SINE VIBRATION AMPLITUDE METRICS

By Tom Irvine
Email: tomirvine@aol.com

March 9, 2010

Let

D	=	Displacement
V	=	Velocity
A	=	Acceleration
f	=	Frequency

Let each amplitude metric represent zero-to-peak. Note that displacement is sometimes given as peak-to-peak.

The conversion formula from displacement to acceleration is

$$A = (2\pi f)^2 D \tag{1}$$

Example:

$$D = 0.5 \text{ in} \quad \text{at} \quad f = 10 \text{ Hz}$$

$$A = (2\pi\ 10 \text{ Hz})^2\ (0.5 \text{ in})$$

A=1974 in/sec^2

Divide by 386 to convert from in/sec^2 to G.

$$A = 5.1 \text{ G}$$

The conversion formula from velocity to acceleration is

$$A = (2\pi f)V \qquad (2)$$

Example:

V=20 in/sec at f=100 Hz

$$A = (2\pi\ 100\ \text{Hz})(20\ \text{in/sec})$$

A=12566 in/sec^2

Divide by 386 to convert from in/sec^2 to G.

A = 32.5 G