Subject: Re: Volume = capacitance; Restriction = resistance
Posted by Wayne Parham on Tue, 22 Jan 2002 18:48:15 GMT
View Forum Message <> Reply to Message

Displacement is the linear motion of the diaphragm times its surface area (Sd). For maximum displacement, you could calculate using Xmax as the linear motion. With this, you can calculate pressure in the chamber surrounding it. It's relatively easy to calculate what pressures would exist if the box were sealed. When the box has a hole in it, that makes it more difficult because it now acts as a resonator with an acoustic filter function. What you have is actually two acoustic filter chambers in the motor cabinet, where only one is actually wanted. The Helmholtz resonator in the main motor chamber section is one acoustic filter, and the secondary "supplemental volume" chamber forms another.The issue that concerns you, when having two chambers seperated by a restriction baffle, is that as frequency rises, the pressure source is increasingly more restricted to the second chamber. This creates an acoustic filter that becomes significant at some frequency depending on the dimensions of the constructs involved. It's a low-pass filter. That may or may not be a good thing, depending on what you expect from this design. At low frequencies, the filter function can be disregarded because static pressure will equalize between the two subchambers. Low frequency pressure changes act similarly to static pressures, and that's why you can disregard the filter function if the dimensions are large enough.See the document called "Acoustic High-Pass, Low-Pass, and Band-Stop Filters", written by Daniel Russell for more information on this subject.