# Impact Energy Calculation Worksheet

Chart 1

The Energy that a shock absorber must absorb originates from the weight and velocity of the moving mass (kinetic energy) that is to be decelerated, and from any mechanical or pneumatic force that is driving this mass. It can also originate from a free falling mass.

Please choose the option that matches your application and fill in the blanks in the formulas to determine the generated energy level. Next, choose a Cushioneer® with sufficient capacity from Table 1 (adjustable) on page 2 or Table 2 (self-adjusting) on page 3.

Estimated Cylinder Speeds @ 80-100 PSI
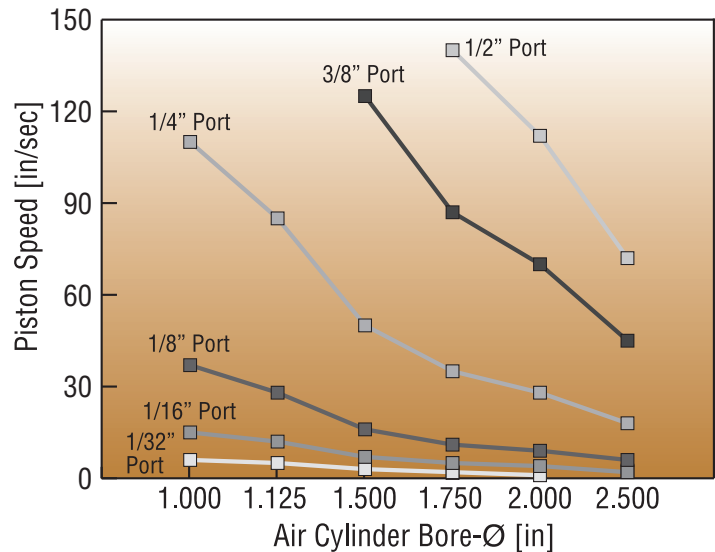
Kinetic Energy
(used for Option 1 and 2)
$E_{kin} = \frac{1}{2} mv^2 = 0.0013 \times w \times v^2$
$E_{kin} = $_____ [in-lbs]

w   weight [lbs]_____
v   velocity [in/sec]_____
Use chart 1 to estimate velocity if needed

Note: the variable **L** in the following formulas is the stroke length of the Cushioneer.

Option 1

Kinetic Energy and Energy from **Pneumatic** Driving Force
$E_{pneum} = \frac{\pi}{4}D^2 \times L \times p = 0.7854 \times D^2 \times L \times p$
$E_{pneum} = $_____ [in-lbs]
Impact Energy $E_{impact} = E_{kin} + E_{pneum} = $_____ [in-lbs]

D   Air Cyl. Bore [in] _____
L   Cushioneer Stroke [in] _____
p   Air Pressure [psi] _____

Option 2

Kinetic Energy and Energy from **Mechanical** Driving Force
$E_{force} = F \times L$
$E_{force} = $_____ [in-lbs]
Impact Energy $E_{impact} = E_{kin} + E_{force} = $_____ [in-lbs]

F   Force [lbs] _____
L   Cushioneer Stroke [in] _____

Option 3

Energy from **Free Falling Mass**
$E_{fall} = w \times h$
Impact Energy = $E_{fall} = $_____ [in-lbs]

w   Weight [lbs] _____
h   Height [in] _____
     Distance to Impact Point

Please use the formula below to calculate the Energy Absorption during Extended Use

Number of Impacts/Minute = _____
Sustained Capacity = $E_{impact} \times$ Impacts/Minute = _____ [in-lbs/min]
Hold operating temperature below 130°F (54°C).