



# *Borough of Flemington*

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## **SAMPLE GUIDE FOR RESIDENTIAL WOOD DECKS**

1. Please refer to the 2009 International Residential Code/NJ Edition.
2. Please submit one plot plan showing deck location.
3. Please submit two sets of scaled drawings including all detailed dimensions. All drawings must indicate owner's name and signature, address of job site, block and lot number. To draw your own plans you must be owner and occupant of said property, if not, you will need drawings by a New Jersey Licensed Architect or New Jersey Registered Professional Engineer.
4. Secure a zoning permit from Zoning Department prior to submitting a construction permit application to the Construction Department.
5. The drawings submitted shall include the following information:
  - a. Show deck in relation to house.
  - b. Show door from house to deck. Indicate distance from top of threshold to deck (the deck should not be more than 8¼ inches below the top of the threshold)
  - c. Specify type of wood being used to construct deck. (Preservative treated wood, or "naturally durable wood" shall be provided). The term "preservative - treated wood" refers to wood (including plywood) pressure treated with preservatives. The term "naturally durable wood" refers to the heartwood of the following species: Redwood, cedar, black locust and black walnut.

(Exception) If the decking material or deck railings are made out of wood/plastic composite material, provide 2 copies of manufacturer's installation instructions.
  - d. Show sizes and spans between footings, columns, girders, joists. Show ledger size. Show flashing, decking, and guardrails for decks 30 inches above floor or grade below, handrails, stairways, lateral bracing and connectors.

**PIER FOOTINGS:** Minimum 36 inches deep and 12 inches in diameter minimum. Footings shall be supported on undisturbed natural soils. Minimum thickness of concrete to be 8 inches at the bottom of the footing. **Note: Footings may need to be belled to a larger size at the bottom depending on the bearing capacity of the soil and the size of the deck.**

**COLUMNS:** Minimum of 4" x 4" posts anchored to footings and secured to girder to prevent girder rotation and deck uplift. If the post is to be notched to accept a beam or girder, then a minimum 6" X 6" post is required.

## Acceptable Spans for Girders and Joists

**GIRDERS:** Note - Any joints in girder must be directly above the support columns.

Table 3. Deck Beam Spans ( $L_B$ ) <sup>1</sup> for Joists Framing from One Side Only		Joist Spans ( $L_J$ ) Less Than or Equal to:						
Species	Size <sup>4</sup>	6'	8'	10'	12'	14'	16'	18'
Southern Pine	2-2x6	7' - 1"	6' - 2"	5' - 6"	5' - 0"	4' - 8"	4' - 4"	4' - 1"
	2-2x8	9' - 2"	7' - 11"	7' - 1"	6' - 6"	6' - 0"	5' - 7"	5' - 3"
	2-2x10	11' - 10"	10' - 3"	9' - 2"	8' - 5"	7' - 9"	7' - 3"	6' - 10"
	2-2x12	13' - 11"	12' - 0"	10' - 9"	9' - 10"	9' - 1"	8' - 6"	8' - 0"
	3-2x6	8' - 7"	7' - 8"	6' - 11"	6' - 3"	6' - 10"	5' - 5"	5' - 2"
	3-2x8	11' - 4"	9' - 11"	8' - 11"	8' - 1"	7' - 6"	7' - 0"	6' - 7"
	3-2x10	14' - 5"	12' - 10"	11' - 6"	10' - 6"	9' - 9"	9' - 1"	8' - 7"
	3-2x12	17' - 5"	15' - 1"	13' - 6"	12' - 4"	11' - 5"	10' - 8"	10' - 1"
Douglas Fir, Larch <sup>2</sup> , Hem-Fir <sup>2</sup> , SPF <sup>2</sup> , Redwood, Western Cedars, Ponderosa Pine <sup>3</sup> , Red Pine <sup>3</sup>	3x6 or 2-2x6	5' - 5"	4' - 8"	4' - 2"	3' - 10"	3' - 6"	3' - 1"	2' - 9"
	3x8 or 2-2x8	6' - 10"	5' - 11"	5' - 4"	4' - 10"	4' - 6"	4' - 1"	3' - 8"
	3x10 or 2-2x10	8' - 4"	7' - 3"	6' - 6"	5' - 11"	5' - 6"	5' - 1"	4' - 8"
	3x12 or 2-2x12	9' - 8"	8' - 5"	7' - 6"	6' - 10"	6' - 4"	5' - 11"	5' - 7"
	4x6	6' - 5"	5' - 8"	4' - 11"	4' - 6"	4' - 2"	3' - 11"	3' - 8"
	4x8	8' - 5"	7' - 3"	6' - 6"	5' - 11"	5' - 6"	5' - 2"	4' - 10"
	4x10	9' - 11"	8' - 7"	7' - 8"	7' - 0"	6' - 6"	6' - 1"	5' - 8"
	4x12	11' - 5"	9' - 11"	8' - 10"	8' - 1"	7' - 6"	7' - 0"	6' - 7"
	3-2x6	7' - 4"	6' - 8"	6' - 0"	5' - 6"	5' - 1"	4' - 9"	4' - 6"
	3-2x8	9' - 8"	8' - 6"	7' - 7"	6' - 11"	6' - 5"	6' - 0"	5' - 8"
3-2x10	12' - 0"	10' - 5"	9' - 4"	8' - 6"	7' - 10"	7' - 4"	6' - 11"	
3-2x12	13' - 11"	12' - 1"	10' - 9"	9' - 10"	9' - 1"	8' - 6"	8' - 1"	

1. Assumes 40 psf live load, 10 psf dead load, L/360 simple-span beam deflection limit, L/180 cantilever deflection limit, No. 2 grade, and wet service conditions.
2. Incising assumed for refractory species including Douglas fir-larch, hem-fir, and spruce-pine-fir.
3. Design values based on northern species with no incising assumed.
4. Beam depth must be equal to or greater than joist depth if joist hangers are used (see Figure 6, Option 3).

## FLOOR JOIST:

Table 2. Maximum Joist Spans ( $L_j$ )

Species	Size	Joist Spacing (o.c.)					
		Without Overhangs <sup>1</sup>			With Overhangs up to $L_j/4$ <sup>2</sup>		
		12"	16"	24"	12"	16"	24"
Southern Pine	2x8	13' - 8"	12' - 5"	10' - 2"	10' - 9"	10' - 9"	10' - 2"
	2x10	17' - 5"	15' - 10"	13' - 1"	15' - 6"	15' - 6"	13' - 1"
	2x12	18' - 0"	18' - 0"	15' - 5"	18' - 0"	18' - 0"	15' - 5"
Douglas Fir-Larch, Hem-Fir, SPF <sup>3</sup>	2x8	12' - 6"	11' - 1"	9' - 1"	9' - 5"	9' - 5"	9' - 1"
	2x10	15' - 8"	13' - 7"	11' - 1"	13' - 7"	13' - 7"	11' - 1"
	2x12	18' - 0"	15' - 9"	12' - 10"	18' - 0"	15' - 9"	12' - 10"
Redwood, Western Cedars, Ponderosa Pine <sup>4</sup> , Red Pine <sup>4</sup>	2x8	11' - 8"	10' - 7"	8' - 8"	8' - 6"	8' - 6"	8' - 6"
	2x10	14' - 11"	13' - 0"	10' - 7"	12' - 3"	12' - 3"	10' - 7"
	2x12	17' - 5"	15' - 1"	12' - 4"	16' - 5"	15' - 1"	12' - 4"

1. Assumes 40 psf live load, 10 psf dead load, L/360 deflection, No. 2 grade, and wet service conditions.

See Figure 1B.

2. Assumes 40 psf live load, 10 psf dead load, L/180 cantilever deflection with 220 lb point load, No. 2 grade, and wet service conditions. See Figure 1A and Figure 2.

3. Incising assumed for refractory species including Douglas fir-larch, hem-fir, and spruce-pine-fir.

4. Design values based on northern species with no incising assumed.

## CANTILEVERS:

Cantilever Spans for floor joists of decks is determined based on the available joist span (see table 2 above) divided by 4. The cantilever maximum length is  $\frac{1}{4}$  the length of the joist span based on table 2 above.

**LEDGER:** The connection between a deck ledger and a 2-inch nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with a minimum  $\frac{1}{2}$  inch diameter galvanized lag screws or bolts with washers in accordance with Table R502.2.2.1. listed below. **Note: The tip of the lag screw shall fully extend beyond the inside face of the band joist.** Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer.

**Placement of lag screws or bolts in deck ledgers.** The lag screws or bolts shall be placed 2 inches in from the bottom or top of the deck ledgers and between 2 and 5 inches in from the ends. The lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger.

**TABLE R502.2.2.1**  
**FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER**  
**AND A 2-INCH NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST<sup>c,19</sup>**  
 (Deck live load = 40 psf, deck dead load = 10 psf)

JOIST SPAN	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
<b>Connection details</b>	<b>On-center spacing of fasteners<sup>d,e</sup></b>						
1/2 inch diameter lag screw with 15/32 inch maximum sheathing <sup>a</sup>	30	23	18	15	13	11	10
1/2 inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
1/2 inch diameter bolt with 15/32 inch maximum sheathing and 1/2 inch stacked washers <sup>b,b</sup>	36	36	29	24	21	18	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479kPa.

- a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be 1/2".
- c. Ledgers shall be flashed to prevent water from contacting the house band joist.
- d. Lag screws and bolts shall be staggered in accordance with Section R502.2.2.1.1.
- e. Deck ledger shall be minimum 2 x 8 pressure-preservative-treated No.2 grade lumber, or other approved materials as established by standard engineering practice.
- f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1 inch thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.
- g. A minimum 1 x 9 1/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist.
- h. Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1 inch in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.

**FLASHING:** Provide continuous corrosion-resistive flashing along ledger in such a manner as prevent the passage of moisture into the wall of any untreated wood or wood siding. Non-clad aluminum flashing can no longer be used with ACQ treated lumber. Copper, copper clad, stainless steel or heavy UV resistant plastic may be used. (In addition check with preservative-treated wood manufacturer's requirements for the types of flashing that may be used).

**FASTENERS and CONNECTORS:** Fasteners for preservative-treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. Coating types and weights for connectors in contact with preservative-treated wood shall be in accordance with the connector manufacturer's recommendations. In the absence of manufacturer's recommendations, a minimum of ASTM A 653 type G185 zinc-coated galvanized steel, or equivalent, shall be used.

**GUARDS:** To be at least 36" above decking that is more than 30 inches above grade, and have balusters or other construction such that sphere with a diameter of 4 inches cannot pass through any opening. Exception: Openings for required guards on the sides of stairs treads shall not allow a sphere 4 3/8 inches to pass through. Guards shall be designed and constructed for a concentrated load of 200 pounds applied at any point and in any direction along the top railing member. The in-fill area of a guard system

shall be designed and constructed for a horizontal concentrated load of 50 pounds applied on a one square foot area at any point in the system, including inter-mediate rails or other elements serving this purpose. All stairways with a vertical rise of more than 30 inches are required to have guards on both sides measuring 34 inches or more in height above the leading edge of the tread. The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such size that a sphere 6 inches cannot pass through.

**STAIRWAYS:** Minimum stairway width is 36 inches. Maximum riser height is 8 1/4 inches. Minimum tread depth shall be 9 inches with a one inch nosing. (10" minimum.) A nosing of not less than 3/4 inches but not more than 1 1/4 inches shall be provided on stairways with a solid riser where the tread depth is less than 11 inches. Solid risers are not required provided that the opening between treads does not permit the passage of a sphere with a diameter of four (4) inches. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches or less.

**DIMENSIONAL UNIFORMITY:** There shall not be a variation exceeding 3/8" in the depth of adjacent treads or in the height of adjacent risers. The tolerance between the largest and smallest riser or between the largest and smallest tread shall not exceed 3/8" in any flight of stairs.

**LATERAL BRACING:** If deck is far enough above ground to cause it to sway, diagonal bracing must be installed between girder and posts. AF & PA DC 6-2009 indicates that a deck greater than 2' above grade needs diagonal bracing. This bracing is used to resist what is known as "pull-out" or the deck pulling away from the house.

**HANDRAILS:**

- a. Required on at least one (1) side of all continuous run of treads or flight with 4 or more risers.
- b. Minimum of 30" and maximum of 38" high measured vertically from the top of nosing of tread.
- c. Equivalent graspability of all handrails is required. There are 2 types of handrails, (See 2009 IRC/NJ Edition section R311.7.7.3. for complete grasp ability requirements).
- d. If mounted on a wall or a guardrail, minimum space between the wall or guard and the handrail is 1 1/2".
- e. Ends of the handrails shall be returned to a post or wall or terminate into a post or safety terminal.

**SLOPES:** The grade away from foundation walls shall fall a minimum of 6 inches within the first 10 feet.

Exception: Where slopes or other physical barriers prohibit 6 Inches of fall within 10 feet drains or swales shall be provided to ensure drainage away from the structure.

**EXIT FACILITIES:** Exterior exit balconies, stair or similar exit facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal.

**REQUIRED INSPECTIONS:**

1. The bottom of footings before placement of concrete.
2. Frame/Flashing/Ledger Attachment, Post Connections - before covering with decking.

Please note that there may be a need for multiple inspections at this point to verify code compliance for all framing portions of the deck construction.

3. Final



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