VIBRO/*DYNAMICS* Corporation
Frequently Asked Questions

GENERAL QUESTIONS

Q. Why should I use isolators?

A. Isolators offer many benefits that save money and time.

- Installation Savings – Machines are installed faster and easier than anchoring.
- Case Histories have shown that the precision leveling and alignment features of Micro/Level® Isolators reduces machine wear and tear; increases tool life; and increases productivity by reducing downtime and improving part quality and repeatability.
- Reduce vibration and shock levels for a better work environment.
- Releveling and moving the machine is also much faster and easier.

Q. How are Vibro/Dynamics Isolators different from others on the market?

A. Vibro/Dynamics doesn't use a "*one size fits all*" approach to isolator selection. Every Micro/Level Isolator size has a wide variety of different elastomeric inserts to precisely meet the isolator characteristics required to solve a particular problem.
Our design is unique. Look at a cross-section drawing of a Vibro/Dynamics Micro/Level® Isolator. Its design is unlike anything on the market. Notice that the isolator has pins or "fingers" that extend down from the support housing, pass through the bearing plate, and then fit into "grippers" molded into a custom-engineered elastomer. This feature, called "Glide/Damping™", reduces the isolator's horizontal stiffness and provides a greater degree of isolation. It also helps keep machines from walking by decoupling the support housing from the elastomer.

Q. Why don't presses "walk" on isolators?

A. Presses don't walk on properly selected free-standing isolators due friction between the isolator and the foundation. To keep a machine from walking, the static deflection (compression) of the isolator under load must be greater than any dynamic unloading of the isolator caused by the operation of the machine. Properly selected and applied isolators always carry load, so the friction of the elastomer on the floor is usually sufficient to overcome any horizontal forces that cause a machine to walk.

Q. My press is rocking. Is this normal?

A. Yes, to an extent. A press with an unbalanced crankshaft or eccentric will generate a rocking force. Isolators compress and shear in reaction to these forces, so it is normal that a press will rock to some degree. The softer the isolator is, the more the press will rock. Depending on the press and isolators, one-quarter inch at the crown is not unusual. The human eye thens to magnify motion, so what looks like excessive motion may not be.

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Q. How long will isolators last?

A. It is not uncommon for Vibro/Dynamics Isolators to last 30 years or more. When properly applied and installed, the isolators can last the life of a machine.
Chemicals can be harmful. Vibro/Dynamics has three alternate elastomeric compounds to handle most environments. Consult with us if your isolator installation will be subjected to a high degree of chemical exposure.

Q. Why are you recommending a larger isolator than your competitor?

A. It could be due to two reasons. *One*, Vibro/Dynamics manufactures vibration isolators as opposed to simple machinery mounts. Our goal is to provide the best isolation possible while keeping machinery motion to an acceptable level. A larger area isolator is usually a softer isolator. Due to the larger area, greater isolator deflection is possible without over stressing the isolator's elastomeric element. Overstressing causes leveling instability (due to elastomeric creep) and the higher stress on the foundation.
Two, a larger isolator may have been recommended to provide better support coverage of the machine foot. The isolator support housing should span the foot gussets.

Q. Why does the isolator stick out from under the machine foot? Is this a problem?

A. There are really two questions here. *One*, is it a problem for the isolators and *two*, is it a problem for the machine? In answer to the first question, the support housing of a Micro/Level® Isolator is designed to transfer the load on the isolator's support housing to the leveling adjustment screw, which then distributes the load uniformly over a heavy-duty steel bearing plate. The isolator has a built-in swiveling capability that automatically compensates when the bottom of the machine foot is not parallel to the floor, assuring that the isolator's elastomer is uniformly loaded.
In answer to the second question, most machines have foot and leg designs strong enough to allow them to be supported at the mounting hole. Of course, there are exceptions and the Applications Engineering Staff at Vibro/Dynamics can offer assistance in this regard. Vibro/Dynamics has a complete line of vibration isolators design for amost every situation. If the machine cannot be supported at the mounting hole, then Vibro/Dynamics will recommend a wedge-style isolator that can be placed anywhere under the machine foot.

Q. How do isolators reduce noise?

A. Isolators are very effective at reducing *structural-borne* noise caused by transmitted vibration. Vibration causes noise when it excites the natural frequencies of a structure. This "*sounding board*" effect is directly related to vibration in the supporting surface. Since isolators reduce vibration, structural-borne noise is reduced.

Q. Is it OK to use isolators on a press with a rolling bolster or die cart?

A. Absolutely. This is very common. The alignment tolerance for most rolling bolster and die carts is sufficient so that it is not a problem.

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VIBRATION REDUCTION

Q. Where does the vibration go when I mount my press on isolators?

A. Internal forces caused by the stamping operation occur whether the press is bolted to a foundation or installed on isolators. However, the magnitude of the vibration within the press is lower when using vibration isolators.

It is a common misconception that bolting a press to a foundation somehow "*sucks*" the vibration out. Bolting a press to a foundaton actually subjects it to more vibration and impact force. Vibration isolators are cushions that transform a sudden shock pulse into a decaying series of longer duration forces.

Imagine hitting a brick wall with your fist. It would hurt! Now image hitting the wall with the same energy, but with your hand in a well padded boxing glove. It hurt less! Why? It's because the impact duration is longer effectively reducing the impact force. Short duration impacts mean higher force.

This is the same thing that happens on a hard-mounted press. The sudden release of potential energy at snap-through causes the press foot to slam against the foundation. This fast duration, high magnitude force hits the foundation and the foundation responds in kind, sending damaging forces back into the press.

Q. Why do I still feel vibration in the floor when my press is on your isolators?

A. Vibro/Dynamics rates isolation effectiveness as a percentage compared to the levels that would exist if the machine were anchored or "hard mounted". It is not possible to obtain 100% with a passive isolation system, but you can come close.

When selecting isolators, many factors are taken into account. But it usually comes down to two things: How much isolation is required and how much motion can be tolerated? Isolators are usually selected to achieve highest amount of vibration isolation possible while keeping motion to an acceptable level. These are conflicting goals. To reduce machine motion, the stiffness of the isolator is often increased, at the detriment of isolation, resulting in some vibration being felt in the floor.

Q: What can I do to reduce the vibration in my press?

A: Vibro/Dynamics isolators have been installed on tens of thousands of presses. We have a lot of experience isolating machines with a wide variety of different press designs, jobs, and soil conditions. Lowering the shock level within the machine will improve tooling and machine life and will further improve the work environment with less vibration in the plant. The following list of suggestions will help reduce vibration and save a lot of downtime and money.

- Increase shear in the dies, flat punches will deliver very high snap-through loads.
- Use an appropriately sized press for the job. Most press manufacturers do not design their machines to accommodate overloads. For long life, it is advisable to allow some safety factor in the job tonnage. A hard or thick batch of steel or bad tooling can create an overload, causing damage to the machine and higher vibration levels.
- Avoid small dies in machines with a large die space. Sometimes it has to be done, but small dies tend to load up and store energy by deflecting the slide like a bow.

- For High-Speed blanking in eccentric geared presses, Vibro/Dynamics has noticed that 500 ton and higher capacity eccentric geared presses running faster than 30 SPM tend to generate much more shock. For these cases, coil spring isolators are strongly recommended.
- Set the air counter-balance properly.
- Make sure the press is level and not twisted.
- Reduce the moving weight or speed. As press speed increases, so does inertia. In some cases, the reciprocating mass of the slide and upper die can generate enough force that it starts to approach the weight of a press, causing the press to "walk". The formula for determining the "inertia force" generated by the slide and upper die is: inertia force (Peak-Peak)= $W/g*r*\omega^2$ where W=moving weight, g=acceleration of gravity (9.8 m/s^2 or 386 in/s^2), r=stroke length, and ω=machine operating speed in rads/sec (1 SPM = 0.105 rad/sec). Note that the machine speed is a dominant term, doubling the speed quadruples the inertia force.
  To check for an inertia force vibration problem, run the machine without hitting material at the speed that normally causes problems. If the vibration problem persists, then the inertia force generated by the unbalanced moving mass is the cause of the vibration.

  Some machine builders reduce the generated inertia forces in their fast running machines by using a "dynamic balancer", a slide that runs 180° out-of-phase (directly opposite) from the main slide and upper die. The dynamic balancer is often 100% balanced for a "typical" upper die weight, but may be restricted due to clearances within the press crown structure. Spring isolators can be used to install most dynamically balanced presses, but a motion analysis over the press' speed range should be done first.
- Make sure the tie rods are stretched correctly.
- Make sure there are no "short circuits." Avoid beams, deck plates, and feeds that are connected to both the press and the foundation.
- Check and maintain press level.

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FOUNDATIONS

Q. Do I still need a foundation if I use machinery mounts or isolators?

A. Isolators do not eliminate the need for a well-designed foundation. The foundation must be strong enough to support the physical weight of the machinery, plus the dynamic forces generated by the machine. Dynamic forces vary with machine characteristics. Well-designed isolators will reduce the dynamic force transmitted into a foundation, but determining the amount going into a foundation is very difficult.
(See the following question).

Q. How much force is transmitted to the foundation when a machine is installed on isolator?

A. This question is often asked by civil engineers and architects when designing machinery foundations. The short answer is, “we cannot determine the exact magnitude of the transmitted impact forces.”

In order to determine the transmitted force, the frequency and forces being generated must be known as well as the characteristics of the soil, foundation, and machine construction. Many of the variables influencing the magnitude of the input forces are not known or even measurable. Factors that strongly influence the transmitted force:

- machine construction
- structural response of machine to shock
- stamping operation (i.e., blanking, coining, drawing, etc.)
- soil conditions
- foundation size and rigidity
- die design
- material properties
- isolator properties

Estimates of transmitted forces can be made, but they are only estimates. Vibration isolators are the most important factor in reducing transmitted vibration. However, the vibration isolators must be given the proper conditions to function at peak efficiency.

Q. Is my current foundation or floor sufficient?

A. Local Civil Engineers or Architects are the best people to answer this question. They can assess the local soil conditions, the status of the existing concrete, and the status of the existing reinforcing steel. Areas with high water tables or that have been filled could potentially cause problems if the foundation design doesn’t take then into consideration.