Subject: A Question About Reflex Ports
Posted by cddeluca@telocity.com on Fri, 18 Oct 2002 09:54:20 GMT
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When calculating a reflex box response, a small, short (thickness of the wall) vent is mathematically equivalent to a long, large vent. But I can't help but think that there's more to the story - otherwise why would anyone go through the effort of using a port tube; you could just size the port (within limits, I understand) to require a length equivalent to the baffle thickness. This is rarely done in practice. So my question is this: what are the governing relationships? Is there an empirical relationship that has been derived over the years (for instance a target length:width ratio)?TIACharlie

Subject: Answer and more questions (Hi Wayne)
Posted by ToFo on Fri, 18 Oct 2002 12:23:51 GMT
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With giant boxes or high tuning you can have a port of large vent area and shallow depth, but for normal sized boxes with low tuning the port would be very small in area and would make lots of noise.If you use big power you want to have a big enough port to keep the wind from wistling.  I had a pair of polk mini monitors when i was in high school, they had .75" ports. I put them on a big amp once and the wistling was so loud they were chirping to the beat. In less nasty cases I have heard the term chuffing used, and thats what it sounds like.Hmmmm, now for my questions:I wonder if it would be ok to use small ports with low power, as excursion, and thus air displacement is considerably less at a handfull of watts.Can a port be too big to load the system at low power? Should port size be closely coupled to the intended rate of flow to hit a specific optimal pressure range or flow rate range? (I mean, you couldn't use a garden hose nozzle on a bottle of windex) or is it a question of just being under the threshold of audible turbulence?Thomas

Subject: Re: Answer and more questions (Hi Wayne)
Posted by cddeluca@telocity.com on Fri, 18 Oct 2002 15:22:42 GMT
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I'm trying to figure all this out myself, so anything I might have by way of answer is mostly

speculation. Nonetheless, as far as I can tell the volume in a reflex box virtually doesn't load the driver cone. Now I'm sure it does to some degree, but I think that for relatively low/modest excursion drivers at reasonable peak levels (110 dB or so) fooling with numbers makes me believe the situation is akin to an infinite baffle arrangement. What the driver is doing with the port is exciting a resonance, and the port is the outlet (the "speaker") for that resonating air mass. But the contribution from the port appears to roll off very sharply as you move away from that resonance. So in the end, what matters is mach number in the port. If the port is large enough that the moving air velocity is relatively low at the resonant frequency (when the port is acting) then you're good to go.What prompted the question is some old lit I saw somewhere once that said, in effect, that the port area ought to be a very large fraction of the driver area (like half or better). That's all I remember (and this was something from the 50's or 60's), but as far as I can tell that would be the only "rule of thumb" that would drive you toward a port tube, assuming baffle space was no object (assuming velocity was not an issue).Or maybe not....

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Subject: Qb
Posted by Wayne Parham on Fri, 18 Oct 2002 18:26:12 GMT
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Check the "Pi Alignment Theory" whitepaper, because it describes the relationship between cabinet size and port area, expressed with a term called Qb.

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Subject: Re: A Question About Reflex Ports
Posted by mollecon on Fri, 18 Oct 2002 23:33:26 GMT
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In his book "High Performance Loudspeakers" Martin Colloms have a few things to say on the subject. He claims that to make sure to avoid windy noises the port diameter should be 7 cm. (2.8") or more. He also says that the diameter to length ratio should be no more than 1:2.While the above is easily achieved in larger boxes tuned at frequencies > 40Hz, the opposite is the case when it comes to the now fashionable compact subwoofers with internal volumes well below 40 liters ( < 1½ cu.ft. ), & low tuning frequencies. In those cases a passive radiator is often used or alternatively the ends of a small diameter port are 'radiused' to avoid wind noises.

Subject: Hi Gang
Posted by Art J. on Sat, 19 Oct 2002 00:47:17 GMT
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Here is the article from the 60's that you may have seen.This is what got me going back then. I guess Im getting old.You see; large ports need a large box. The ideal back thenwas to have the port area the same as the cone area and tune by box volume. The port then becomes an effective radiator.The box is very large.....

http://www.lansingheritage.org/html/altec/plans/1960s-plans.htm