



Lock-Deck Laminated Decking

Lock-Deck is a structurally engineered product of two to five kiln-dried lumber laminations bonded together with an exterior waterproof adhesive to form glue-laminated decking.

The decking is used for ceilings and roofs, as well as for balconies, mezzanines and floors. With Lock-Deck, extraordinary designs can be created for homes, churches, offices and other structures.

Lock-Deck is commonly used in Heavy Timber construction as well as wood frame and hybrid systems.

Random length and long length (finger-jointed) decking, plus a variety of face patterns, textures and finishes broaden design possibilities.

Lock-Deck laminated decking provides a strong, dimensionally stable decking with all the beauty and warmth of natural wood.

Cover photography courtesy of Deck House, Inc., Acton, Mass., 800-727-3325.



Beaverton, Ore., Public Library



Church, Palm Beach Gardens, Fla., Unit Structures



Indoor Swimming Pool



Timbercraft Homes



Product Description

Species. Lock-Deck laminated decking is available in Douglas Fir/Larch, Ponderosa Pine, Western Red Cedar, and Southern Pine. Available on inquiry--Alaska Yellow Cedar, Redwood, White Fir, Idaho White Pine, SPF.

Grades

Supreme--Available in most species, this grade is manufactured with a "clear" face. This grade may contain occasional small knots or minor characteristics that do not detract from the overall appearance. The grade is the finest in quality and the ultimate in appearance. Supreme is for use where appearance is more important than budget.

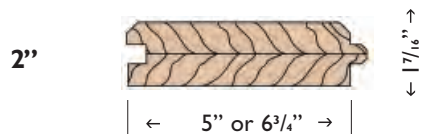
Decorative--Available in all species, this grade contains sound knots and natural wood characteristics. Occasional pieces may contain chipped edge knots, short end splits or seasoning checks, and pin holes. The most widely used grade, it is well suited to most applications.



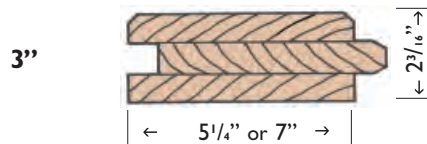
Pennsylvania Ski Lodge, Seech Industries

Service--Available on inquiry, this rustic grade is recommended for industrial applications where strength is more important than appearance. This grade allows face knotholes, stain, end splits, skip, roller split, planer burn and other non-strength reducing characteristics.

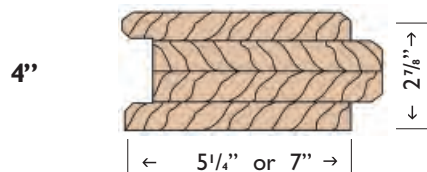
Nominal Sizes. 2x6, 2x8, 3x6, 3x8, 4x6, 4x8, 5x6 and 5x8. Following is the typical length assortment for 2", 3", 4" and 5" thicknesses.



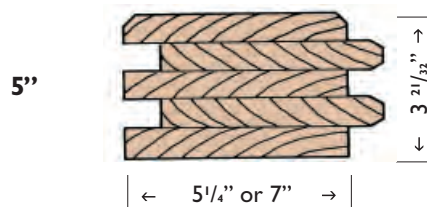
Minimum 15% combined 14' and/or 16', minimum 5% 16', maximum 85% 6' to 12', maximum 15% 6' to 9'.



Minimum 20% combined 14' and/or 16', minimum 10% 16', maximum 80% 6' to 12', maximum 10% 6' to 9'.



Minimum 35% combined 14' and/or 16', minimum 20% 16', maximum 65% 6' to 12', maximum 10% 6' to 9'.



Minimum 45% combined 14' and/or 16', minimum 30% 16', maximum 55% 6' to 12', maximum 7% 6' to 9'.

Patterns. Standard Vee, Square Edge, Channel, Bull Nose. Center laminations are offset and machined to form a tongue and groove on both the edges (center match) and the ends (end match).

Lengths. Random 6' to 16', shipped in multiples of 1' and 1" short of nominal. Specified lengths and lengths 18' to 24' or longer are available on inquiry.

Surface Textures. Five textures are offered, with samples available on request.

- Smooth Surfaced
- Smooth Sanded
- Coarse Sanded (16 grit)
- Resawn (crossband saw texture)
- Wire Brushed

Moisture Content. 10% to 12% average, maximum 15%.

Adhesive. 100% exterior waterproof type, meeting ASTM D2559. Laminated decking is cured under pressure using high frequency electronics in a radio frequency (RF) press.

Quality Control. Manufactured in accordance with ANSI/AITC A190.1 and certified by an independent inspection agency.

Factory Finishing. Available in factory applied, oven dried, acrylic semi-transparent colors. See page 8.

Manufacturing Plants. Lock-Deck is manufactured in Chehalis, Washington and Warren, Arkansas.



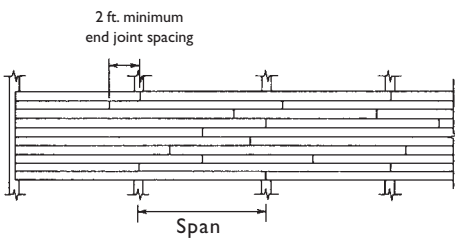
Lock-Deck Design

Allowable Uniform Loads

The table on page 5 provides allowable loads for random length continuous applications and simple spans.

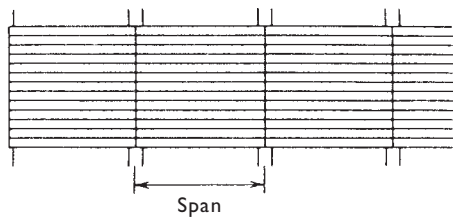
Random Length Continuous--A random length continuous configuration is applied over three or more spans. It is the most common method of applying Lock-Deck decking and the most economical. This configuration allows the use of mixed lengths of material on a variety of span conditions, providing high structural efficiency as well as attractive appearance.

$$\Delta = \frac{wL^4}{130EI} \quad F_b = \frac{wL^2}{6.67S}$$



Simple Spans--This configuration requires specified length decking and provides shorter spans for the same thickness decking than the random length layout.

$$\Delta = \frac{5}{384} \frac{wL^4}{EI} \quad F_b = \frac{wL^2}{8S}$$



- ▲ = Deflection, inches²
- E = Modulus of elasticity of the decking, lbs. per inches²
- I = Moment of inertia for a 1-foot wide strip, inches⁴
- S = Section modulus for a 1-foot wide strip, inches³
- F_b = Allowable unit stress for extreme fiber bending, lbs. per inch²
- L = Span, inches
- W = Unit load along a 1-foot wide strip, lbs. per inch

Estimating Factors and Footage Conversion

Nominal Size (Inches)	Actual Sizes (Inches)	Bd. Ft./ Sq. Ft.	Bd. Ft./ Lineal Ft.
2 x 6	1 7/16 x 5	2.40	1.000
2 x 8	1 7/16 x 6 3/4	2.37	1.334
3 x 6	2 3/16 x 5 1/4	3.43	1.500
3 x 8	2 3/16 x 7	3.43	2.000
4 x 6	2 7/8 x 5 1/4	4.57	2.000
4 x 8	2 7/8 x 7	4.57	2.667
5 x 6	3 21/32 x 5 1/4	5.71	2.500
5 x 8	3 21/32 x 7	5.71	3.334

Factors are exact and do not include waste or trim loss.

Section Properties -- One Foot Section¹

Nominal Thickness Inches	Actual Thickness Inches	Area Sq. in.	Moment of Inertia in. ⁴	Section Modulus in. ³
2"	1 7/16	17.26	2.97	4.14
3"	2 3/16	25.88	10.29	9.39
4"	2 7/8	33.95	23.44	16.30
5"	3 21/32	43.13	48.04	26.26

1. Cross sectional properties per running foot.

Design Weights (lbs/ft²)

Species	2" Nominal	3" Nominal	4" Nominal	5" Nominal	Shipping Wgts. lbs./MBF
Western Red Cedar ¹	3	4	6	7	1300
Cedar face with whitewood core	4	5	7	8	1450
White Fir, Ponderosa Pine	4	5	7	9	1550
Douglas Fir/Larch	4	6	8	11	1750
Southern Pine	5	7	9	12	2000

1. Includes Inland Red Cedar.

Allowable Stresses

Species	Modulus of Elasticity (E) psi	Extreme Fiber In Bending (F _b)		Shear Parallel to the Grain (F _v) psi
		Roof psi	Floor psi	
Western Red Cedar	1,200,000	1590	1380	150
Ponderosa Pine	1,300,000	1590	1380	150
Inland White Fir	1,500,000	1850	1610	130
Idaho White Pine	1,500,000	1850	1610	150
Douglas Fir/Larch	1,800,000	2640	2300	165
Southern Pine	1,800,000	2640	2300	200

Sloped Roof Deck -- Load Adjustment Factors¹

To calculate the allowable load for a sloped roof deck, apply the coefficient for the pitch to the load for a flat roof listed in the Allowable Load table below.

Slope	Slope
4:12 -- 1.05	9:12 -- 1.25
4 1/2:12 -- 1.07	9 1/2:12 -- 1.28
5:12 -- 1.08	10:12 -- 1.30
5 1/2:12 -- 1.10	10 1/2:12 -- 1.33
6:12 -- 1.12	11:12 -- 1.36
6 1/2:12 -- 1.14	11 1/2:12 -- 1.39
7:12 -- 1.16	12:12 -- 1.41
7 1/2:12 -- 1.18	12 1/2:12 -- 1.44
8:12 -- 1.20	14:12 -- 1.54
8 1/2:12 -- 1.23	16:12 -- 1.67

1. Estimated



Deck House, Inc.

Allowable Total Uniform Roof Load¹

Lock-Deck	Span	Douglas Fir, Larch ⁴ , Southern Pine E1.8 F _b =2640 ²				Idaho White Pine ⁵ , White Fir E1.5 F _b =1850 ²				Ponderosa Pine, Western Red Cedar Face E1.3 F _b =1590 ²				Western Red Cedar All Laminations E1.2 F _b =1590 ²			
		Simple		Continuous ³		Simple		Continuous ³		Simple		Continuous ³		Simple		Continuous ³	
		1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240	1/180	1/240
2"	4'	245	183	368(f)	309(f)	206	155	247(f)	247(f)	176	132	252(f)	223	162	122	274(f)	206
	5'	125	93	212	158	106	79	158	134	90	68	152	114	83	63	180	105
	6'	72	54	123	92	61	46	103	78	52	39	88	66	48	36	81	61
	7'	46	34	77	58	38	29	65	49	33	25	56	42	30	23	52	39
	8'	31	23	52	39	26	19	44	33	22	16	37	28	20	15	34	26
3"	9'	21	16	36	27	18	14	31	23	15	12	26	20	14	11	24	18
	8'	107	80	181	136	89	67	151	113	77	58	127(f)	98	71	54	121	91
	9'	75	56	127	96	63	47	106	80	54	41	92	69	50	38	85	64
	10'	55	41	93	70	46	34	77	58	40	30	67	50	37	27	62	46
	11'	41	31	70	52	34	26	58	44	30	22	50	38	27	21	47	35
4"	12'	32	24	54	40	26	20	45	34	23	17	39	29	21	16	36	27
	13'	25	19	42	32	21	16	35	26	18	14	31	23	17	12	28	21
	10'	125	94	212	159	104	78	168(f)	132	90	68	144(f)	115	83	63	141	106
	11'	94	70	159	119	78	59	132(f)	99	68	51	115	86	63	47	106	79
	12'	72	54	122	92	60	45	102	77	52	39	88	66	48	36	82	61
5"	13'	57	43	96	72	47	36	80	60	41	31	70	52	38	28	64	48
	14'	46	34	77	58	38	28	64	48	33	25	56	42	30	23	51	39
	15'	37	28	63	47	31	23	52	39	27	20	45	34	25	19	42	31
	16'	31	23	52	39	25	19	43	32	22	17	37	28	20	15	34	26
	15'	72	54	121	91	63	47	107	80	55	41	93	70	51	38	86	64
5"	16'	60	44	100	75	52	39	88	66	45	34	76	57	42	31	71	53
	17'	49	37	83	62	43	33	74	55	38	28	64	48	35	26	59	44
	18'	42	31	70	53	37	27	62	46	32	24	54	40	29	22	50	37
	19'	35	26	59	44	31	23	53	40	27	20	46	34	25	19	42	32
	20'	30	23	51	39	27	20	45	34	23	17	39	29	21	16	36	27

Footnotes:

1. Values followed by (f) are governed by bending stress. Allowable loads for floors where governed by deflection are half of those listed in the 1/180 column.
2. Bending stress relates to 2-month duration. It is not exceeded when the listed loads are applied based on recognized decking formulas.
3. Span/loads shown assume compliance to layout rules described elsewhere. Longer spans may require specific lengths differing from the standard shipment--consult your Disdero representative.
4. Nominal 5" Fir/Larch will have a MOE of 1.7 x 10⁶ psi unless special arrangements are made prior to manufacture.
5. Comparable values are obtained with Ponderosa Pine face and Douglas Fir/Larch centers and back.



Installation

General Requirements

Random Length Continuous (RLC) is the most common method of applying Lock-Deck. It allows the use of mixed lengths of material on a variety of span conditions, providing high structural efficiency and attractive appearance.

The allowable RLC roof loads recommended in the span table are based on actual full-scale tests, where the decking was laid in conformance with certain rules. Install as follows for equivalent performance.

1. The deck must be continuous over three or more spans of approximately equal length, with each piece of deck over at least one support. Other situations require special design.
2. Place decking to disperse end-joints as randomly as possible;
 - a. The distance between end-joints in

adjacent rows of decking is at least two feet.

- b. The distance between end-joints in rows of decking separated by only one row is at least one foot.
3. End spans shall be carefully planned and placed. To ensure that end spans perform as indicated by the Span Tables, follow one of these practices:
 - a. Eliminate end-joints in one-third of the decking courses, or
 - b. Provide a cantilevered overhang, free of end-joints, equal to 20% of the end span, or
 - c. Shorten the end span by 10%.

Where one of these practices cannot be applied, end span deflection may exceed the values shown. Construction practice generally accepts the 10% reduction in end spans.

4. Decking should be end-matched and toenailed within one foot of all ends (see Attachment Procedures, this page).

Diaphragm Construction

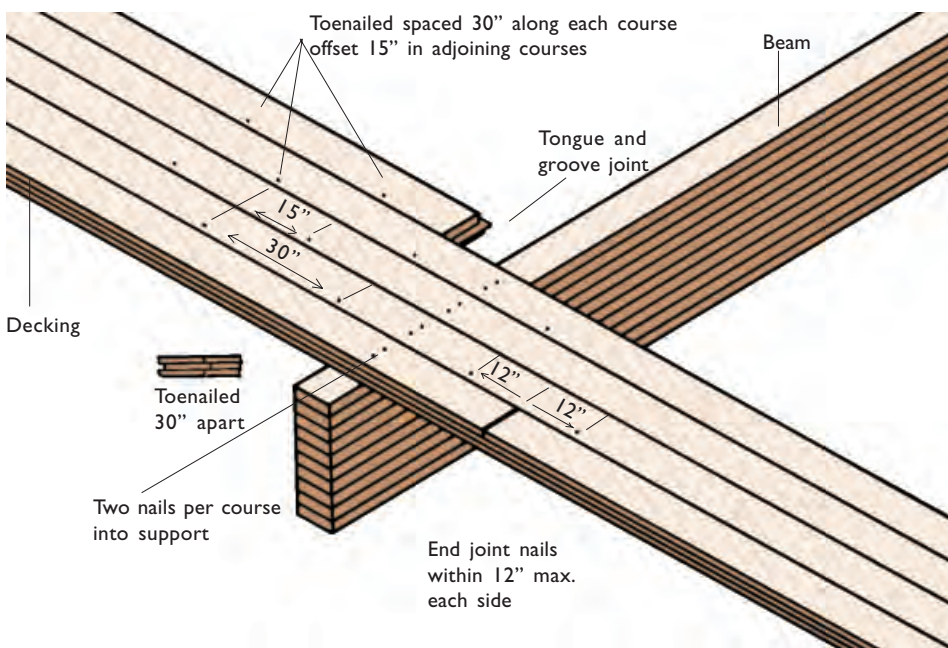
Lock-Deck can be engineered to carry diaphragm shear forces from earthquake and high-wind forces.

The most used method for obtaining diaphragm resistance is to install plywood or OSB over the Lock-Deck. The nailing of panel edges is the same as for panels installed over joists. The Lock-Deck provides the required blocking.

Lock-Deck laminated roof or floor decking in 3", 4", and 5" thicknesses may be designed to resist lateral forces when a 3/8" bead of 3M adhesive No. 5200 is applied on top of the tongue-and-groove joint between adjacent decking courses. Random applied decking may be used and the nailing schedule is the same as regular deck.

Either diaphragm design must have a continuous Chord along all sides to resist the moment forces.

Attachment Procedures



Nailing Schedule

Toenailing along Courses:

- 6d@30" o.c. for 2" nominal
- 8d@30" o.c. for 3" nominal
- 16d@30" o.c. for 4" nominal
- 16d@30" o.c. for 5" nominal

Face Nailing to Supports:

- 16d for 2" nominal
- 20d for 3" nominal
- 30d for 4" nominal
- 50d for 5" nominal

Screws

Screws can be used as an alternate providing equal shear and withdrawal resistance are provided.



Insulation / Specifications

Thermal Resistance

Decking will normally require additional insulation to meet today's energy codes. Rigid insulation or structural insulated panels can be installed over the decking to provide the desired insulating capacity.

Thermal Resistance Calculation (R) For Laminated Roof Deck Systems

Air film resistance, outside	0.17
Asphalt shingles	0.44
3/8" plywood or OSB sheathing	0.47
Vapor barrier	0.12
Air space	1.05
Air film resistance (inside)	0.61
3" laminated decking	4.00
6" rigid insulation R=5.4 per inch	32.40
Total R Value	39.26

Guide Specifications

Species: Select face from Western Red Cedar, Idaho White Fir, White Pine, Ponderosa Pine, Douglas Fir/Larch, or Southern Pine.

Grades: Supreme, Decorative, Service.

Textures: Select face from smooth surface, smooth sanded, course sanded (16 grit), resawn (cross band-saw texture), or wire brushed.

Nominal Sizes: 2x6, 2x8, 3x6, 3x8, 4x6, 4x8, 5x6, and 5x8.

Lengths: Random 6' to 16' or specified lengths up to 24'. End matched tongue-and-groove is standard. Square ends or end-matched available up to 20'. Lengths 18' to 24' may have structural finger-jointed lumber.

Pattern: Standard vee, square edge, channel, bull nose.

Moisture Content: 10% to 12% average, maximum 15%.

Adhesives: 100% exterior waterproof type, meeting ASTM D2559. Laminated decking is cured under pressure using high frequency electronics in a radio frequency (RF) press.

Factory Finish: Use factory applied, oven dried, acrylic semi-transparent colors.

Quality Control: Lumber to be graded under American Softwood Lumber Standard grading provisions. Glueline certification complies with ASTM D205 and AITC 200. Laminating is certified by an independent inspection agency.

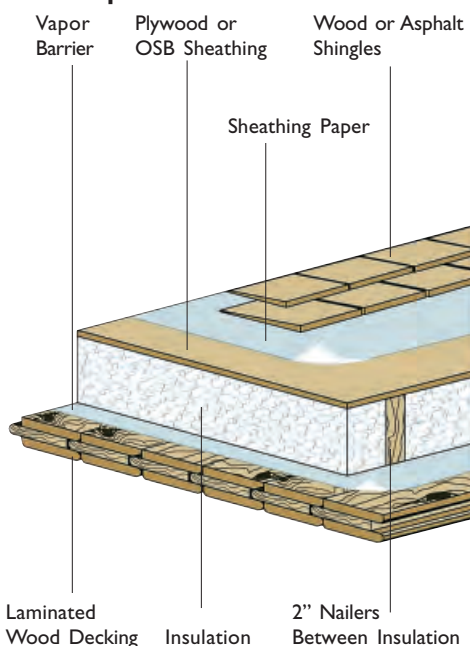
Decking Thermal Resistance -- R¹

Decking Thickness Nominal Inch	Cedar		White Fir		
	Western Red Cedar	Face Whitewood core & back	Idaho White & Ponderosa Pine	Douglas fir	Southern Pine
2	2.67	2.53	2.40	2.07	2.05
3	4.00	3.70	3.58	3.08	3.05
4	5.02	4.58	4.47	3.81	3.69
5	6.16	5.59	5.48	4.63	4.63

¹R = Total thermal resistance of the assembly without roofing or air film resistance.

Examples of Typical Roof Assemblies

Roof Slopes Over 4:12



Roof Slopes Under 4:12

