

Active Isolation System - A system that supports and isolates an object by providing motion that counteracts the disturbing motion. This requires extremely fast acting actuators and high gain feedback devices to sense the motion and control the actuators.

Airmount Design Height - The air spring height (bottom of the lower plate to top of upper plate) deemed optimum for mounting an object. This is chosen taking into account lateral stability, and the lowest possible spring rate for a given style air spring.

Amplification - The condition that occurs when the disturbing frequency is less than $\sqrt{2}$ times the natural frequency. ($f_r < f_n \cdot \sqrt{2}$) The amplitude of the vibration is greater in the "suspended" object than the amplitude of the vibration itself.

Amplitude - Half of the peak to peak distance of the motion of an oscillation or vibration.

Critical Damping - The amount of damping force necessary to stop an oscillation in 1 (one) cycle.

Damping - A force that tends to dissipate energy, thus reducing the amplitude of an oscillation over time. This can be either inherent in the supporting member itself (as in hysteresis or inter-leaf friction of a spring), or externally applied (as in a shock absorber, or viscous damper). This is usually expressed as a ratio of damping force to the critical damping force. A damping ratio of .1 means that an oscillation will damp out in 10 cycles if unaffected by external stimulus.

Disturbing Frequency (f_r) - The frequency of the motion that needs to be isolated, usually expressed in cycles per minute (CPM) or cycles per second (Hertz abbreviated Hz). This motion is from whatever source is disturbing the object to be isolated.

Eccentricity - The radius of oscillation of the center of gravity of a rotating object around its center of rotation.

Effective Area (A_e) - Effective area can be thought of as the "piston area" that the internal air pressure of the Airmount has to work on. This results in the supporting force that the Airmount exerts. However, in actuality, effective area is not a pure physical area. It is an expression of the net force exerted by the air spring as a result of the physical area and the resistant force exerted by the side wall of the air spring in tension. You can see the result of this change in effective area by looking at the shape of the static pressure curves in the Engineering Manual and Design Guide.

Effective Deflection (d_e) - Effective deflection is the difference between actual deflection and the x-intercept of the tangent to the load curve at the design load. Since the spring rate is the slope of this tangent line, the effective deflection simulates the actual deflection of a constant rate spring with a spring rate equal to the air spring or Marshmallow spring at that point.

Excursion - The peak-to-peak motion of a piece of vibrating equipment supported on resilient mounts. This is a function of the ratio of the moving mass to the static mass, as well as the offset force of the vibration.

Hysteresis - A damping force inherent to a deflected solid object. It is similar in concept to "internal friction." When a solid is deflected, some of the energy necessary to deflect it goes to heat. This energy is not returned in the form of return force, but dissipated into the environment.

Inertia Mass - A heavy base used to increase the static mass of vibrating equipment. This allows a resilient isolator to function without extreme motion of the equipment.

Isolation - The measure of the amount of energy prevented from being transmitted from the vibrating surface of an isolator to the isolated surface. The inverse of transmissibility. $I=100-T$

Isolator - A device that joins two entities, yet allows each to remain in its natural state without influence from the other.

Lateral Stability - Lateral stability is the characteristic of an isolator that returns the system to the center equilibrium position if the isolator and system are deflected laterally.

Natural Frequency (f_n)- The frequency at which a spring-mass system will oscillate if deflected and allowed to move without influence of an outside force.

Passive Isolators - These are mounts that support and isolate an object without the contribution of any outside energy source.

Resonance - The condition that exists when the natural frequency equals the disturbing frequency. (T=∞, I=-∞%) All of the energy of the vibration is transferred into the isolated object.

Spring-mass System - A system consisting of a mass suspended on an elastic member. This can be either an oscillating suspended mass, or a suspended static mass to be isolated from a vibrating support structure.

Spring Rate - The force that tends to return a deflected spring to its equilibrium position. This is expressed in pounds per inch. That is the force in pounds that it takes to deflect a spring one inch from its equilibrium position.

Transmissibility - The measure of the amount of vibration energy that is transmitted from the vibrating surface of the isolator to the isolated surface. The inverse of isolation. $T=100/(f_i/f_n)^2-1$