

THE 12" RULE EXPLAINED

S12.1 – Introduction:

The 12" Rule may be one of the most misunderstood and misapplied rules in the seismic restraint of pipe and duct. It is something that the contractors try to take advantage of at the last possible moment for the following reasons.

1. The contractor was unaware that seismic restraints for the pipe or duct were required before the bid was accepted, and now there is no money available to buy and install seismic restraints for the pipe or duct.
2. Other contractors "have gotten there first", and have left little or no space to install seismic restraints.
3. The contractor is trying to save money and believes this will reduce costs.

There may be many other last minute reasons for trying to apply the 12" Rule, but these are probably the ones most cited.

The truth concerning the application of the 12" Rule is that it is very difficult to implement in a consistent fashion. The application of the 12" Rule for a particular run of pipe or duct requires the knowledge, consent, and participation of all of the design disciplines and installing contractors with components in the immediate vicinity.

S2.2 – Measuring the Distance for the 12" Rule:

Regardless of any other arrangement, the 12" dimension is ***always*** measured from the hanger attachment point on the building structure. For single clevis supported pipe the 12" dimension is measured to the top of the pipe as shown in Figure S12-1. For trapeze supported pipe the 12" dimension is measured to the top of the trapeze bar in the same fashion demonstrated in Figure S12-2.

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International: 614-889-0480
FAX: 614-889-0540
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E-mail: sales@kineticsnoise.com

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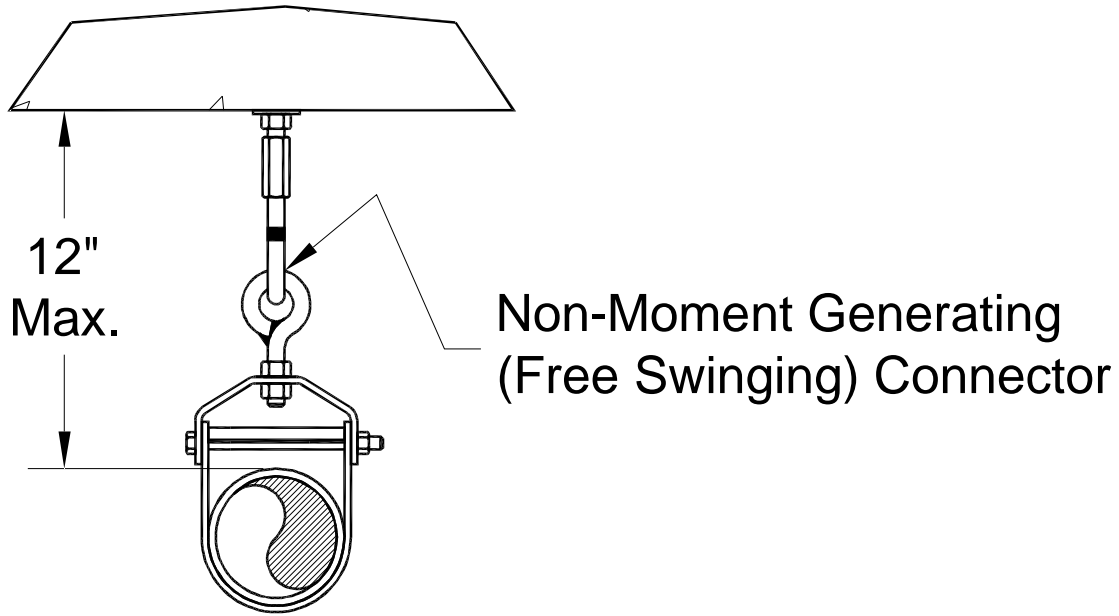


Figure S12-1; Measurement of 12" Dimension for Single Clevis Supported Pipe

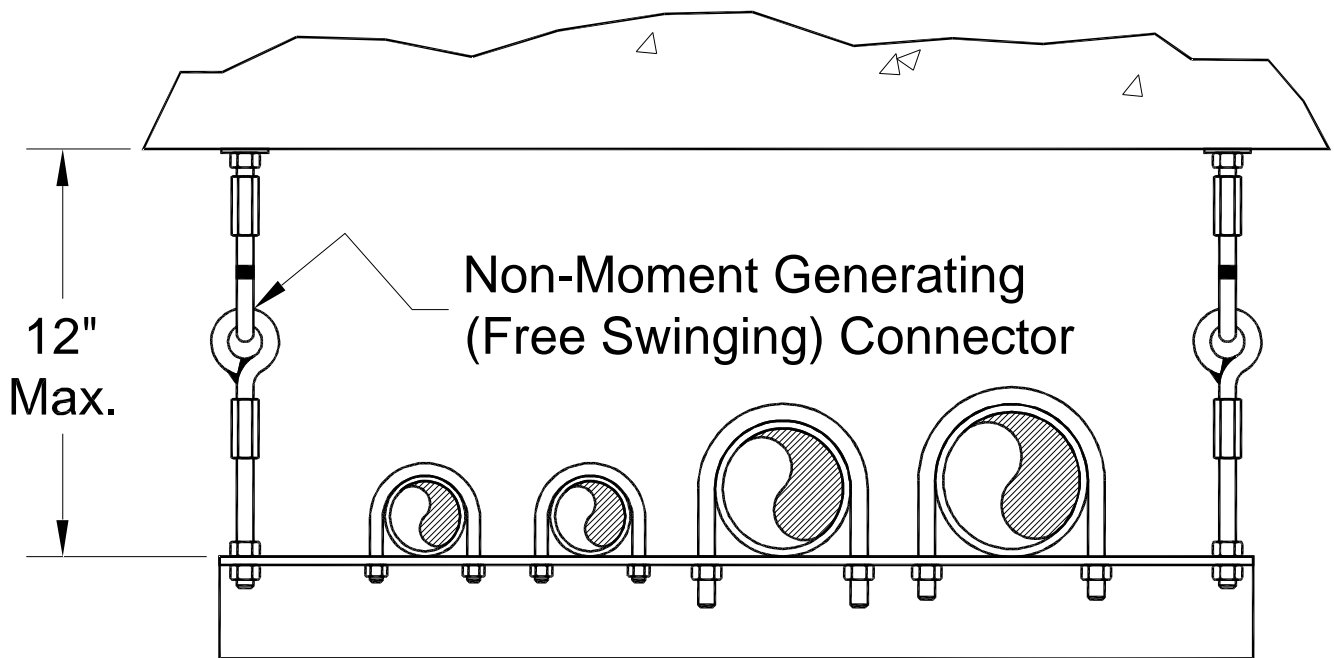


Figure S12-2; Measurement of 12" Dimension for Trapeze Supported Pipe

For single hanger supported duct, the 12" dimension is measured to the top of the duct as shown in Figure S12-3. And, finally, for double hanger supported duct the 12" dimension is measured to

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the attachment point of the hangers to the duct or reinforcing steel. The case of lightweight duct is shown in Figure S12-4 where the 12" dimension is measured to the top of the duct which for all intents and purposes is the attachment point for the hangers.

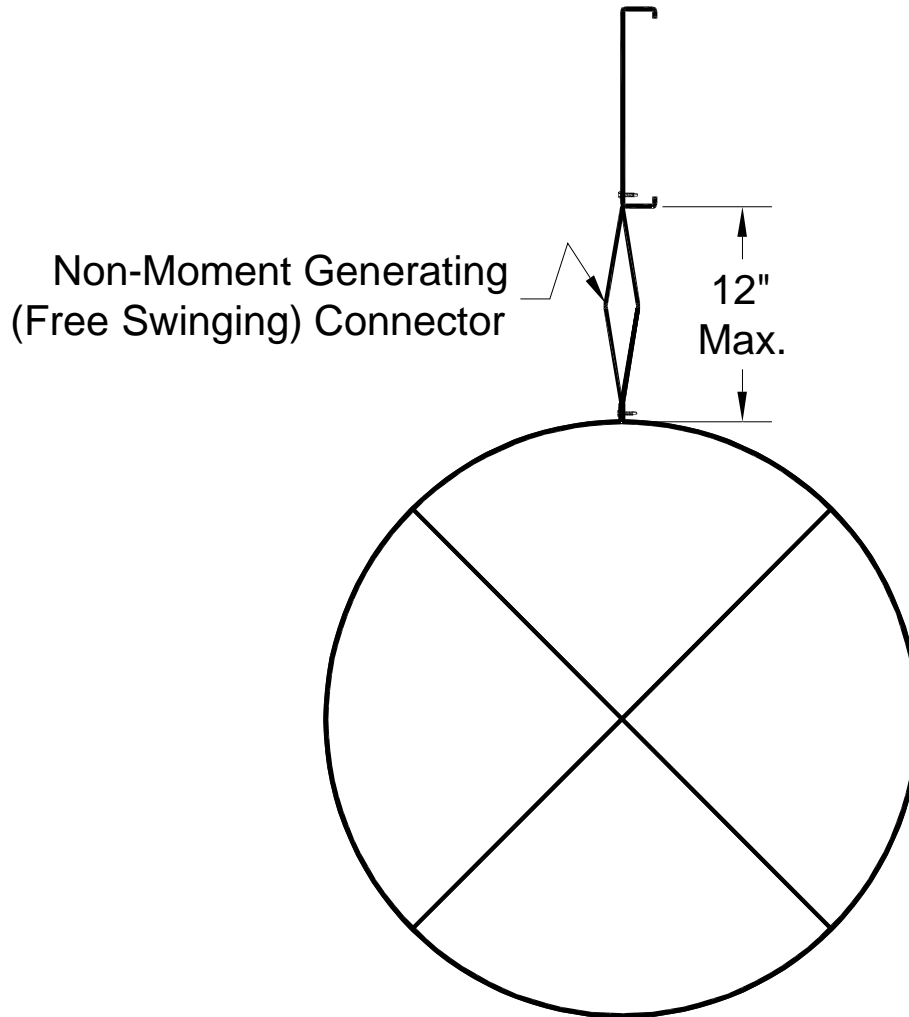


Figure S12-3; Measurement of 12" Dimension for Single Hanger Supported Duct

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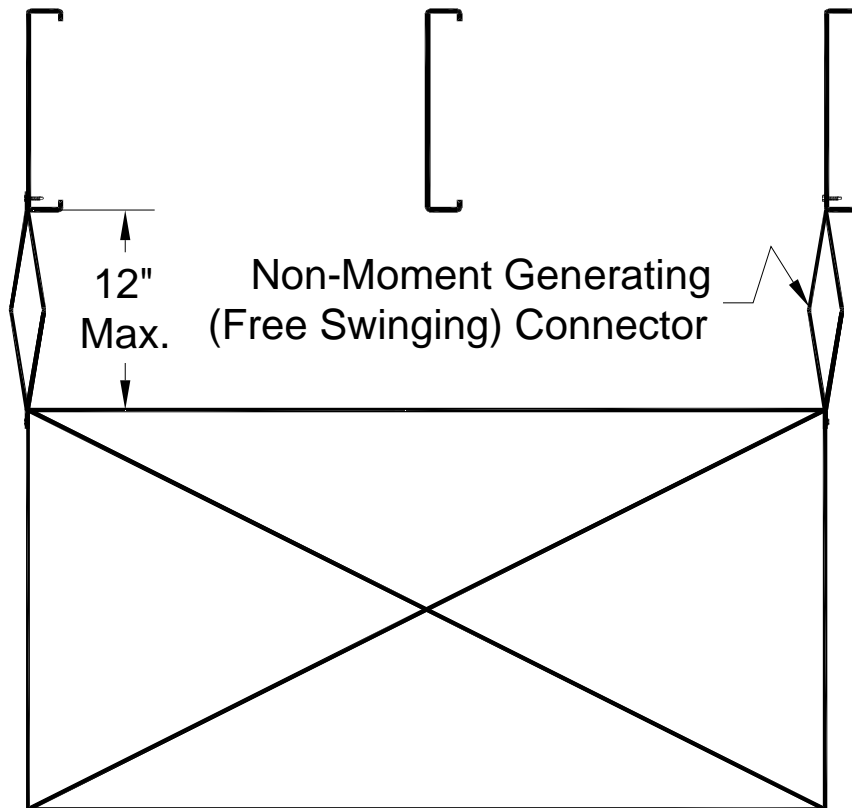


Figure S12-4; Measurement of 12" Dimension for Double Hanger Supported Duct

S12.3 – Non-Moment Generating (Free Swinging) Connector:

The intent of making use of a non-moment generating connector is to prevent fatigue failure of the hangers during an earthquake or it's after shocks. In 2006/2009 IBC, ASCE/SEI 7-05, this requirement for piping is worded; "the hangers are to be detailed to avoid bending of the hangers or their attachments." For duct the wording in 2006/2009 IBC, ASCE 7-05, is; "the hangers have been detailed to avoid significant bending of the hangers and their attachments."

The intent in both cases is to prevent fatigue of the hanger or its attachments. Kinetics Noise Control has taken the position that if the 12" Rule is to be applied, it is the responsibility of the design professional of record for the system and the installing contractor to design and/or select and install the non-moment generating connectors for each hanger location. It would be prudent

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for the design professional of record for the system to design and or select the non-moment generating connectors using the same criteria as that used for the “Chandelier Exception” which is found in Section 13.6.1 of ASCE/SEI 7-05. It is also the responsibility of the design professional of record for the system and the installing contractor to ensure that all of the other conditions specified in the code for the application of the 12” Rule have been met, see Sections S4.3.1 and S4.5.1 of this manual. Primarily included in these requirements are the conditions that the piping system must be free to swing without contacting other components or the structure, and that connections to equipment must be designed to tolerate the maximum expected motions.

12.4 – Types of Non-Moment Generating (Free Swinging) Connectors:

There are various types of connector/hangers which will meet the requirements of the 12” Rule. Some of these are listed below.

1. Chains.
2. Wire rope hangers.
3. Two forged or welded eyes.
4. Twisted strap hangers.
5. Isolation hangers.

Some of these connector/hangers can be quite long. So, their use at all hanger locations must be verified to avoid having a measurement that exceeds the compliance dimension for the 12” Rule.

12.5 – The Whole Run and Nothing but the Run:

The title of this section refers to the range of applicability of the 12” Rule. **Every hanger** in a run of pipe or duct **must** have a measurement that is **less than or equal** to the compliance dimension for the 12” Rule! This requirement is demonstrated below in Figure S12-5.

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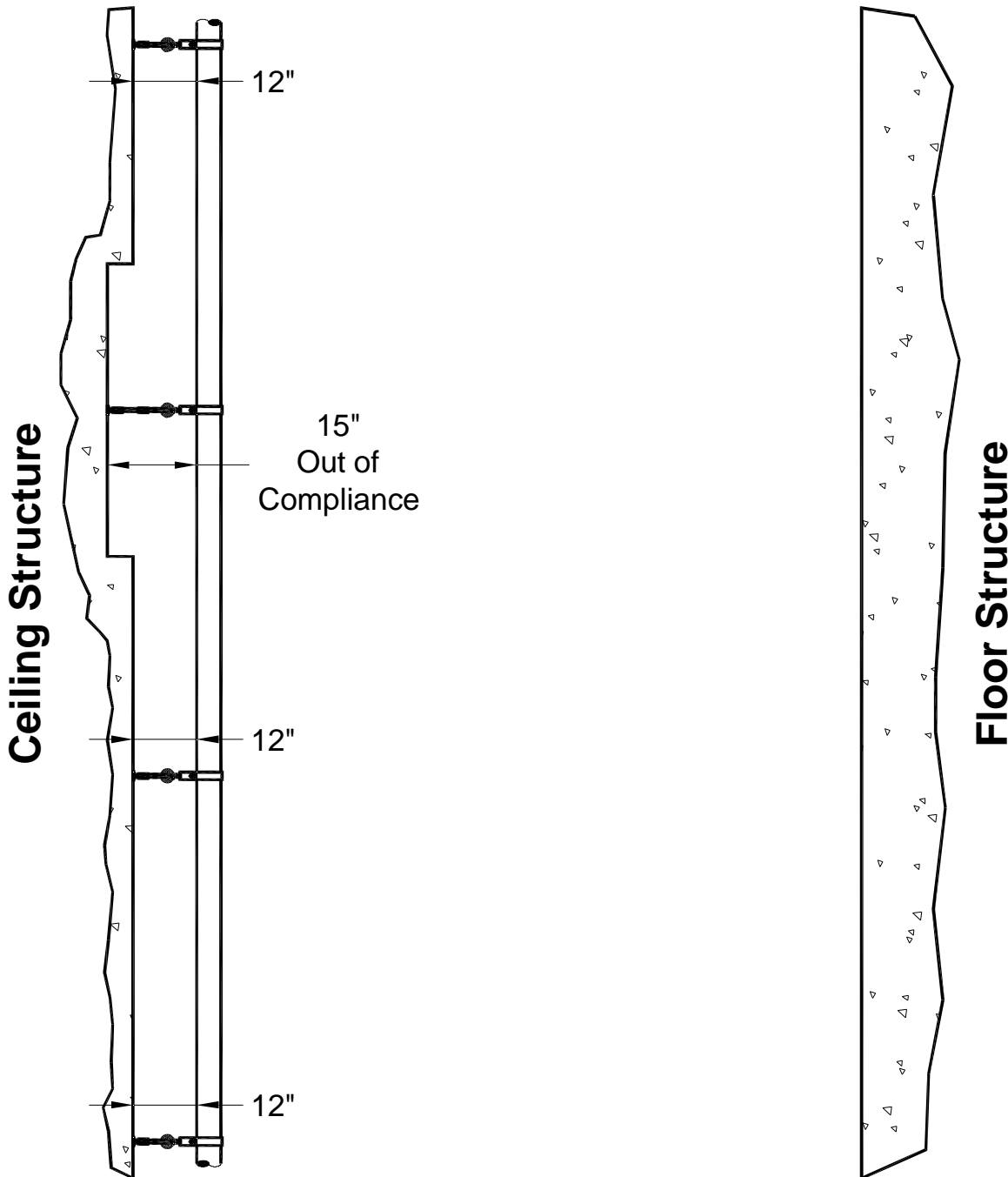


Figure S12-5; Every Hanger Location on a Run of Pipe or Duct Must be 12" or Less

If even one hanger location exceeds the 12" dimension, the entire run of pipe or duct must be restrained. The run of pipe shown in Figure S12-5 fails the test for the 12" Rule.

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S12.6 – Summary:

The 12" Rule is not a "get out of jail free" card. It is an exemption that may be designed into a piping or duct system during the initial stages of a project. It is not a last minute sort of thing that can be successfully implemented by the installing contractor. It is the responsibility of both the design professional of record and the installing contractor for a particular system to implement the requirements for the 12" Rule. It is also the responsibility of the design professional of record for the system to interface with the other design professionals and contractors to ensure that the requirements for the 12" Rule may be implemented at each projected hanger location. This will require very careful co-ordination between professions and trades.

Each run of pipe and duct from which the 12" Rule is intended to be applied must be carefully designed to ensure that there will be building structure at the proper elevation to take advantage of the 12" Rule.

It is wise to have a "fall back" plan in case one or more of the hanger locations fails to pass the test for the 12" Rule. Putting a little extra money and installation time in the initial quotation will help alleviate non-compliance issues for pipe and duct runs planned for the 12" Rule.

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