Subject: Possible answer
Posted by Adrian Mack on Sun, 22 Feb 2004 03:14:04 GMT
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I was modelling an Altec 409-8D 8" driver in Hornresp a few weeks ago and something happened that is similar to your situation. Horn length was only long enough to support a 300Hz Fc, but it had an 80Hz F3 with a 3db dip at 150Hz and a little hump at 80Hz when there was no back chamber. A 17L back chamber showed the dip rise to 180Hz and the hump rise to 120Hz making the new low end F3 100Hz, and efficiency in the 100-150Hz region raised overall by about 2db. Mouth size was a good 1600cm^2, similar results happened with a really large 2500cm^2 mouth, response was just flatter.My conclusion was that it was just acting simply as a closed box down that low (which it would anyway). But the driver was more different as it's got an Fs of 91Hz and a very high Qts of 1.54, so I thought that could be the answer. The high Qts tells me that any rear box volume is going to peak quite a lot at the closed box resonance. Modelling the closed box response of the driver in a simple box modelling program (like Boxplot) showed a good +4.5db peak at ~90Hz when in an infinitly large box (like an IB or dipole). In a 17L box (volume size equal to Vas), it shifted to the 120-130Hz region and peaking at resonance became even more pronounced at almost +7db. This corresponds to what Hornresp showed me comparing the horn with no back chamber (like a dipole, with Qtc equalling Qts and the resonance equalling Fs) to the horn with a back chamber of 17L, the inclusion of back chamber shifting F3 from 80HZ to 100Hz in the horn (because the 17L rear volume raises its Qtc, so F3 rises too). The increase of peaking at resonance from 4.5db to 7db accounts for the increase in efficiency on the horn of ~2 to 2.5db between 100-150Hz. The peaking of the back chamber was boosting the low end response around 100Hz, and this major peaking of the closed box combined with the horn response was enough to make the F3 be at 100Hz. Response was within +/- 2.5db from 100Hz to 1KHz, so the high Qts made the output usable to 100Hz (although it required a lot more excursion at 100Hz than at 300Hz). If Qts was a lot lower, say 0.30, then I seriously doubt this would occur and low end cutoff would be 300Hz, as a horn length of 30cm supports, providing mouth is of adequate size. However you have said your drivers got a Qts of 0.40, so something else must be going on. If Fs was around 30Hz then with the Vas of 30L and Qts of 0.40 you may see some more output down low, but its not peaking or anything so I wouldn't expect it to actually be flat down low, you could see a step from 480Hz (Fc of 7" long horn) and then the step giving more output down low but at an attenuated level (like an EBS ported box style response at the low end, 150Hz to 480Hz on your horn). Is this what it looked like?Perhaps you've got some of the parameters wrong? Mmd can never be less than Mms seeing that Mms=Mmd+Mmr, so maybe theres an error in your inputs. Mmr (air load) for a typical 6" driver with 125cm^2 Sd is only 0.8grams. For referance, here are some Mmr approximations for different driver sizes: Adrian