Step 1

Determine the frequency of the disturbing vibration,often called the disturbing frequency, fd. There are a number of ways to determine the disturbing frequency. For rotating equipment, the disturbing frequency is usually equal tthe rotational speed of the equipment, expressed in revolutions per minute (RPM) or cycles per minute (CPM). If the speed is specified in RPM or CPM, it must be converted to cylces per second (Hz) by dividing by 60.

For other types of equipment, disturbing frequencies must be specified by the manufacturer or measured. Environmental vibrations can be measured, or are sometimes specified in military or commercial specifications or test reports.

There could be more than one disturbing frequency. In this case, one should first focus on the lowest frequency. If the lowest frequency is isolated, than all of the other higher frequencies will also be isolated.

The most important thing to remember about vibration isolation is that without knowing the frequency of the disturbing vibration, no analytical isolation predictions can be made. In many of these cases, Hutchinson

Step 2

Determine the minimum isolator natural frequency, fn, that will provide isolation. This natural frequency can be calculated by using the following equation:

Eq. 15 $$f_n = \frac{f_d}{\sqrt{2}} = f_d \times .707$$

If this fn is exceeded, this isolation system will not perform properly, and it is quite possible that you will amplify the vibrations. Isolators that have a fn lower than that calculated in Equation 15 will provide isolation.

At this point, there will be many isolators that can be removed from the list of possible selections. Our catalog clearly states the natural frequency range of each isolator family in the main information block on the first page of each family. If any of the information is missing or unclear, please contact us or your local sales engineer listed on this website if you need help or advice on your application.

Step 3

Determine what isolator natural frequency will provide the desired level of isolation. Step 2 has provided a quick way to determine which mounts provide isolation, but does not provide any information on the level of isolation that will be achieved. Equation 11 can be used to calculate transmissibility.

Equation 11
Eq. 11

$$T = \left| \frac{1}{1 - \left(\frac{f_d}{f_n} \right)^2} \right|$$

Equation 11 can be used to calculate the transmissibility of a known disturbing frequency through a mount with a known natural frequency. It can also be rearranged to the following form:

Equation 16
Eq. 16

$$f_n = \frac{f_d}{\sqrt{2}} = f_d \times .707$$

Equation 16 is valid only when fd/fn>1. This can be used to calculate the required natural frequency to achieve the desired level of isolation of a particular disturbing frequency.

Step 4

Select the appropriate isolator for your application. Step 3 should reduce the list of possible isolators considerably, but there still may be more than one isolator that "qualifies". One way to determine which is best suited is to look under the "Applications" heading on the first page of each isolator family. If your application is not in this list, it does not necessarily mean that the isolator can't be used, but there may be a better choice.

The selection can also be narrowed down by looking at the environmental and dimensional data sections for each candidate isolator. Is the temperature range appropriate? Can the isolator fit in the required space? Us the mount capable of supporting a load in the necessary direction? These are typical questions that can be used to make a final selection.

If there is still more than one isolator that fits your application, or if you cannot find one that meets all of your requirements, please contact us or your local sales engineer listed on this website if you need help or advice on your application. We have expert engineers available to help make selections and answer questions about our products.