Vibration Isolation and Seismic Control
Manufacturer's Association
994 Old Eagle School Road -- Suite 1019
Wayne, PA 19087-1866
www.viscma.com

VISCMA

PIPE RISERS AND THEIR SUPPORTS

HVAC piping in a building usually has its longest run in vertical plane in the form of a pipe riser. The length of the run is not immediately visible to those reviewing the building plans, but the scale of the pipe run becomes clear when riser diagrams are reviewed.

The riser piping is the main "artery" of any HVAC distribution system. It stretches between floors only to branch off as the main line and its own successive branches for a given floor. Understandably, it's a big part of an HVAC distribution system in tall buildings.

The generally uninterrupted straight nature of the pipe run brings with it its own technical challenges. The most important issue to consider for riser piping is thermal expansion and contraction.

The thermal expansion depends on a number of factors such as the length of the pipe riser, the material used for piping and temperature differential (the difference between operating temperature and the ambient temperature during the actual installation of the riser piping). For that reason, thermal considerations become an important point of attention for pipe risers in tall buildings.

Traditionally the basic approach has been applied through utilizing pipe anchors that positively attach the piping to building and pipe guides that control the axial expansion and contraction in check. These systems either place a single center anchor in the middle of the building with pipe guides distributed throughout the riser run, or two separate anchors on pipe riser extrema with guides and an expansion compensator in one of the intermediate floors to direct the thermal movement towards (or away from if the pipe contracts). The expansion compensator is usually a fabricated inline product, a fabricated flexible universal "seismic loop" type connector or a combination four 90-degree elbows that take advantage of internal flexibility of hard piping. Each solution has its own unique challenges, but the main challenge of the traditional approach is the potentially high structural demands at anchor locations that could be initially overlooked

by building designers. The secondary challenge is around the expansion compensators where space and a potential for leaks are generally time-consuming issues to solve with potentially catastrophic consequences if fabricated products are not properly furnished.

Another method increasingly being used in building designs by mechanical consultants in North America involves "floating" or partially floating the thermally active pipe riser on spring mounts. The general advantage of a fully floating system is that there are no hard anchor points where piping is positively and rigidly attached to the building. Instead, the weight and the reaction load from thermal expansion is distributed along the building usually at every other floor or every third floor. This eliminates the need for a special focus by building structural designers. The pipe riser becomes a completely flexibly floating entity when the branch lines are also suspended with isolation hangers or connected to floor mains with flexible connectors that compensate for the thermal movement. This brings in the added "bonus" advantage of vibration isolation which is an important factor especially on residential buildings such as high-rise condominiums. This advantage makes floating riser solution a favorite among acoustical consultants.

Floating riser systems that utilize spring supports are combined with other traditional methods every now and then in order to create hybrid systems depending on the demand of thermal movement. A hybrid floating pipe riser system may incorporate expansion compensators and/or pipe anchors and guides for very high thermal displacements. These systems don't eliminate the anchor points even with the intermediate spring supports. Nevertheless, the benefit of distributing loads on intermediate floors is still established, reducing the structural load demand at anchor points.

Floating riser systems are generally offered as a delegated design by the vibration isolation and seismic control manufacturers. This saves time and labor for contractors and consultants.

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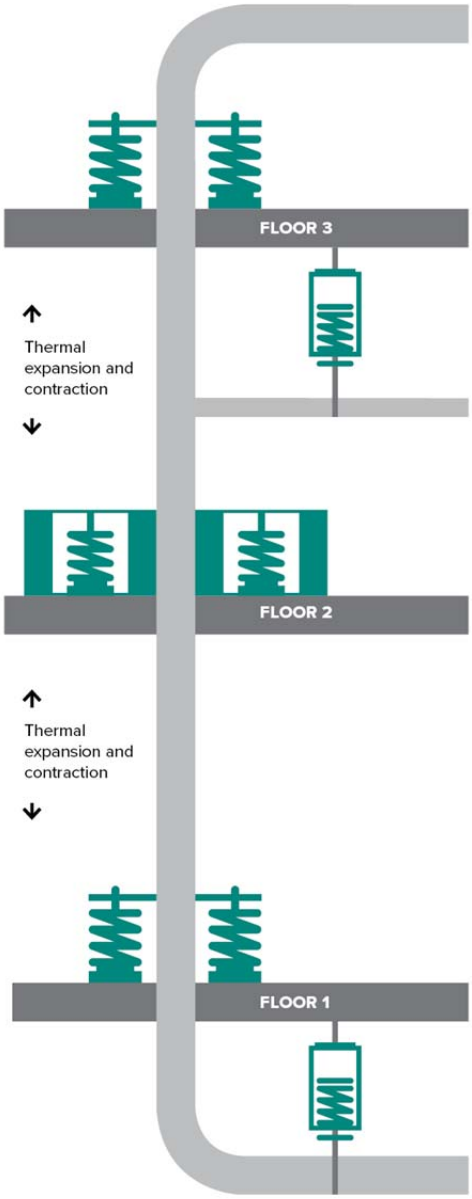
Floating Riser System



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VISCMA is a non-profit association representing the manufacturers of seismic restraint, vibration isolation and noise control equipment. The primary objectives of the organization are to educate the construction industry on the proper use and application of vibration isolation and seismic restraint and to develop standards to continually improve the industry.

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.

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