

Maximum Height for a 4x4 Post

Q Is there a maximum allowable height for a 4x4 deck support post?

A Glenn Mathewson, a building inspector from Westminster, Colo., responds: Unfortunately, there are few pre-engineered and universally accepted standards that address this question.

The International Building Code and the International Residential Code (IRC), the foundations for most of the building codes in the United States, specify only that a post must be at least a 4x4. This isn't meant to imply that 4x4 posts are good for all conditions, merely that there's no condition where less than a 4x4 is acceptable. For most decks, post size is overlooked unless an inspector notices the unusual height of a particular deck. A short 4x4 can carry an awfully big load, and many deck builders use 6x6 posts as a standard, regardless of the height or load of the deck.

Though the height of a deck is often questioned only in regard to the requirement for guards, it is a factor in determining the height or "span" of the posts. When an undersized post is compressed along its axis by the weight of the deck above, the post can bend or bow, although complete failure is rare. Taller posts of a given cross section are more likely to bend than shorter ones. Additionally, the tributary load that each post will carry has a direct effect on its minimum required cross section.

The tributary load is the area supported by a single post multiplied

by the expected live and dead loads, typically 50 pounds per square foot. To find the tributary area, halve the joist and beam spans on all sides of the post (except that you must include the entire area of any cantilever adjacent to a post) and calculate the resulting area. Multiplying that area by the expected load tells you the weight a post is expected to carry. Deck builders may be more familiar with this exercise in determining the loading on footings. That said, without engineering knowledge or a table of prescribed post heights, knowing the tributary load isn't very useful.

Design Resources

Although the IRC says little about post sizing, the two sources described below go into greater detail. Either of those, or an engineered design, can be submitted to the regulatory jurisdiction as alternatives if requested.

Published by the American Forest and Paper Association (AF&PA), the DCA6 (Design for Code Acceptance #6) *Prescriptive Residential Wood Deck Construction Guide* is an alternative to the IRC that local authorities may allow, but they may require it to be used in its entirety (the document is available free at awc.org/publications/dca/dca6/dca6.pdf).

The DCA6 recommends minimum 6x6 posts with a maximum 12-foot height. Although the DCA6 contains no mention of the tributary load, its

joist and beam spans provide a maximum tributary load that should be within the capabilities of its post cross-sectional and height limitations (for more information about using the DCA6 to build a deck, see *Structure*, May/June 2008; free at deckmagazine.com).

Another document that provides a flexible post-sizing table is *Wood Decks: Materials, Construction, and Finishing* (Kent A. McDonald et al., The Forest Products Society, 1996). Tables 6 and 7 in this book show a range of tributary areas and post sizes; they were developed by the AF&PA and should still be valid for most designs. The one caveat is that the AF&PA has reduced its recommendations for the maximum post height. While the tables allow posts to reach a height of 17 feet in some instances, the AF&PA now recommends going no higher than 14 feet.

Otherwise, based on these tables (for Douglas fir or southern pine posts and a combined live and dead load of 50 psf), a 4-foot-tall 4x4 post could carry a maximum tributary area of 256 square feet, but a 4x4 that's 10 feet tall (the maximum allowed height) could carry only 36 square feet. Increasing the size of the post to 6x6 would mean that at 13 feet in height, the post could support 256 square feet.

Of course, it is up to the local inspector whether to accept this documentation. Extraordinary loads — say a 6x14 glue-laminated beam supporting long-spanning joists — are beyond any code or code alternative, and an engineered analysis would be necessary. ♦

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