

## PROPER APPLICATION OF THE 12" RULE IN CHAPTER 13 OF THE ASCE 7-16

When designing seismic restraints for mechanical and electrical distribution systems, there are exceptions that permit the system to be unrestrained. One of the exceptions that is commonly utilized by designers is what is known as "The 12" Rule".

Under the previous design standard (ASCE 7-10), the rules were relatively simple. Distribution systems would otherwise require bracing did not where the following requirements were met:

- Rods that are 12" long or less from the connection point of the structure to the connection of the system support.
- Rods must be detailed with swivel devices to prevent inelastic deformation from occurring.
- Provisions must be made to avoid impact of the system with nearby systems, equipment, or the surrounding structure.

One of the major issues with these simple rules was that there was no limit set for the size of the rod or the weight it was supporting, leaving room for the poor practice of applying this rule to rather large systems (such as 6" schedule 40 steel pipe full of water).

The new ASCE 7-16 addresses these problems by adding weight limits in order to prevent heavy distribution systems from using The 12 Inch Rule. The new rules for each type of distribution system are generally the same with only a few differences. It is important to note, these rules do not apply to fire protection piping, which must meet its own standard under the NFPA 13.

**For electrical distribution systems (conduit, cable tray, and raceways) per section 13.6.6 & ductwork systems per section 13.6.7:**

- Trapeze assemblies using 3/8" diameter rod 12" long or less from the attachment point on the trapeze to the attachment point to the structure and the total weight supported by any trapeze in a run does not exceed 100 lbs.

- Trapeze assemblies using 1/2" diameter rod 12" long or less from the attachment point on the trapeze to the attachment point to the structure and the total weight supported by any trapeze in a run does not exceed 200 lbs.
- Trapeze assemblies using 1/2" diameter rod 24" long or less from the attachment point on the trapeze to the attachment point to the structure and the total weight supported by any trapeze in a run does not exceed 100 lbs.
- Single rod supports with 3/8" or 1/2" diameter rod that are 12" long or less from the conduit, cable tray, raceway, or duct support attachment point to the attachment point to the structure and the total weight supported by any single rod in a run does not exceed 50 lbs.

**For pipe & tube systems per section 13.6.8.3:**

- Trapeze assemblies using 3/8" diameter rod 12" long or less from the attachment point on the trapeze to the attachment point to the structure, the total weight supported by any trapeze in a run does not exceed 100 lbs, and none of the pipes supported by the trapeze have diameters exceeding the Seismic Design Category limits listed on the next page for single hung pipe.
- Trapeze assemblies using 1/2" diameter rod 12" long or less from the attachment point on the trapeze to the attachment point to the structure, the total weight supported by any trapeze in a run does not exceed 200 lbs, and none of the pipes supported by the trapeze have diameters exceeding the Seismic Design Categories listed on the next page for single hung pipe.
- Trapeze assemblies using 1/2" diameter rod 24" long or less from the attachment point on the trapeze to the attachment point to the structure, the total weight supported any trapeze in a run does not exceed 100 lbs, and none of the pipes supported by the trapeze have diameters exceeding the Seismic Design Categories listed on the next page for single hung pipe.

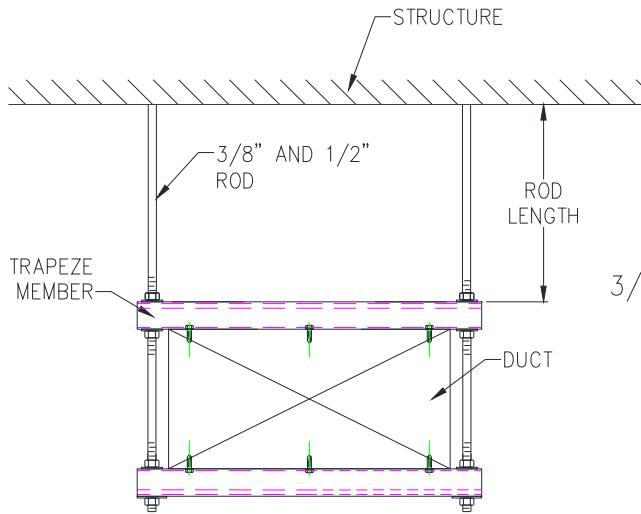
- Single hung supports with 3/8" or 1/2" diameter rod 12" long or less from the attachment point on the pipe to the attachment point to the structure for the full pipe run, the pipe has a design Rp value of 4.5 or greater, and the maximum weight per rod in a run does not exceed 50 lbs. Also, the maximum pipe diameter is limited by the Seismic Design Category of the project.
  - o The pipe diameter limits per Seismic Design Category are:
    - For a Seismic Design Category of C and  $I_p > 1.0$  the maximum pipe diameter is 2.0" or less.
    - For a Seismic Design Categories of D, E, or F and  $I_p > 1.0$  the maximum pipe diameter is 1.0" or less.
    - For a Seismic Design Categories of D, E, or F and  $I_p = 1.0$  the maximum pipe diameter is 3.0" or less.
- Pneumatic tube systems on trapeze assemblies using 3/8" diameter rod 12" long or less from the attachment point on the trapeze to the attachment point to the structure and the total weight supported by any trapeze in a run does not exceed 100 lbs.
- Pneumatic tube systems supported by individual 3/8" or 1/2" diameter rod 12" long or less from the attachment point on the tube to the attachment point to the structure and the total weight supported by a rod in a run does not exceed 50 lbs.

To summarize the rules for each of the aforementioned distribution systems, the following table below has been created for quick reference:

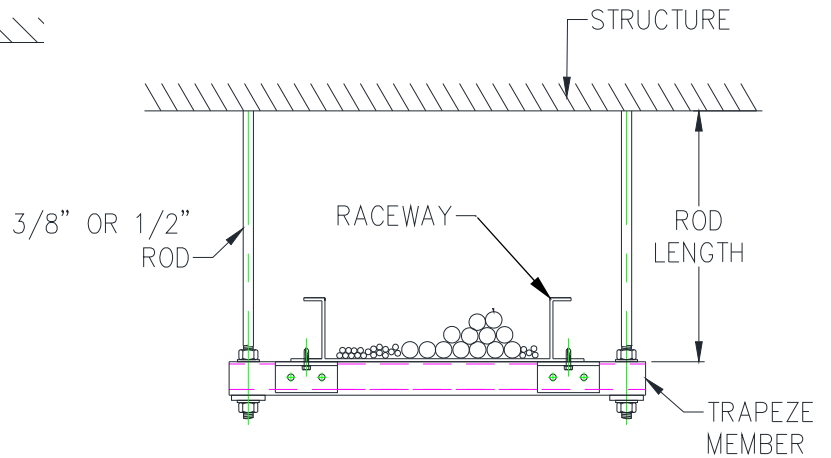
### Seismic Bracing Exceptions for Distribution Systems

System Type	Support Type & Rod Size (& Pipe Size When Applicable)	Maximum Rod Length From Attachment Point to the Structure	Maximum weight per support in a run (or linear weight)
Electrical Conduit, Cable Tray, or Raceway, or Duct Systems	Trapeze Support w/ 3/8" Rod	12"	100 lbs (10 lb/ft for duct)
	Trapeze Support w/ 1/2" Rod	12"	200 lbs
	Trapeze Support w/ 1/2" Rod	24"	100 lbs
	Single Rod Support w/ 3/8" or 1/2" Rod	12"	50 lbs
Trapeze Supported Pipe* <small>(*Pipe Diameter not to exceed size limits based on SDC for single hung pipe below)</small>	w/ 3/8" Rod	12"	100 lbs
	w/ 1/2" Rod	12"	200 lbs
	w/ 1/2" Rod	24"	100 lbs
Single Rod Supported Pipe	2" Dia. Pipe, $I_p > 1.0$ , SDC C, and 3/8" or 1/2" Rod	12"	50 lbs
	1" Dia. Pipe, $I_p > 1.0$ SDC D, E, F, and 3/8" or 1/2" Rod	12"	50 lbs
	3" Dia. Pipe, $I_p = 1.0$ SDC D, E, or F, and 3/8" or 1/2" Rod	12"	50 lbs
Pneumatic Tubing	Trapeze Support w/ 3/8" and 1/2" Rod	12"	100 lbs
	Single Rod Support w/ 3/8" or 1/2" Rod	12"	50 lbs

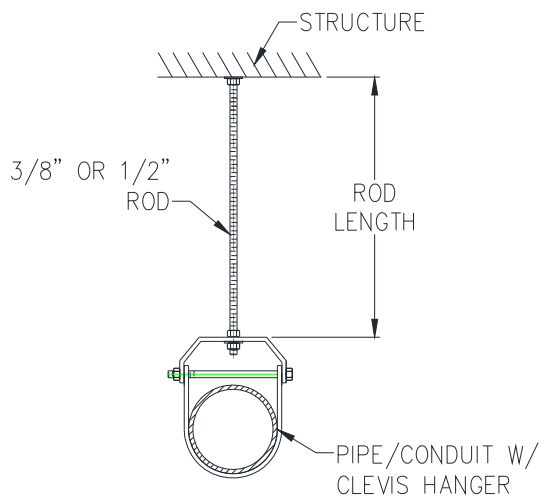
## Typical Example Details



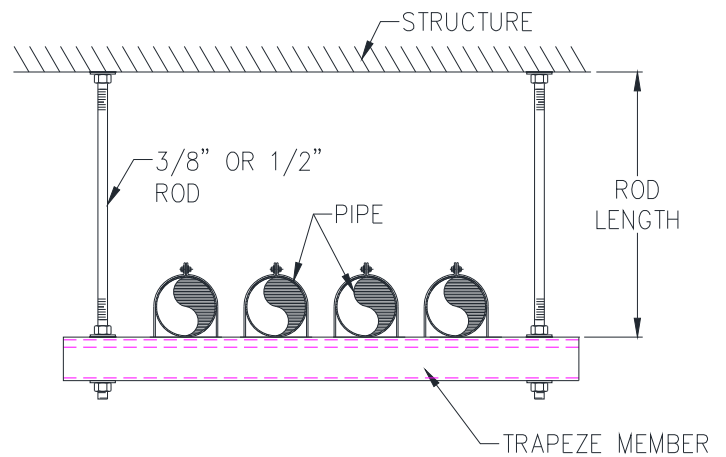
**Trapeze Supported Duct**



**Trapeze Supported Raceway**



**Single Rod Supported Pipe**



**Trapeze Supported Pipe**

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In partnership with FEMA and ASCE, VISCMA also publishes three Seismic Installation and Inspection Manuals designed to assist field personnel.

The association office is located at 994 Old Eagle School Road, Suite 1019, Wayne, PA 19087-1866 and can be reached at 610-971-4850 or [info@viscma.com](mailto:info@viscma.com).

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