Subject: trying to understand of the 'q' of an open baffle system
Posted by hitsware on Sat, 04 Dec 2004 01:08:03 GMT
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http://fullrangedriver.com/tiki-download_forum_attachment.php?attId=131..................

Subject: oops
Posted by hitsware on Sat, 04 Dec 2004 01:14:57 GMT
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http://home.comcast.net/~jhyamamoto/Baffleless.xls
rev. 359 - V

Subject: Re: oops
Posted by Wayne Parham on Sat, 04 Dec 2004 20:01:56 GMT
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If you're talking about Q in terms of electro-mechanical parameters, the Q of an open baffle speaker is the Q of the driver in free air.

Subject: Re: oops
Posted by hitsware on Sun, 05 Dec 2004 00:52:15 GMT
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I'm talking about the acoustic system Q. If we put a driver in an infinite baffle the Qtc = Qts (of the driver). But with an open baffle the Qtc (or perhaps Qtb) of the system goes down with the size of the baffle. What I have ascertained so far (by means of sims) is that if the baffle cutoff frequency = Qts x Fs we get sort of a max flat alignment where Fc(-3db) = Fs.......... I'm not sure "Fc" is the right term. To get on the same page would you define the differant "F" numbers as you understand them.....mike

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Subject: Re: oops
Posted by Wayne Parham on Sun, 05 Dec 2004 01:41:13 GMT
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I see wat you're driving at. The open baffle acts sort of like an infinite baffle, but the dimensions of it do set some parameters. It's like the shift produced when placing the driver near any other boundary, only in this case, you're focused on the size of the boundary.

Subject: Re: oops
Posted by hitsware on Sun, 05 Dec 2004 02:18:18 GMT
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"Some years ago, while designing the SCM8 dipole surround speaker (the triangular one) for B&W's original THX Home Theatre System, I was discussing with Quad's Peter Walker the problems of coping with the bass roll-off imposed by front-to-back cancellation of dipole designs. I was having a problem meeting the (then) THX bass extension with such a small enclosure, but did not want to revert to monopole in the bass (as so many do). Peter told me of a technique he used on the Quad electrostatics, which I was ashamed I hadn't also thought of, which was to engineer an underdamped bass alignment. That gave a basically rising response with decreasing frequency down to the nominal cut-off frequency, which compensates the roll-off due to dipole cancellation. This underdamped characteristic, of course, shows up in a nearfield measurement, but not in the far field. It is not apparent in the midrange panel because it is not needed. The dipole cancellation starts at a frequency defined by the smallest dimension of the panel and this is the same for all sections in a common panel size. The midrange panel operates above this frequency. So such a nearfield peak is often a deliberate part of the design of dipoles (of which panel speakers are an example). Mind you, both Peter and I went for much more modest peaks. The dipole imposes an extra roll-off rate of 6dB/octave. You can add a second-order Q=1 to a first-order at the same frequency to get close to a third-order Butterworth or, for a more extended "flat" response; a second-order Q=2 added to a first-order at twice the frequency gives something akin to a Tshebychev with a 1dB ripple. The Magnepan peak does seem a little excessive, but it all depends how it interacts with the modes of the listening room. This technique does open the debate as to what the ear actually hears. A Q of 2 has a pretty abysmal transient response and the question is whether the dipole "equalisation" ameliorates that effect in the total response. As both mechanisms are minimum-phase, I suspect and believe that that indeed happens. As it is ultimately third-order, though, the response will have an inferior low-level transient behaviour to a well-adjusted second-order. It should have some similarity to the series C (capacitor) closed-box alignments we used while I was at KEF with Laurie Fincham. There the -3dB point was lowered by putting a capacitor in series with an acoustic alignment with Q of 1. In those days we wanted to protect speakers from turntable rumble."—Mike Gough, Senior Product Manager, B&W Loudspeakers Ltd. I'd like to get away from 'alignments'(whatever that means?) and have a simple system (equation) like the sealed box equation.How about a 'Pi Alighned Open Baffle'

Subject: Re: oops
Posted by Wayne Parham on Sun, 05 Dec 2004 04:44:23 GMT
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Speakers like the Eminence Alpha 15 have such high Q that they are underdamped in any configuration, yielding the response curve you've described. It's basically peaked at resonance, then falling to the minimum and then beginning to rise again somewhere in the midrange. As with all things, the Q is a way to describe the filter function and it doesn't matter if the thing that causes it is electrical, mechanical or acoustic, the outcome is the same both in response and in group delay.Equalization from electronics will do the same as a speaker system with specific mechanical Q as will a Helmholtz resonator or other acoustic device that provides the same curve. These things are all just ways of describing conditions, and that's really all that is meant by the word "alignment" as used in loudspeaker configurations. It's basically just a label that is used to describe a particular set of circumstances.So no matter what you do, the system will have a particular set of characteristics, and those can be said to be it's "alignment." It is neither good or bad, just a way to describe the system.