10	8	7	149	105	76	57	44	35	28	23	19	16	13	11	10
900000	L/180	81	57	42	31	24	19	15	12	10	223	157	114	86	66	52	42	34	28	23	20	17	14
	L/240	61	43	31	23	18	14	11	9	8	167	118	86	64	50	39	31	25	21	17	15	13	11
1000000	L/180	90	64	46	35	27	21	17	14	11	248	174	127	95	74	58	46	38	31	26	22	19	16
	L/240	68	48	35	26	20	16	13	10	8	186	131	95	72	55	43	35	28	23	19	16	14	12
1100000	L/180	99	70	51	38	29	23	19	15	12	273	192	140	105	81	64	51	41	34	28	24	20	17
	L/240	75	52	38	29	22	17	14	11	9	205	144	105	79	61	48	38	31	26	21	18	15	13
1200000	L/180	109	76	56	42	32	25	20	16	14	298	209	152	115	88	69	56	45	37	31	26	22	19
	L/240	81	57	42	31	24	19	15	12	10	223	157	114	86	66	52	42	34	28	23	20	17	14
1300000	L/180	118	83	60	45	35	27	22	18	15	323	227	165	124	96	75	60	49	40	34	28	24	21
	L/240	88	62	45	34	26	21	16	13	11	242	170	124	93	72	56	45	37	30	25	21	18	15
1400000	L/180	127	89	65	49	38	30	24	19	16	347	244	178	134	103	81	65	53	43	36	30	26	22
	L/240	95	67	49	37	28	22	18	14	12	261	183	133	100	77	61	49	40	33	27	23	19	17
1500000	L/180	136	95	69	52	40	32	25	21	17	372	261	191	143	110	87	69	56	47	39	33	28	24
	L/240	102	71	52	39	30	24	19	15	13	279	196	143	107	83	65	52	42	35	29	25	21	18
1600000	L/180	145	102	74	56	43	34	27	22	18	397	279	203	153	118	93	74	60	50	41	35	30	25
	L/240	109	76	56	42	32	25	20	16	14	298	209	152	115	88	69	56	45	37	31	26	22	19
1700000	L/180	154	108	79	59	46	36	29	23	19	422	296	216	162	125	98	79	64	53	44	37	31	27
	L/240	115	81	59	44	34	27	22	17	14	316	222	162	122	94	74	59	48	40	33	28	24	20
1800000	L/180	163	114	83	63	48	38	30	25	20	447	314	229	172	132	104	83	68	56	47	39	33	29
	L/240	122	86	63	47	36	28	23	19	15	335	235	172	129	99	78	63	51	42	35	29	25	21

<sup>1</sup> For a deflection limit L/360, use 1/2 the tabulated value for a deflection limit of L/180.

<sup>2</sup> Tabulated values are based on 2-1/2 in. net thickness. For 2-5/8 in. decking multiply the tabulated allowable loads by 1.147.

<sup>3</sup> 3-1/2 in. thickness

<sup>4</sup> Duration of Load,  $C_D = 1.0$  used in this table. For other load durations, adjust by the appropriate factor.

<sup>5</sup> No increase for size effect has been applied, ( $C_F = 1.00$ ).

<sup>6</sup> Dry conditions of use.

**Table 5. Three and Four Inch Nominal Thickness - Allowable Roof Load Limited by Deflection - Controlled Random Layup (3 or More Spans)**

Modulus of Elasticity, psi	Deflection Limit <sup>2</sup>	Allowable Uniformly Distributed Total Roof Load <sup>1,4,6,7,8</sup> , psf																									
		3 inch nominal thickness <sup>3</sup> , Span, ft.										4 inch nominal thickness <sup>5</sup> , Span, ft.															
		8	9	10	11	12	13	14	15	16	17	18	19	20	8	9	10	11	12	13	14	15	16	17	18	19	20
700000	L/180	96	67	49	37	28	22	18	15	12	10	8	7	6	263	185	135	101	78	61	49	40	33	27	23	20	17
	L/240	72	50	37	28	21	17	13	11	9	7	6	5	5	197	138	101	76	58	46	37	30	25	21	17	15	13
800000	L/180	109	77	56	42	32	26	20	17	14	11	10	8	7	300	211	154	116	89	70	56	46	38	31	26	22	19
	L/240	82	58	42	32	24	19	15	12	10	9	7	6	5	225	158	115	87	67	52	42	34	28	23	20	17	14
900000	L/180	123	86	63	47	36	29	23	19	15	13	11	9	8	338	237	173	130	100	79	63	51	42	35	30	25	22
	L/240	92	65	47	36	27	22	17	14	12	10	8	7	6	253	178	130	97	75	59	47	38	32	26	22	19	16
1000000	L/180	137	96	70	53	41	32	26	21	17	14	12	10	9	375	264	192	144	111	87	70	57	47	39	33	28	24
	L/240	103	72	53	39	30	24	19	16	13	11	9	8	7	282	198	144	108	83	66	53	43	35	29	25	21	18
1100000	L/180	150	106	77	58	45	35	28	23	19	16	13	11	10	413	290	211	159	122	96	77	63	52	43	36	31	26
	L/240	113	79	58	43	33	26	21	17	14	12	10	8	7	310	218	159	119	92	72	58	47	39	32	27	23	20
1200000	L/180	164	115	84	63	49	38	31	25	21	17	14	12	11	450	316	231	173	133	105	84	68	56	47	40	34	29
	L/240	123	86	63	47	36	29	23	19	15	13	11	9	8	338	237	173	130	100	79	63	51	42	35	30	25	22
1300000	L/180	178	125	91	68	53	41	33	27	22	19	16	13	11	488	343	250	188	145	114	91	74	61	51	43	36	31
	L/240	133	94	68	51	40	31	25	20	17	14	12	10	9	366	257	187	141	108	85	68	56	46	38	32	27	23
1400000	L/180	192	135	98	74	57	45	36	29	24	20	17	14	12	526	369	269	202	156	122	98	80	66	55	46	39	34
	L/240	144	101	74	55	43	33	27	22	18	15	13	11	9	394	277	202	152	117	92	74	60	49	41	35	29	25
1500000	L/180	205	144	105	79	61	48	38	31	26	21	18	15	13	563	395	288	217	167	131	105	85	70	59	49	42	36
	L/240	154	108	79	59	46	36	29	23	19	16	14	11	10	422	297	216	162	125	98	79	64	53	44	37	32	27
1600000	L/180	219	154	112	84	65	51	41	33	27	23	19	16	14	601	422	308	231	178	140	112	91	75	63	53	45	38
	L/240	164	115	84	63	49	38	31	25	21	17	14	12	11	450	316	231	173	133	105	84	68	56	47	40	34	29
1700000	L/180	233	163	119	89	69	54	43	35	29	24	20	17	15	638	448	327	245	189	149	119	97	80	67	56	48	41
	L/240	174	123	89	67	52	41	33	26	22	18	15	13	11	479	336	245	184	142	112	89	73	60	50	42	36	31
1800000	L/180	246	173	126	95	73	57	46	37	31	26	22	18	16	676	475	346	260	200	157	126	103	84	70	59	50	43
	L/240	185	130	95	71	55	43	34	28	23	19	16	14	12	507	356	259	195	150	118	95	77	63	53	44	38	32

<sup>1</sup> To determine allowable uniformly distributed loads for other span conditions, multiply controlled random layup load values by the following factors:

- Cantilever pieces intermixed; 0.9
- Combination simple span and two-span continuous; 1.13
- Two-span continuous; 1.59

<sup>2</sup> For a deflection limit of L/360, use 1/2 the tabulated value for a deflection limit of L/180.

<sup>3</sup> Tabulated values are based on 2-1/2 in. net thickness. For 2-5/8 in. decking multiply the tabulated allowable loads by 1.147.

<sup>4</sup> When using controlled random layups spans greater than 14 feet for 3-inch decking and greater than 16 feet for 4-inch decking requires special ordering of additional lengths to assure that at least 20% of the decking is equal to the span length or longer.

<sup>5</sup> 3-1/2 in. thickness

<sup>6</sup> Duration of Load, C<sub>D</sub> = 1.0 used in this table. For other load durations, adjust by the appropriate factor.

<sup>7</sup> No increase for size effect has been applied, (C<sub>F</sub> = 1.00).

<sup>8</sup> Dry conditions of use.



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