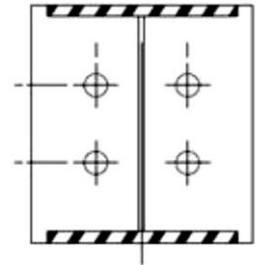


## Pinned Base Vs. Fixed Base Columns

December 2019

Column bases are the foundations for the columnar components of a steel building. The column base transfers loads to the building foundation and acts as a support for the structural loads. There are two key methods of connecting the column base to the foundation: Fixed and Pinned Base. Using fixed as opposed to pinned base columns could have an impact on the overall cost of a project. Do you put more money into the steel structure to support the loads and deflections? Or do you put more money into the foundations to resist the moment, or bending?

A **pinned base column** is the standard column base found in most metal buildings. This connection is pinned because it has enough stiffness to apply horizontal and vertical loads to the foundations, but enough flexibility to not apply moment. When deflection requirements are very stringent, pinned base will require much more steel than fixed base. The pinned base is typically very easy to install. Pinned base will be smaller at the base, but much larger in the haunch.



Pinned Base



Fixed Base

A **fixed base column** (also called a moment connection, where the term moment refers to bending loading) is more of a special situation base connection. This base has a lot of stiffness and will apply horizontal, vertical, and moment loads to the foundations. The additional stiffness at the base and in the columns, means less stiffness is required from the rest of the building's members. The foundations may need to be larger than those used for pinned base because of this moment. The installation of fixed base columns can also be more difficult because of the additional plates on the column and anchor rods required. Fixed base columns must also be straight columns and are typically deeper at its base in comparison to pinned base. Typically fixed base columns are recessed below finished floor. The graphic of the fixed base column, to the left, is just an example of what the baseplate could look like. There are a few options for this condition depending on the size of the building and the loading.

### Example

- Framing Type: Rigid Modular Single slope (2 @ 50'-0")
- Building Low Eave Height 40'-0"
- Horizontal Deflection Required =  $H/360$
- Building Width: 100'-0"
- Slope: 0.5 : 12

	<u>Pinned</u>	<u>Fixed Base</u>
Frame Weight	8,969 lbs	7,747 lbs
Wind Horizontal Deflection	$H/132$	$H/364$

Note: These results cannot be applied to projects of similar size. Location will determine the economics of your building.