AMC PIPE RISER ISOLATION AMC MECANOCAUCHO®

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As the buildings become taller, the loads and the problems related to pipe risers also become more complex. Pipe risers are subject to hydraulic forces due to the pressure changes, and also to thermal expansions and contractions.

The length change due to thermal expansion can create significant forces in both the pipe itself and also its restraints, which in turn is transferred to the building structure. These forces can cause an unacceptable high stress in mechanical components and cause them to fail.

The solutions implemented in the past to solve this problem consisted mainly of adding expansion joints or horizontal expansion loops. Both of these methods came with their own downsides, such as reliability problems and the undesirable requirement of more space.

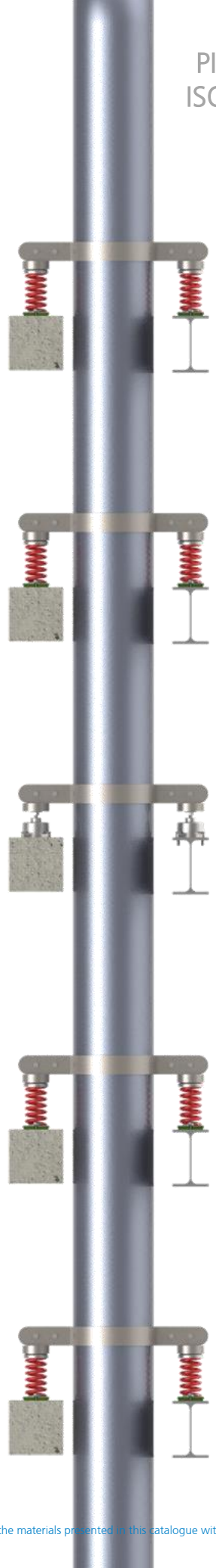
A more efficient solution to these problems can be solved with the use of several spring mounts along the length of the pipework, sometimes including a fixed anchoring point.

When a fixed anchoring point is used, the anchored point of the pipe remains in place, while the thermal expansion and contraction is absorbed by the spring isolators placed above and below. It is important to mention that when a fixed anchoring point is used, it should be placed at the midpoint of the total height of the riser. This is to ensure that each end of the riser at the top and the bottom absorbs half of the total thermal expansion. If for example it is placed at the top end, the bottom end would have to absorb 100% of the thermal expansion and contraction.

Installations without fixed anchoring points are also possible, in this case spring isolators would be used at all points. This results in an installation which is completely ‘floating’ and is not recommended for high demanding applications. For example in a case where there are high thermal differences due to the presence of steam, the loads and displacements in each point are more difficult to predict.

The number, the position and the types of supporting points is defined based on the maximum loads created by the mass and the temperature extremes in the system.

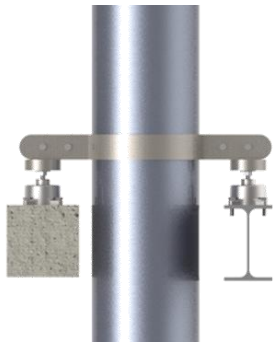
In addition to withstanding the loads and absorbing the thermal expansions and contractions, the elastic supports provide lower natural frequencies to the suspended pipe, resulting in noise and vibration isolation to the building.



ELEMENT TYPES

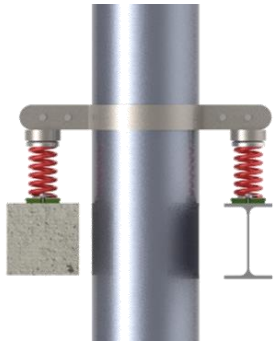
Anchoring point:

The element that most restricts the movement, and typically the component that withstands most of the non thermal expansion related loads. However, they still allow some displacement, as they are provided with a flexible polyurethane isolator that is available with different stiffness grades depending on the requirements. Usually placed in the midpoint of the total height of the riser.



Non-Restrained Spring Isolator:

They are used to absorb thermal expansions and contractions. In installations without an anchoring point, they also withstand the weight and the hydraulic loads. They allow displacements in any direction.

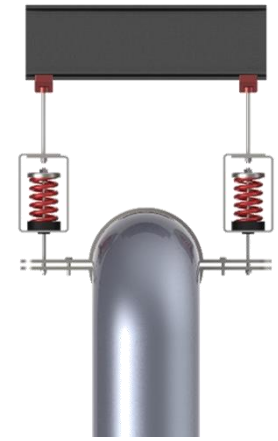


Restrained Spring Isolator:

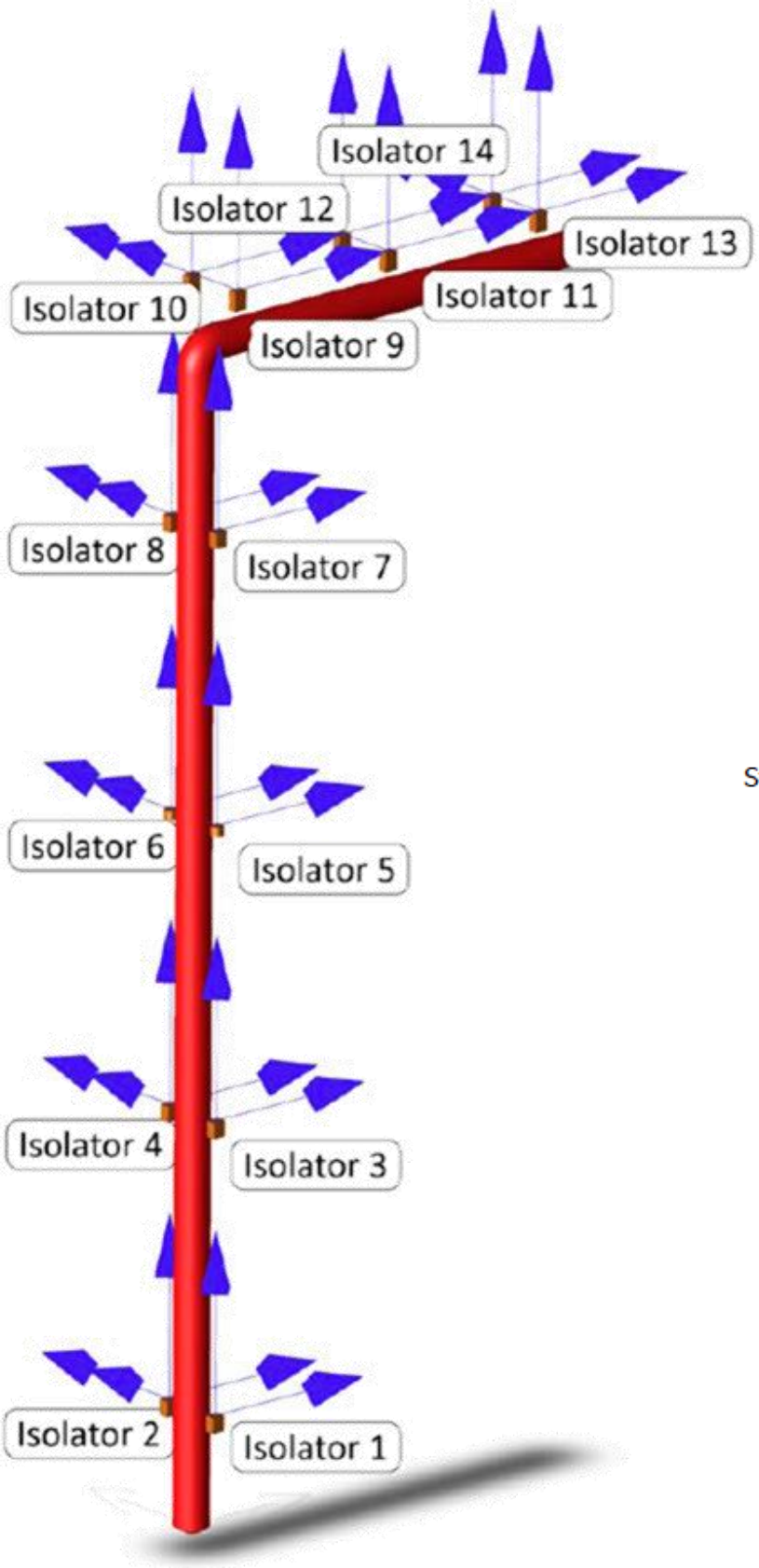
They have the same purpose as the non-restrained spring isolator, but they add restrictions to the displacements in all directions, specially in horizontal directions. Therefore, these restrained spring isolators act as guides for the pipe.

Spring Hanger:

These are used in cases where the pipe must be hung from a structure that is above the fixation point. They are typically used to hold horizontal sections of the pipe from a ceiling.



AMC ENGINEERING SERVICES



Static Loads Isolators

Name	Type	Fz (kN)
Isolator01	1 AMC 305+antiseismic	0,87
Isolator02	1 AMC 305+antiseismic	0,87
Isolator03	1 AMC 305+antiseismic	0,87
Isolator04	1 AMC 305+antiseismic	0,87
Isolator05	FZ-200-51-M12	6,077
Isolator06	FZ-200-51-M12	6,078
Isolator07	1 AMC 305+antiseismic	0,87
Isolator08	1 AMC 305+antiseismic	0,87
Isolator09	VT-150	0,316
Isolator10	VT-150	0,316
Isolator11	VT-150	0,323
Isolator12	VT-150	0,323
Isolator13	VT-150	0,33
Isolator14	VT-150	0,33

Static Deflections Isolators

Name	Type	z (mm)
Isolator01	1 AMC 305+antiseismic	6,31
Isolator02	1 AMC 305+antiseismic	6,31
Isolator03	1 AMC 305+antiseismic	6,31
Isolator04	1 AMC 305+antiseismic	6,31
Isolator05	FZ-200-51-M12	6,61
Isolator06	FZ-200-51-M12	6,61
Isolator07	1 AMC 305+antiseismic	6,31
Isolator08	1 AMC 305+antiseismic	6,31
Isolator09	VT-150	6,32
Isolator10	VT-150	6,32
Isolator11	VT-150	6,46
Isolator12	VT-150	6,46
Isolator13	VT-150	6,59
Isolator14	VT-150	6,59

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