1DOF Compliant Isolation

$$f_r = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$$

Equation 1

$$f_r = \frac{1}{2\pi}\sqrt{\frac{g}{d}}$$

Equation 2

$$d = mg/k$$

Equation 3

where f_r is natural (resonance) frequency

k is spring stiffness (N/m)

m is mass (kg)

g is acceleration due to gravity (m/s^2)

d is static spring deflection (m)

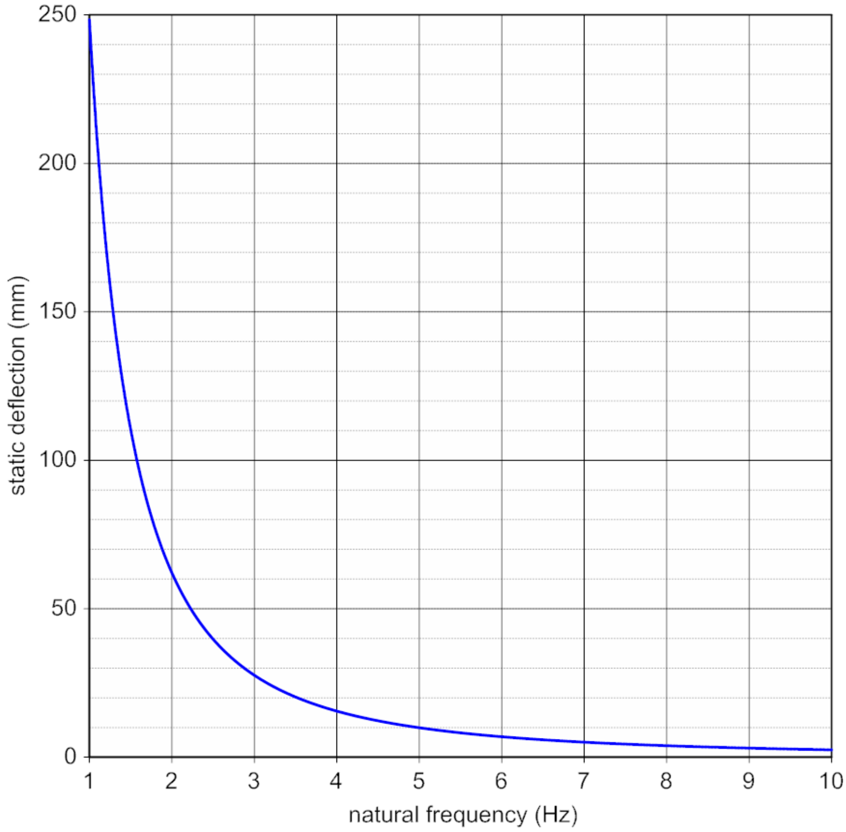


Figure 1. Static deflection (d) versus natural frequency (f_r), linear scales

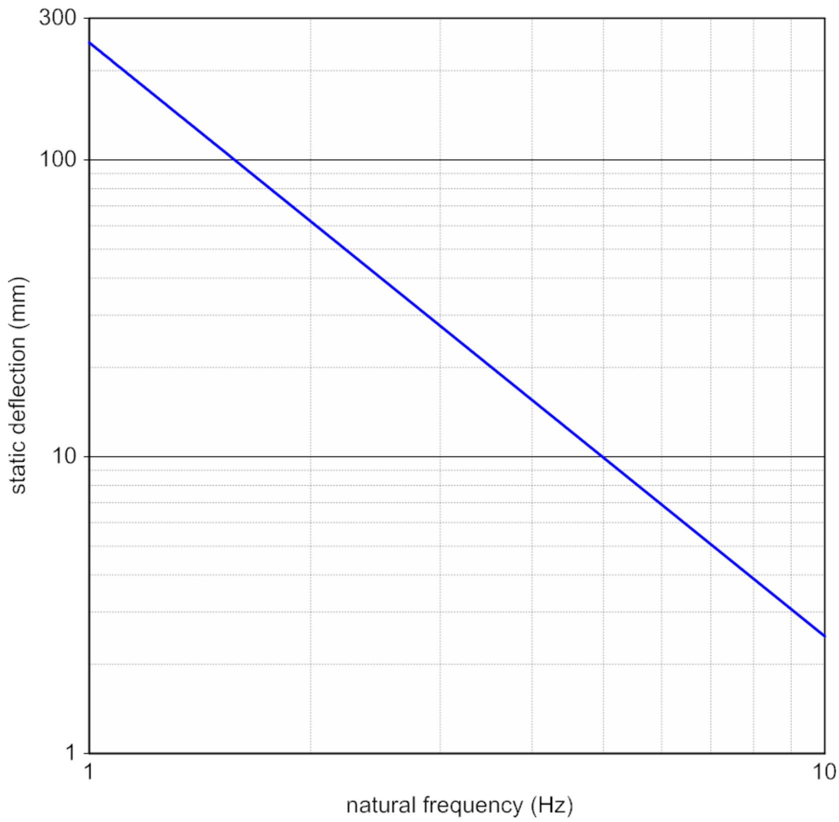


Figure 2. Static deflection (d) versus natural frequency (f_r), log scales

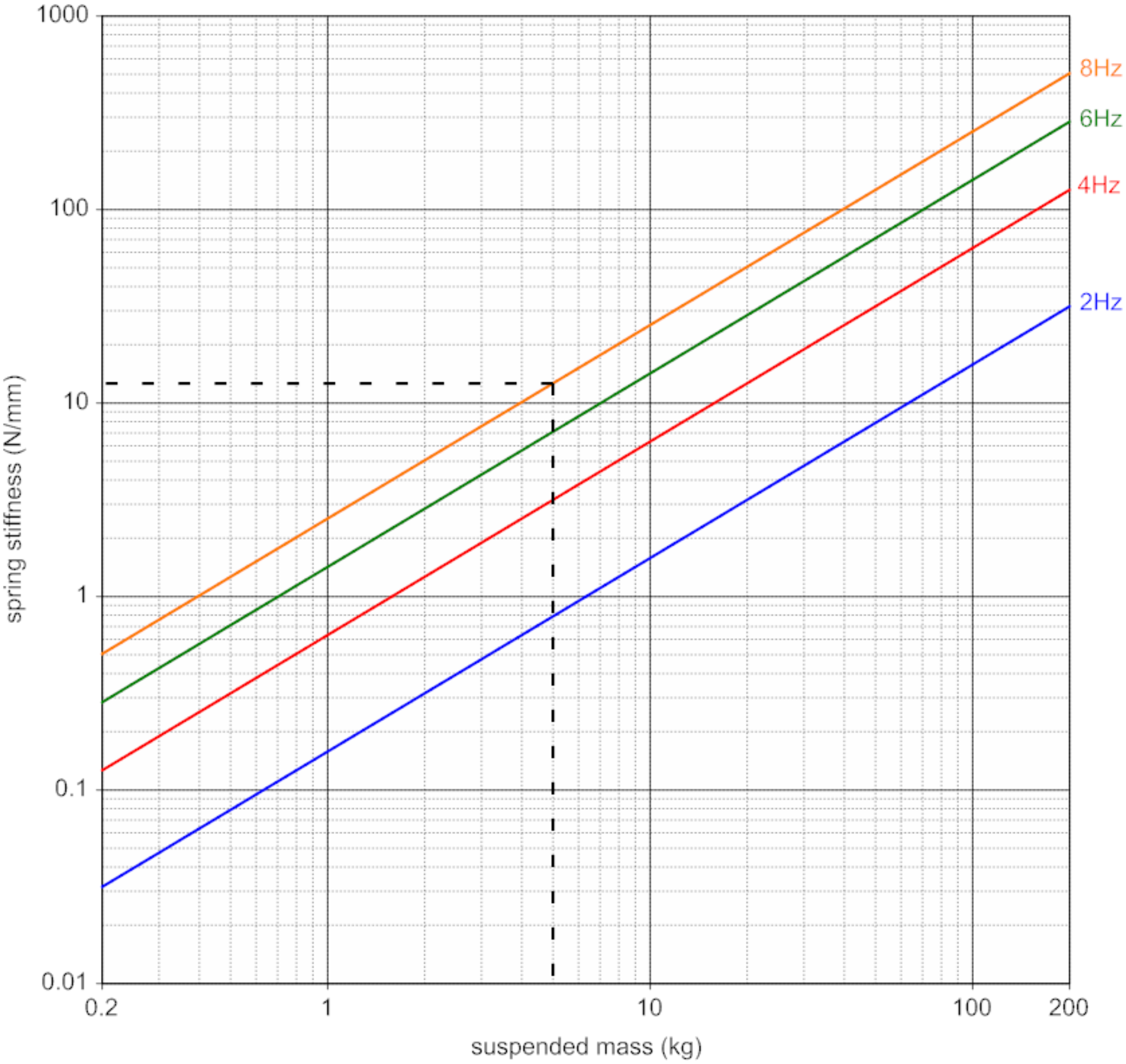
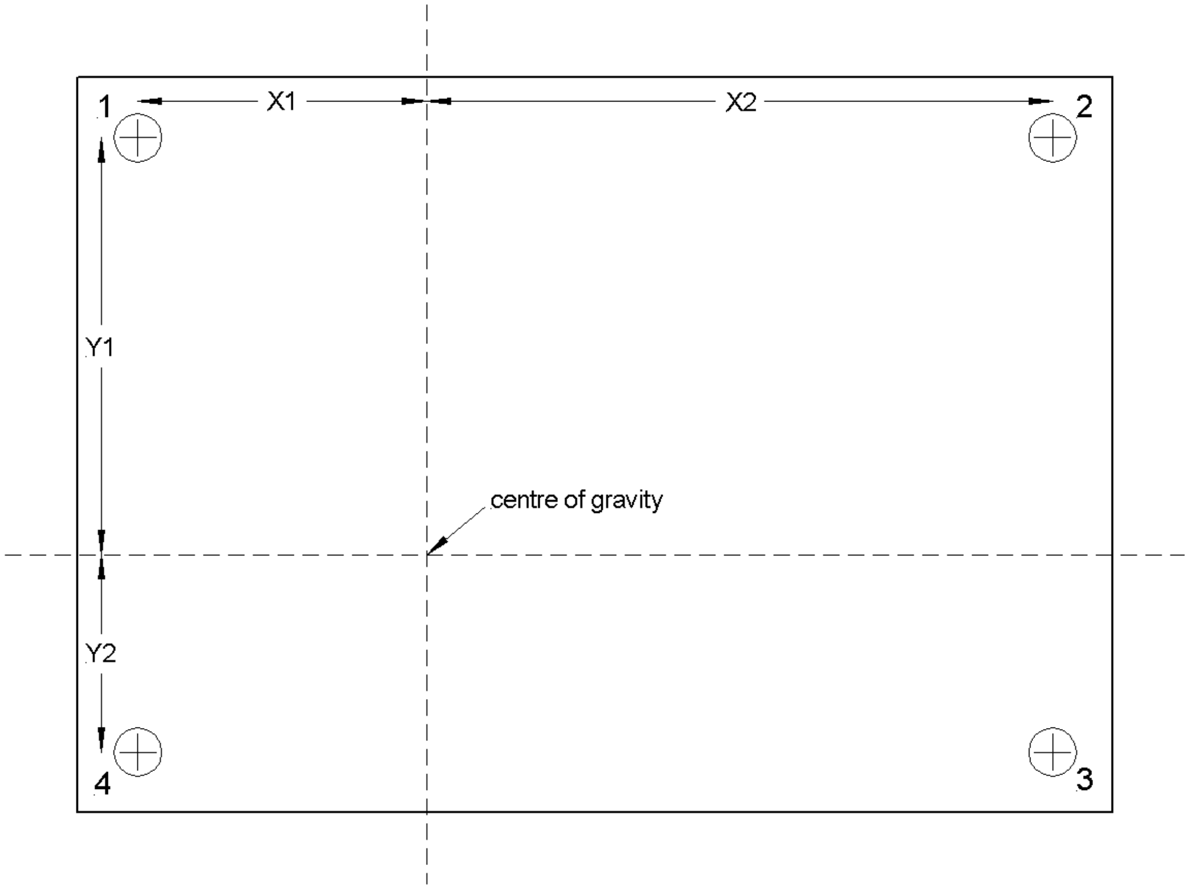


Figure 3. Spring stiffness versus suspended mass for four natural frequencies. Example (dotted lines) shows that for 8Hz natural frequency with a 5kg load the required spring stiffness is 12.6N/mm (12,600N/m)



Spring rate, position 1:

$$k\left[\frac{X2}{X1+X2}\times\frac{Y2}{Y1+Y2}\right]$$

Spring rate, position 2:

$$k\left[\frac{X1}{X1+X2}\times\frac{Y2}{Y1+Y2}\right]$$

Spring rate, position 3:

$$k\left[\frac{X1}{X1+X2}\times\frac{Y1}{Y1+Y2}\right]$$

Spring rate, position 4:

$$k\left[\frac{X2}{X1+X2}\times\frac{Y1}{Y1+Y2}\right]$$

where *k* is the total spring rate calculated from Equation 1 or read off Figure 1 or Figure 2

*X*1, *X*2, *Y*1, *Y*2 are the dimensions shown on the diagram above