Subject: Pneumatic loading
Posted by Wayne Parham on Mon, 15 Sep 2003 12:14:56 GMT
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In a sealed box, there is only one mass/spring resonant frequency, and that is fo. Fs could be said to no longer exist, because it has been shifted up to become fo. Of it could be said that fo = fs, because there is only one resonant frequency. The distinction is maintained because the speaker's free-air resonant frequency is not determined by the system, and is a stand-alone parameter.When the speaker is removed from any system - electrical, mechanical or pneumatic - it will resonate at its natural free air resonance, fs. Energies will tend to excite the moving system at fs. If you short the voice coil, that will provide some motor braking which will add moving resistance and help control the cone.If you put the speaker a sealed box, the air in the box will act as a shock absorber and that will help control the cone and shift the resonant frequency up a bit. If you put a weight on the cone, it will shift the resonant frequency down and if you place something on the cone that interferes with its movement without adding mass, that will damp the resonance without altering the frequency.Fo is where the sealed system resonates, so that's where control is the least. But remember that the sealed system acts to damp the cone pneumatically, so a well-designed system will have better control of the cone at fo than the speaker alone would have at fs.