
Subject: How do you calculate the optimal back chamber size for a frontloaded bass horn?

Posted by [Peter Krojgaard](#) on Thu, 03 Jun 2004 07:16:27 GMT

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Using McBeans HornResp program (and with the generous aid of others!), I am about to build a pair of large, straight 29 Hz bass horn. I use two 15" woofers (Precision Devices PD.158) for each horn in order to get the horn shorter. The throat size for the dual woofers is 720 cm² which is a little less than 1:2 (throat size:cone area). In McBeans program you can see how the predicted output varies using different sizes of back chambers. Now, for my particular horn, I get almost identical predicted outputs from McBeans program using back chambers between 100 and 140 liters for both woofers. Does this mean that I just need to get the size of the back chamber within this interval, or can I get a more precise 'guess' regarding optimal back chamber size based on 'reactance annulling' (which I unfortunately do not know about)? If the latter is the case, I would really appreciate if someone could tell me how to achieve 'reactance annulling'! I thank you a lot in anticipation! Regards Peter Krojgaard

Subject: Re: How do you calculate the optimal back chamber size for a frontloaded bass horn?

Posted by [Bill Fitzmaurice](#) on Thu, 03 Jun 2004 10:31:02 GMT

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You have to be able to measure impedance. After the horn is complete mount the driver but leave the cabinet back off and run an impedance plot; there will be a peak at about 1/2 the driver F_s , which is the $F_s(h)$. Put the cabinet back on and run another plot; that peak will ideally move up to the horn F_c . If it doesn't go up to the F_c the chamber is too big. If it goes above the F_c the chamber is too small.

Subject: Thanks a lot and a few more questions!

Posted by [Peter Krojgaard](#) on Thu, 03 Jun 2004 15:36:02 GMT

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Hi Bill, Thanks a lot for your answer. You just know it all! McBeans program actually display impedance based on the T/S parameters of the driver(s) and the actual horn, of course, so I hope I can use these program facilities as a rule of thumb. However, the program displays both Acoustical and Electrical impedance. Question 1: Please correct me if I am wrong, but is it the Electrical impedance you refer to in your reply? If it is the Electrical impedance you refer to, then I would like to know how critical 'reactance annulling' is soundwise (Unfortunately, I have already ordered the cabinets that might be too small, so it may be an expensive lesson - at least to me!). The cabinets ordered have a back chamber volume of 120 liters, which gives an Electrical

impedance peak at about 32 Hz, while the $F_c = 29.11$ Hz. According to your answer, this indicates that the cabinet is too small!!With your added knowledge I have now been changing the numbers in the program, and these simulations indicate that I have to increase the back chamber volume to 160 liter in order to push the electrical impedance peak from 32 Hz down to 29 Hz.Question 2:Would such a change (pushing the impedance peak from 32 Hz to 29 Hz)make a large difference soundwise?I thank you a lot in anticipation and look forward to hear your answer!RegardsPeter Krojgaard

Subject: Re: Thanks a lot and a few more questions!
Posted by [Bill Fitzmaurice](#) on Thu, 03 Jun 2004 16:35:14 GMT
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First, remember that McBean is a simulation, and is not perfect; that's why you have to measure the completed box and adjust the rear chamber accordingly. I've personally found that predictions almost always end up with a rear chamber too large.The impedance testing I refer to is electrical.Usually backchambers prove too large and you end up filling them with bricks.A deviation of 5 Hz or less isn't going to be critical, but 10 Hz high would give a response bump above the F_c with rolloff below it and 10 Hz low would give a more severe response loss at F_c .

Subject: Re: Thanks a lot and a few more questions!
Posted by [Peter Krojgaard](#) on Thu, 03 Jun 2004 17:58:47 GMT
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Hi Bill,Thanks a lot for your time and expertise, I really appreciate it!RegardsPeter Krojgaard
