Subject: 1:1 throat area
Posted by DMoore on Tue, 20 Feb 2007 21:20:19 GMT
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I think one consideration is the size of the diaphragm being employed in a 1:1 throat area.It is conceivable that a relatively small cone in a low Fc horn with a proper mouth size would provide enough pathway length to achieve a considerable amount of acoustic resistance applied to the cone.As the cone diameter and the corresponding throat size increase, the horn pathway would shorten for a given Fc and mouthsize, and the acoustic resistance would be reduced as a matter of course. The resulting response due to increased impedance/reaactance caused by a too-short-horn would be more "peaky" in such a case. The typical design response is to raise the Fc of the horn in question.The matter seems to be related to overall pathway length, mouth size, and Fc, and the diaphragm/throat size is subjective in relation to that consideration.DM

Subject: Re: 1:1 throat area
Posted by DMoore on Tue, 20 Feb 2007 21:21:33 GMT
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Sorry. meant to be a response to horn questions thread below...

Subject: Re: 1:1 throat area
Posted by Cuppa Joe on Wed, 21 Feb 2007 05:01:41 GMT
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I'm considering a 10" driver (again) for this application, as opposed to a 12" as used in the MSL-4. I'd also consider a pair of stacked 8" drivers (for power handling) if necessary, to get a longer horn for the mouth size. It's all just a clump of ideas for now!

Subject: Re: 1:1 throat area
Posted by Wayne Parham on Wed, 21 Feb 2007 15:48:00 GMT
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There's also the matter of front and rear chamber volume. Front chamber area plays a big part in upper frequency response and ripple, acting something like an acoustic low-pass filter.

I really like using Hornresp, it does a great job and lets you compare several designs before making and testing a physical model.

Subject: Re: 1:1 throat area
Posted by DMoore on Wed, 21 Feb 2007 20:26:43 GMT
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The front chamber MIGHT be a moot point in a 1:1 throat ratio, seems to me. Although I suppose one could add one to limit the higher frequency bandpass as needed. An appropriately targeted crossover point would accomplish the same thing, but then there are numerous other considerations that come into play.If employed in a less-than 1:1 diaphragm-to-throat ratio, the front chamber would act as a low-pass filter by attenuating higher frequencies. In essence, the front chamber is an acoustic filter by its physical dimensions and could give a -6db rolloff on the upper frequency bandpass.A horn that lacks a front-chamber (1:1) PER SE would be limited in its upper band pass as a result of foldings (if any), and the mass rolloff, electrical impedance, etc., of the driver, amongst other considerations.DM

Subject: Re: 1:1 throat area
Posted by Wayne Parham on Thu, 22 Feb 2007 02:47:02 GMT
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The front chamber is absolutely a mute point when the driver isn't necked down by the throat. The front chamber volume is zero. And, yes, I agree, one could make something that had a front chamber that then had an opening that was equal to diaphragm area. Then there would be a front chamber volume, but I don't think that's what you or CuppaJoe were talking about. I really just brought it up because the front chamber volume is a parameter to be configured when designing a horn. When the throat area equals the diaphragm area and there is no front chamber, the characteristics are different than the same horn with a compression chamber of some size. It's all configurable, like setting the values of capacitance, inductance and resistance in a reactive circuit.

Subject: Re: 1:1 throat area
Posted by Cuppa Joe on Thu, 22 Feb 2007 04:24:13 GMT
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I was knocking around some ideas for a low-compression throat section which would mount over the driver from the front of the horn. I imagine it to be more of a smoothing transitional guide intended to reduce reflections of higher frequencies. Maybe it will cover only the driver's frame, maybe it will encompass the surround, as well. Is there any real harm if the throat expansion is a wider angle than that of the horn walls?

Subject: Re: 1:1 throat area

Posted by Wayne Parham on Thu, 22 Feb 2007 16:04:50 GMT
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Generally, the closer to the diaphragm, the more impact flare changes make. I would not want the throat expansion rate to be greater than the rest of the flare, unless the area where this happened was small in relation to wavelength through the bandwidth of the device. On the other hand, there may be cases where this kind of shape smooths the response curve or does something otherwise beneficial. I'd sure check it with Hornresp to see what effect that short section at the throat entrance will have.

Subject: Re: 1:1 throat area
Posted by DMoore on Thu, 22 Feb 2007 17:28:27 GMT
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That example would be a multiple-flare horn or a "rubber throat". Not typical of a "straight" horn, though. Better used in a longer folded type bass horn to reduce throat impedance.On the other hand, though, the 1978 EV midrange horn (Keele) US patent # 4,071,112 has 3 separate flare rates for purposes of bandwidth and coverage pattern. So there is no real limitation as to what you can do if you can achieve a balance of all the variables involved to arrive at your particular goals.DM

Subject: Re: 1:1 throat area
Posted by Wayne Parham on Thu, 22 Feb 2007 17:49:10 GMT
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Klipsch's rubber throat does that, you're right. But as you've said, it was done on undersized

smaller scale for a midhorn though, so I think it was worth noting. Good call.The use of changing wall angle to increase uniformity of a constant directivity horn is a different matter, because it addresses the loss of pattern control. What CuppaJoe is talking about is widening a very small area near the throat. This will not widen or narrow the pattern at any frequency. It might cause a reflection at high frequency, hopefully, out of band. But the pattern would not be set by this feature because the rest of the wall angle constricts radiation to a narrower pattern.

Subject: Re: 1:1 throat area
Posted by Cuppa Joe on Fri, 23 Feb 2007 03:28:25 GMT
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I'm thinking that the transition should be either as short as possible, or very gradual if it must be longer. The first idea was small strips of solid wood with triangular cuts, assembled like a picture frame. Not sure what to do aout the corners, if anything. Maybe the frame could include a phase plug? (I'd rather not muck about with phase plugs...!) I just want to discourage reflections off the baffle/throat panel.

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Subject: Re: 1:1 throat area
Posted by swett on Fri, 23 Feb 2007 20:56:03 GMT
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Have you read this paper by JBL? They have a very complex looking phase plug and it talks about why using smaller(6" and 8") drivers is wise for a midrange horn/waveguide.http://www.jblpro.com/PD5000/PDF/PT_WaveGuide.pdf

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Subject: Re: 1:1 throat area
Posted by Cuppa Joe on Sat, 24 Feb 2007 04:19:21 GMT
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Thanks for the link, Ian! Article is downloaded, I'll let you know what I think when finished reading later this year.... Since the considered cones might be paired with a 2" horn/driver combo, I'm hesitant to go smaller than 10", unless I decide to use an adaptor for a 1" driver instead (entirely feasible). The HF horn I have in mind is the DDS CFD2-25, with an interchangeable 25x30 degree coverage, turned sideways for the 30-degree application.I took example for the "Transitional Throat Waveguide-type Thingy" from the EV X-Line 3-way box. The vertically stacked pair of 8" cones have what I seek.

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Subject: Re: 1:1 throat area
Posted by Wayne Parham on Tue, 27 Feb 2007 00:41:32 GMT
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I initially intended (wanted/expected) to use a 6" or 8" driver in my midhorn, but couldn't get the response I wanted, mostly down low. The horn can be made large enough, but driver parameters prevented me from getting the low end and smooth response I wanted. Not to say that's the case for every driver, but it was for the ones I was looking at.

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Subject: Re: 1:1 throat area
Posted by swett on Tue, 27 Feb 2007 17:44:22 GMT
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Which drivers did you try?

Subject: Conical midhorns with 6" and 8" drivers
Posted by Wayne Parham on Tue, 27 Feb 2007 18:54:53 GMT
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I evaluated the Eminence Alpha 6, LA6-MB, LA6-MR, LA6-CBMR, Alpha 8 and Beta 8. Some I simply modeled, and found them too far out of line to be worth building a physical model to test. Some I decided would be worth building a prototype to measure, but ultimately found various things that prevented me from choosing any of those drivers. The problems I encountered were peaky response or too little lower midrange extension for my purpose. However, Adrian Mack used the Alpha 6 and was pleased with its performance. Response didn't go low enough for what I wanted to do, but his horn looked great to me and I expect it probably sounded good. Check out Adrian's posts in the links below:Adrian Mack's tractrix midhorn development threadMidhorn driver selectionHornresp questionsAdrian's early Hornresp models for his tractrix midhornAdrian considers the Alpha 6 driver for his midhornAdrian Mack learning my crossover models in Spice to design the crossover for his speakersAdrian describes his overall cabinet design planAdrian finishes making a physical model of his tractrix midhornAdrian posts measurement results of his tractrix midhornDiscussion about summing between subsystemsAdrian contemplates going with a conical midhornAdrian considers using the Pi crossover with a conical midhornAdrian builds a prototype conical midhornAdrian measures his conical midhornAdrian measures a completed midhorn, settles on this designMore measurements of Adrian's midhornAdrian decides on the rear chamber for his conical midhornAdrian's speakers come togetherAdrian's speakers getting closer to completionAdrian concerns himself with speaker placement

Subject: Re: Conical midhorns with 6" and 8" drivers
Posted by Cuppa Joe on Thu, 01 Mar 2007 03:47:14 GMT
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Have you tried any of the smaller-format B&C drivers in any horn designs, like the 8PE21 or the 6MD38?

Subject: Re: Conical midhorns with 6" and 8" drivers
Posted by Wayne Parham on Thu, 01 Mar 2007 05:27:23 GMT

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I didn't try any B&C cone midrange drivers. If you do, by Hornresp model or physical prototype, let us know what you find, will you?

Subject: Re: Conical midhorns with 6" and 8" drivers
Posted by Cuppa Joe on Fri, 02 Mar 2007 02:52:40 GMT
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Eventually, I'll get a round tuit and model the 8PE21, as I'd like to use it in something.Personally, if money weren't an option, there's PLENTY of brands I'd choose first over Eminence! Amongst others, the B&C 1" drivers and smaller cone midranges are some of the better choices. The semi-obscure Oberton has received some good feedback about their 1" drivers, as well (www.oberton.com). Some of their cones look kinda iffy, though....

Subject: Re: Conical midhorns with 6" and 8" drivers
Posted by Wayne Parham on Fri, 02 Mar 2007 03:38:31 GMT
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I've always considered Eminence to be a good brand, but I do prefer JBL in most cases. JBL puts a shorting ring in most of their woofers and mids, and that makes a big difference. B&C strikes me as being somewhere in between.

Subject: Re: 8PE21 Horn
Posted by swett on Mon, 05 Mar 2007 06:52:54 GMT
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In my simulations of a 20"x10" horn(vs 24x12 for the Pi horn), all the horns in the 180-200cm2 throat range looked good. With a spec'd Sd of 220, I imagine a throatless 8PE21 horn would be almost as good. One question of mine has been how to create a throatless midrange horn, since 220cm2 is quite a bit smaller than the spec'd 8" diameter. Therefore, you'd still need to create a 'throat' of sort to cover the driver's surround.