Subject: Re: Speaker Voice Coil Cooling System Valve - Initial Tests
Posted by Wayne Parham on Tue, 28 Jun 2005 23:09:54 GMT
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I am running a LAB12 with the valve installed. The signal is 40Hz, 40VRMS, which is approximately 400WRMS. I am running the driver open, so there is no pneumatic load to help the driver mechanically but it is not reaching its mechanical limits. I've even put 50VRMS into the speaker, which is 625WRMS. That exceeds both electrical and mechanical limits, but not violently.I'm very excited about what we've done so far. We're really on to something here. There is obvious unidirectional flow. So that part is working. The heat generated by the speaker is tremendous, and my gut feel is that when the driver is used in a small sealed box such as the rear chamber of a basshorn, it must be superheating the air inside. I'm fairly confident that the majority of failures are thermal, provided it is used above the quarter-wave frequency, within the pass band of the basshorn. Whatever the case, we will certainly be reducing the heat inside by a lot.Now the question is how much is a lot. We were going to use an infrared sensor to get some readings of the voice coil and magnet today, but we ran out of time. We also learned enough to realize we need to make a change first. Then we'll get some quantified measurements.The thing we plan to change is the inlet. Right now, it's just a pipe. We plan to machine one from aluminum that has a lot of very small holes instead of one large one. The idea is to increase surface area. What we discovered today is that most of the voice coil heat is radiated onto the front plate and center pole instead of being convected into the air surrounding the coil. So we want to increase heat conduction from the center pole to the inlet, and use it as a heat exchanger from magnet to air going into the device. This will make total heat transfer better, and the system will be more effective. After we've made this change, we'll take heat measurements and make comparisons.