TRANE

Published by the
Water Chiller Systems
Business Unit – Pueblo

Chiller Chat

October 2000

Isolating the Facts: Spring vs. Neoprene

Minimizing Vibration in Series R® Chiller Installations

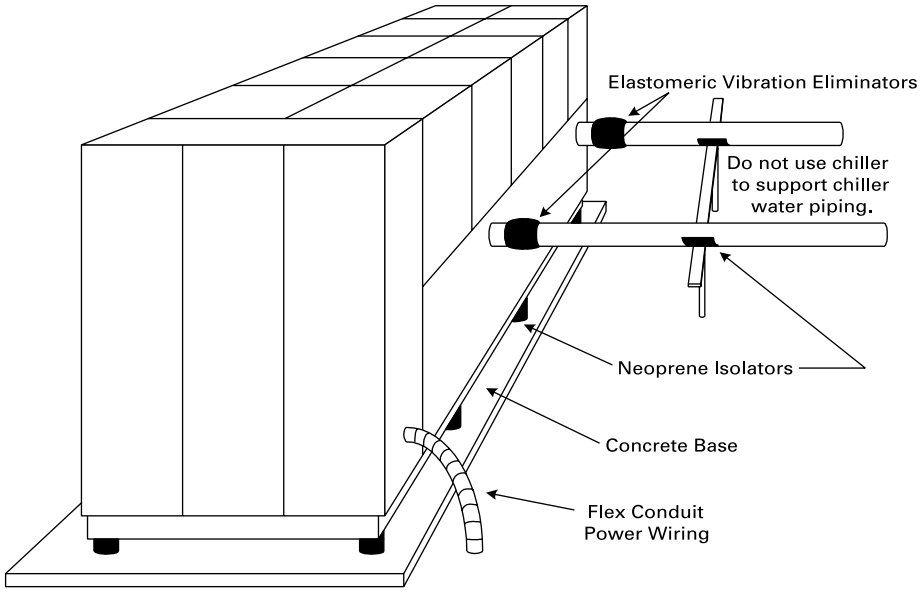
Choosing the correct isolation equipment for Series R chillers can be confusing considering, the advancements in chiller technology in recent years. This decision, however, is a very important one with respect to minimizing sound transmission while maximizing chiller performance and overall equipment life.

Spring Isolation and Reciprocating Compressors

Spring isolators were originally designed for use with reciprocating compressors. Here the springs are used to dampen the vibration caused by the upward and downward strokes of the compressor pistons. This relatively low frequency vibration of less than 125Hz is sufficiently dampened by the spring isolators to eliminate vibrations that travel to the equipment pad and surrounding structure of the unit that can ultimately cause cracks and structure failures.

Neoprene Isolation and Screw Compressors

The introduction of the screw compressor brought a new challenge to chiller isolation due to high- frequency vibration harmonics - approximately 900Hz - that originate from the male rotor lobe passing frequency. Extensive testing indicates that the use of spring isolators is an ineffective method of dampening the screw compressor's higher frequency of vibration. It's ineffective due to the presence of internal resonance within the spring. Elastomeric isolation or neoprene isolators, however, were determined to be up to 90 percent effective when subjected to the same test. Neoprene isolators have the ability to not only dampen, but also to absorb, the vibration created by the screw compressor. This eliminates any unnecessary noise transmission throughout the building in addition to protecting the chiller and surrounding components.



Other Important Considerations

Piping Isolation

Elastomeric isolation is also recommended when installing chilled water and refrigerant piping. Metal braided eliminators have proven to be significantly less effective in several installations. Pipe hangers with elastomeric isolators should be used to fully support the piping. It is important that the chiller does not support the weight of the chilled water piping!

Foundation

It is also very important that the chiller foundation be heavy and rigid in order for the isolators to be effective. Mechanical impedance in the foundation (a combination of mass and rigidity) should always be greater than the chiller structure.

When sound and vibration control are critical, it is important to recommend that the owner seek advice from a professional acoustical consultant.