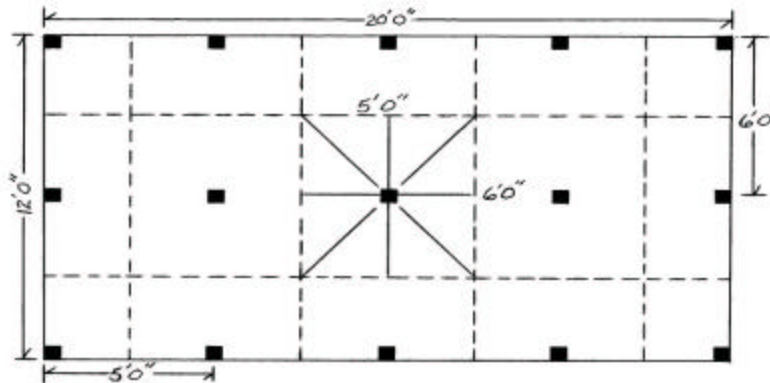


Residential Deck Design Guide

Step 1: Determine your footing size.

Footing size is based on the tributary area of deck that loads onto each individual footing. Tributary area is calculated by measuring half way to the next support (girder, house band, post) in every direction, then multiplying the length times the width of that rectangle. See example below.



Tributary Area: $5 \times 6 = 30$ sq. ft.

Find the square footage in the following chart, which in turn will give you the required minimum footing size. Please note that you cannot interpolate between sizes shown. (You must use the next largest size shown in the chart)

FOOTING CHART

Tributary Area	Precast 4"x 8"x16" Solid Blocks	Poured Concrete
Up to 36 Sq. Ft.	8"x 16"x 4" Deep	8"x16"x "6" Deep
Up to 40 Sq. Ft.	12"x 12"x 4" Deep	12"x 12"x 6" Deep
Up to 70 Sq. Ft.	16"x 16"x 8" Deep	16"x 16"x 8" Deep
Up to 100 Sq. Ft.		16"x 24"x 8" Deep
Up to 150 Sq. Ft.		24"x 24"x 8" Deep

All footings must be at least 12" below grade to the bottom of the footing.

If you ever plan to construct a roof over your deck, use one size larger than required in the chart above.

Step 2: Determine your post size.

Post size is determined solely on the height of your deck, measured the top of the footing to the girder. 4x4 treated posts can be used up to 8' high. 6x6 treated posts are okay up to 20' high. Any deck over 20' high must be designed by a professional engineer.

Step 3: Determine Girder size and span.

Girders support the floor joists, and are supported and connected to each post. The girder can be attached to the posts by bolting the girder boards to the side of the posts using two 5/8" diameter galvanized through-bolts per connection, or by notching the posts at least 1" under each girder board and bolting with one 5/8" diameter galvanized through-bolt per connection, or by resting the girder on top of each post and securing with a treated wood block nailed to the side of the post and the girder. Breaks/ends of girders must occur at posts with a minimum of 1-1/2" bearing on the post. There are two types of girders, dropped girder in which the girder is below the floor joists or a flush girder in which the joists are flush with the girder and attached by hangers or notched for a 2x2 ledger. Girder size is based on the tributary load of the deck being supported. The following table will provide maximum girder spans for doubled 2x8 or 2x10 girders, given the total length of joists loading on the girder.

GIRDER CHART

Maximum Girder Span between Posts

Total Joist Length	Two 2 x 8 Girder	Two 2 x 10
8'	8'	10'
9'	7'	8'
10'	6'	8'
11'	6'	8'
12'	6'	7'
13'	5'	7'
14'	5'	7'
15'	5'	6'
16'	5'	6'
18'	5'	5'
20'	4'	5'
22'	4'	5'
24'	4'	4'

Step 4: Determine your joist size.

FLOOR JOIST SPAN CHART

Joist Size	Spaced @	Will Span
2 x 6	12" O.C.	10' 9"
#2 SYP	16" O.C.	9' 9"
Treated	24" O.C.	8' 6"
2 x 8	12" O.C.	14' 2"
#2 SYP	16" O.C.	12' 10"
Treated	24" O.C.	11' 0"
2 x 10	12" O.C.	18' 0"
#2 SYP	16" O.C.	16' 1"
Treated	24" O.C.	13' 1"
2 x 12	12" O.C.	21' 9"
#2 SYP	16" O.C.	18' 10"
Treated	24" O.C.	15' 4"

Step 5: Specify method of attachment.

If the exterior of the house is siding, you can remove the siding and fibrous sheathing, install approved flashing and treated band to the house band using 5/8" diameter galvanized through-bolts at 20" on center (42" on center if the floor joists span 8' or less), in addition, nail band with three 12d galvanized nails on 6" centers (two 12d galvanized nails on 8" centers if the floor joists span 8' or less). Attach a 2x2 treated ledger to the bottom of the band using three nails per joist or an approved hanger.

If the house is bricked veneered, attach the deck band to the house as above, but bolt through the brick veneer and the house band on 16" centers (28" centers if the floor joist span 8' or less). Minimum edge distance for bolts in the deck band is 2-1/2 inches.

Your deck can be made freestanding by installing a girder within 2' of the house and letting the floor joists cantilever past the girder to the house. This unattached method requires additional bracing.

Step 6: Determine bracing requirements.

Freestanding decks require bracing in both directions (parallel to the house and perpendicular to the house), and attached decks over four feet high require bracing parallel to the house, utilizing one of the following methods.

- A. Install 4x4 diagonal bracing from the girder to at least one-third down each post. Secure each end with one 5/8" diameter galvanized through-bolt.
- B. Embed 4x4 posts 30" into a 12" diameter by 36" deep footing (maximum post height is 4' with 48 sq. ft. tributary area).
- C. Embed 6x6 posts 42" into a 20" diameter by 50" deep footing (maximum post height is 6' with 120 sq. ft. tributary area).
- D. Install 2x6 diagonal bracing (as close to 45 degrees as possible) from post to post with one 5/8" diameter galvanized through-bolt per connection.

All bays may not need bracing. A good rule of thumb is to brace at least half of the bays, and a minimum of two bays. Thus, if you have three support posts, both bays should have bracing. If you have four posts, two of the three bays should have bracing. With five posts, two of the four bays should have bracing, and so forth. Bracing of the deck posts should be in two different directions. Please note that if the post embedment method is used, all posts must conform to the embedment requirements.

Step 7: Specify your decking material.

Assuming that you are using treated pine decking, the following spans apply.

Nominal 1" (dressed to $\frac{3}{4}$ ") decking will span floor joists at 12" on center.

Nominal 1" tongue and groove decking will span floor joists at 16" on center.

Nominal $\frac{5}{4}$ decking will span floor joists at 24" on center.

Nominal 2" decking will span floor joists at 32" on center.

Step 8: Draw your deck plans.

The following is a plan/example that would be sufficient for a permit application.