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Subject: 4-pi box size !!!

Posted by [Wayne-o](#) on Sat, 15 Aug 2009 07:49:43 GMT

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If you did not want to use subs ,would you advise to make the 4-pi box size larger if you wanted it to have the same bass extension like the 2-pi tower?? Or is there other reasons to keep it around 3.2 cu. ft. ? thanks.

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Subject: Re: 4-pi box size !!!

Posted by [Wayne Parham](#) on Sat, 15 Aug 2009 14:06:06 GMT

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Sure, you could go up to five cubic feet or so for increased bass extension.

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Subject: Re: 4-pi box size !!!

Posted by [Wayne-o](#) on Sat, 15 Aug 2009 23:42:33 GMT

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would 5 cu. ft. go down as low as the 2-pi towers??

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Subject: Re: 4-pi box size !!!

Posted by [Wayne Parham](#) on Sun, 16 Aug 2009 01:10:36 GMT

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Yes, just about the same on the bottom end.

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Subject: Re: 4-pi box size !!!

Posted by [feket663](#) on Tue, 18 Aug 2009 06:46:07 GMT

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And a bass-reflex port? same as the original?

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Subject: Re: 4-pi box size !!!

Posted by [Wayne Parham](#) on Tue, 18 Aug 2009 15:14:15 GMT

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No, you'll need to size it to tune the box to 38Hz.

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Subject: Re: 4-pi box size !!!

Posted by [feket663](#) on Tue, 18 Aug 2009 15:15:37 GMT

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Thanks Wayne!

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Subject: Re: 4-pi box size !!!

Posted by [Wayne-o](#) on Wed, 19 Aug 2009 13:30:25 GMT

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How much extra space in cu. ft. should you add to box volume for area taken up by woofer, horn and bracing ? THANKS

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Subject: Using CSG to calculate displacement volume

Posted by [Wayne Parham](#) on Wed, 19 Aug 2009 15:30:03 GMT

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You can calculate displacement volume using a CSG estimate. CSG is constructive solid geometry and it's a term I borrowed from computer graphics that describes what I'm talking about.

As an aside, I was a contributor in the POV-Ray ray tracing project, providing the support for the Inmos line of multi-processors. That's where my ray-tracing terminology comes from, but I was actually using this same process long before ever calling it "CSG" - There is a program called "volume.exe" in the original PiAlign distribution archive, and it was written in the 1970's. I used it as a simple calculator, allowing me to estimate volume offsets using a CSG approach.

Using a combination of primitive shapes (cylinder, wedge, cone, etc.), describe the parts inside the box. For example, a brace is a simple box so that one is easy - just calculate its volume using  $H \times W \times D$ . Write that down. To calculate a loudspeaker, simplify its shape as a cylinder (the magnet) and a cone (the basket and cone assembly). The formula to calculate the volume of the

measurements of your parts and calculate the volume offsets. You can go to whatever level of detail you want when estimating shapes, for example, you can use a single cylinder to estimate the magnet or if it has a bulge in the center, maybe you'll calculate as three cylinders. A horn may be modeled as a wedge or a pyramid or a cone, or perhaps as a combination of several primitive shapes.

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Subject: Re: 4-pi box size !!!

Posted by [feket663](#) on Tue, 25 Aug 2009 22:02:36 GMT

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Dear Wayne! I found this website:<http://www.jblpro.com/pub/manuals/enclgde.pdf> a factory recommended size for JBL 2226 woofer(4 cubic feet enclosure vol., 40 Hz tuned frequency). Can I use this dimensions for a little better bass response with original 4PI crossover? Thanks!

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Subject: Re: 4-pi box size !!!

Posted by [Wayne Parham](#) on Wed, 26 Aug 2009 02:48:42 GMT

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The JBL 2226 works pretty well in cabinets from 2.5ft<sup>3</sup> to 5.0ft<sup>3</sup> tuned to 38Hz. The thing is, when you change box volume, you'll naturally be forced into changing dimensions and port size and location. That will change the way standing waves line up inside the box. As a sub, it's generally not a big deal but when used as a full range speaker, this becomes pretty important.

What do you think about running subs?

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Subject: Re: 4-pi box size !!!

Posted by [feket663](#) on Wed, 26 Aug 2009 18:42:20 GMT

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Actually if the response go down to 40 Hz, this is enough for me. I will build an original size. Later i will build a sub, if necessary. Thank you for help and the patience.

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Subject: Re: 4-pi box size !!!

Posted by [Wayne-o](#) on Mon, 07 Sep 2009 16:28:08 GMT

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Does the standing waves in the box affect the tone of the speaker or the sensitivity ??? Does the standing waves come back through the cone ??? Ok I know, I ask a lot of questions. Thanks again and god bless.

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Subject: Re: 4-pi box size !!!

Posted by [Wayne Parham](#) on Tue, 08 Sep 2009 01:56:50 GMT

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Standing waves do have an influence, yes. They don't pass through the cone as much as they provide an acoustic loading for it, similar to the way Helmholtz resonance does. In fact, some speakers use this as a primary tuning mechanism.

Small boxes have standing waves at relatively high frequency, so stuffing is usually sufficient for absorbing them. The larger the box, the lower the frequency where standing waves form. Long, tall cabinets (like towers) also have pipe modes, i.e. standing waves. I used computer models on my larger cabinets and towers to help determine where to put the drivers and port so the internal standing waves didn't adversely affect response. I then verified this with acoustic measurements of a physical loudspeaker.