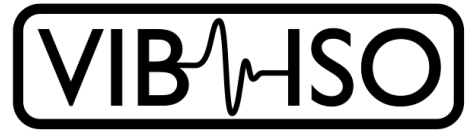


A VIB-ISO White Paper

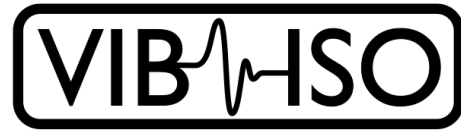


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Vibration Isolation Rail (VIR) ¹

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¹ U.S. Patent No.: US 9,027,901 B2



Vibration Isolation Rail (VIR)

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Introduction

With devastating earthquakes and other natural phenomenon continuing to topple buildings around the globe, the International Code Council (ICC) set up the International Building Code (IBC) to address the integrity of not only structural, but nonstructural building components. Mechanical, electrical and plumbing engineers now have to take seismic forces into consideration when designing their individual systems.

The IBC 2000 and 2006 editions defer to the American Society of Civil Engineers Standard 7 (ASCE7), "Minimum Design Loads for Buildings and Other Structures" as the authority for designing structures for these seismic loads. The purpose of this code mandated seismic restraint is to make the nonstructural components of a building follow the structure of the

building during an earthquake. The restraints themselves, as specified by the IBC, require a defined load path be identified to the structure. Per the IBC and ASCE 7, this means that "component attachments shall be bolted, welded, or otherwise positively fastened..." in order to keep the equipment following the building in the case of an earthquake.

Pre-packaged roof top units (RTUs) that are attached to a building's roof via a roof curb must also adhere to these rules, whether they are isolated from vibration or not.

Problem Statement

It is inherent to think that the best way to isolate a building component is to separate that component from the building structure entirely. However, the IBC and ASCE7 codes dictate that all components must be mechanically fastened to a building in order to ensure the entire structure acts as one unit during a seismic or other natural event. Unfortunately, building owners do not want to hear all of the vibration and noise caused by these sometimes very large building components. The problem is how to satisfy both the government mandated codes, as well as the wishes of building occupants.

Pre-packaged RTUs have a number of different components that can create mechanical vibration. Some of these components can be individually isolated, but most cannot. The simplest and

Vibration Isolation Rail (VIR)

most economical way to solve this issue, is to place the entire unit on a vibration isolation rail. This rail will limit the amount of vibration and noise generated from the unit through to the structural components of a building while also meeting the IBC and ASCE codes.

Previous Options

Previous vibration isolation rails do not provide for the following:

Integrated Restraints - Previous systems use either externally applied or additionally added restraints;

Preassembly - Previous systems are required to be fully assembled on the job site;

Preloaded - Previous systems do not have preloaded spring supports to increase the horizontal stiffness of the unit before it is fully assembled;

Material - Previous systems are made of lesser strength aluminum.

VIR Solution

The VIB-ISO Vibration Isolation Rail (VIR) patent protected system utilizes integrated, pre-assembled seismic and wind restraints with a coil spring as the

resilient media to absorb the vibration energy produced from the running unit. The VIR system is designed to sit between an existing roof curb and a curb mounted piece of equipment.

Figure 1 shows the VIR system and how it sits on a manufacturer supplied roof curb.

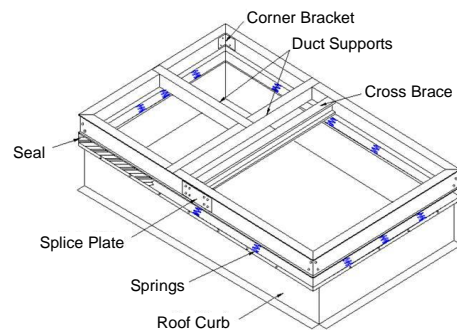


Figure 1

Figure 2 shows the spring and restraint assembly of the VIR.

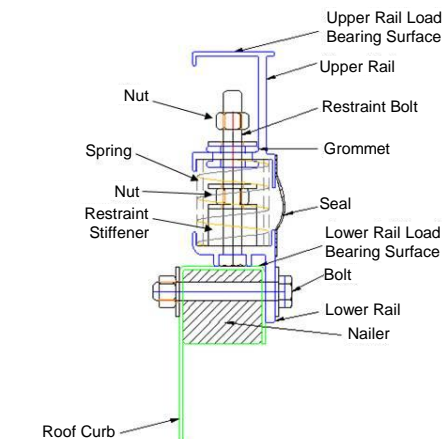
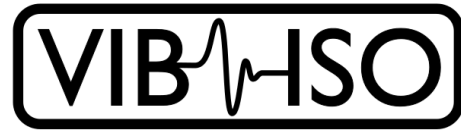


Figure 2



Vibration Isolation Rail (VIR)

Benefits

Many benefits exist for the VIR isolation rail system.

Benefit 1

Additional restraint stiffener - The assembly has an additional restraint stiffener in order to reduce the bending moment on the bolt attached to the lower rail.

Benefit 2

Efficient assembly - The lower rail is designed to capture the head of its bolt, allowing for an efficient assembly process.

Benefit 3

Preloaded spring assembly - This attribute increases the horizontal stiffness of the assembly in an unloaded state.

Benefit 4

Stronger material - The VIR system utilizes a high strength aluminum alloy, which has a higher tensile strength comparable to structural steel.

Benefit 5

U.S. Patented System – The VIR is a U.S. patent protected system (U.S. Patent No.: US 9,027,901 B2). This grants VIB-ISO the exclusive right to manufacture and sell the VIR system.

Implementation

The VIR is used when an owner needs to reduce the amount of noise produced in a building. Typically, VIR systems are used in schools, hospitals, churches, courthouses, and owner-occupied buildings. VIB-ISO will engineer each VIR system to match each individual roof top unit (RTU) and meet any additional requirements of the manufacture or curb supplier. The VIR system can be produced in either 1" or 2" deflection depending upon the customer's requirements and is shipped nearly fully assembled with the springs and restraints installed at the factory to reduce onsite labor. At the job site, the VIR design allows for quick assembly that requires only basic tools to install it to the existing roof curb.

Summary

The VIB-ISO VIR patent protected system is designed not only to increase the effectiveness of noise and vibration isolation from a RTU to the structure of the building, but also increase the ease of installation in the field. VIB-ISO strives to give our customers the best product, at the best price, every time.