Subject: Re: Compression Drivers
Posted by Wayne Parham on Sun, 11 Nov 2012 04:53:21 GMT
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zheka wrote on Sat, 10 November 2012 14:43Have you noticed any changes in authentic DE250s recently?
No, I have not. And as you are aware, I gave them a pretty thorough run of measurements when I tested the H290C waveguide. They act exactly like they always have, at least since I started using them.

In fact, look at the current spec sheet from B&C:
B&C DE250 DatasheetSame as it ever was.

Some characteristics of compression drivers are pretty stable and consistent, but others aren't. Part of a good design is making the crossover tolerate shifts that are most likely. Because they will shift, actually quite a bit, in some respects. That's normal.

The front chamber size and phase plug slots are usually pretty consistent from unit-to-unit. So you can count on the acoustic reactance from those features to stay constant. Alnico magnets may (permanently) lose strength when run hard, but ceramic and neodymium magnets are resistant to demagnetization. So (BL) motor strength is pretty stable in ceramic and neo motors, less so in alnico. Diaphragms can deform when pressed hard, and sometimes their environment can affect them too. Things like sunlight and humidity sometimes affect them. But in general, you can expect the diaphragms to be pretty consistent unless they are damaged. But the one thing that is all over the map is the voice coil. It will change drastically at different drive levels - even seemingly small drive level changes - and this changes motor strength and electrical damping. Lots of non-linear properties shift as well.
Large Signal Performance of Tweeters
Maximum Efficiency of Compression DriversI think the real problem is Geddes crossovers are too sensitive to driver parameter shifts and unit-to-unit variations. This is a common problem, one that I've seen in both DIY and commercial speakers. Some system designs are just more sensitive than others, and in my opinion, one of the most important features of a good design is its tolerance of parameter shifts.

Geddes may use tank circuits in his crossover for impedance/response shaping. He's not alone, I've seen it done by other manufacturers and DIYers as well. It is a fairly common approach, but ill-advised, in my opinion. That kind of crossover design is way too sensitive to changes in drivers, both from unit-to-unit variation and even from shifts due to temperature change at various power levels.

It is described in my Speaker Crossover document as a "resonating damper for the tweeter circuit" and is used as a way to mitigate peaks in impedance, which often show up as aberrations in response. As I said above, the problem with this approach is it is fairly sensitive to driver parameter shifts, and that's why I don't do it in my crossover. Variations between driver units make them hard to match with the crossover. Even temperature changes in the voice coil (which happen as drive voltage changes) will move the peaks enough that the tank circuits do not match.

Probably the greatest strength of my crossover is having that R1/R2/C1 network do all the work. It provides specific damping, and that approach is more tolerant of driver shifts than using tank circuits. Of course, it helps when the horn/waveguide is built properly, and doesn't have resonant modes in the passband.