

Frequently Asked Questions

Manufacturing Tolerances by Rachel Smith

One of the best reasons for using wood in construction is because it is easily cut and shaped and can be very forgiving dimensionally.

One of the limitations is that it can shrink, swell, twist, warp or bow. The result is that once a component piece is cut, its final shape may change from what was originally

intended. This is a fact of life when designing with wood, and most construction and manufacturing details allow for some play in the final results.

In the truss industry, our dimensional resolution is down to 1/16 of an inch, which is arguably even more refined than we can truly control in any type of wood frame construction. In the typical truss assembly line, an accuracy of 1/16 can be easier said than done. There is guidance to account for variations from designed to manufactured product.

QUESTION:

I am a structural engineer on a project with a wood trussed roof. I have noticed some variations in the peak height in a run of identical trusses. Do you have any information on tolerances for the final dimensions of manufactured trusses?

ANSWER:

Length ¹ of Finished Truss Unit	Variance from Design Dimensions
Up to 30 ft.	1/2 inch
Over 30 ft.	3/4 inch
Height ² of Finished Truss Unit	Variance from Design Dimensions
Up to 5 ft.	1/4 inch
Over 5 ft.	1/2 inch

TABLE 4.6.3 MANUFACTURING TOLERANCE FOR FINISHED TRUSS UNITS

¹LENGTH, FOR FABRICATION TOLERANCE PURPOSES, IS THE OVERALL LENGTH OF THE TRUSS UNIT, EXCLUDING OVERHANGS OR EXTENSIONS.

²HEIGHT, FOR FABRICATION TOLERANCE PURPOSES, IS THE OVERALL HEIGHT OF THE TRUSS UNIT MEASURED FROM THE TOP OF THE TOP CHORD TO THE BOTTOM OF THE BOTTOM CHORD AT THE HIGHEST POINT OF THE TRUSS, EXCLUDING PROJECTIONS ABOVE THE TOP CHORD AND BELOW THE BOTTOM CHORD, OVERHANGS AND EXTENSIONS.

Yes, The National Design Standard for Wood Truss Construction, ANSI/TPI 1-1995, provides guidance on manufacturing tolerances. Section 4.6.3 states, "Truss manufacturing dimensions which vary from the truss design drawing shall not exceed the tolerances shown in Table 4.6.3." Table 4.6.3, shown below, specifies that a 1/2 inch span variance on trusses up to 30 feet long is acceptable. This means the final manufactured dimension can be up to a 1/2 inch plus or minus the design dimension. It is better for the framer if all the trusses are 1" too long or too high than one truss 1/2" too short and the next 1/2" too long. The truss manufacturer's goal is to have all the trusses have the same height or length so that the plane they are forming is fairly flat. Once the jig is set in the truss plant this should be the result.

If there is significant variation in the trusses from one to the next, one of the issues to check is the amount of shrink, swell, twist, warp or bow from each truss.

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