

Damping Coefficient

Use for time delay applications. Damping coefficient is almost always the primary determinant for applications where a specific time delay is required.

This is because the coefficient expresses time as it relates to stroke and force:

$$\text{Required Damping Coefficient} = \frac{\text{Force} \times \text{Time}}{\text{Distance}}$$

Force equals the input to the dashpot, Time is the time delay desired of the dashpot, and Distance is the stroke used by the dashpot.

In the English system of units, the damping coefficient is expressed as:

$$\frac{\text{lbs} \cdot \text{s}}{\text{in}}$$

Often, it is written as:

$$\frac{\text{lbs}}{\text{in/s}}$$

We typically express this as "pounds per inch per second".

This ratio expresses the dashpot's resistance to motion, given the rate of air leak inherent in the dashpot. With a closed orifice, the dashpot's leak becomes a function of clearance around the piston.

Damping ratings for each model are shown in the performance specification section. The ratings represent guaranteed minimums with a closed orifice. It is common for most units to have damping capabilities in excess of the ratings.

It is important to understand that the damping coefficient is a ratio, and the rating of any dashpot does not imply an absolute amount of force which the dashpot is capable of resisting.

For example, a rating of 50 lbs/in/sec does not mean that the dashpot can resist a 50 lb load. It only means that a one pound load would take 50 seconds to travel one inch, and a 5 pound load would take 10 seconds, and so forth. All computations must be scaled to accommodate the maximum force and stroke limitations of the dashpot model selected.

When calculating the required damping coefficient, it is important to consider the air spring characteristics of the model selected. It is helpful to review the Air Spring explanation and to use the effective damping distance in the coefficient formula, and not the total available stroke. Please contact Airpot's engineering department if you need assistance.