Subject: Basic requirements for phase plug in horn loaded cone driver?
Posted by Norris Wilson on Fri, 28 Nov 2008 21:58:24 GMT
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Could someone knowledgable explain what the basic requirements would be for a phase plug of a woofer for horn loading?What would be the advantage of using a woofer with a phase plug versus one without?There are a few midrange and mid-woofers available with phase plugs that look like they could be possible candidates for a horn loaded design. But, I am not sure what to look for in their specifications that indicates a good woofer for horn loading?Thanks to those who can enlighten me.NW

Subject: Re: Basic requirements for phase plug in horn loaded cone driver?
Posted by JLH on Mon, 01 Dec 2008 17:32:43 GMT
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Norris,There is no reason to use a phase plug in front of a woofer. Its job is to increase high frequency extension, not something you want in a basshorn. Even midbass would be something not worthwhile. Midrange, possibly. Tweeter, definitely.The whole purpose of a phase plug is to make path length the same from all points on the cone/diaphragm to the throat. Without one, sound eminating from the edge travels futher than sound coming from the center. The difference causes a phase shift and if enough, cancellation. That's why high frequency suffers without a phase plug.Rgs, JLH

Subject: Re: Basic requirements for phase plug in horn loaded cone driver?
Posted by Norris Wilson on Tue, 02 Dec 2008 00:03:49 GMT
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Thanks JLH for your reply.What I gather from your input is that a phas plug is pretty useless for midrange frequencies and below.But, may beneifit a wideband driver intended to be used above 3kHz, like a Lowther 6" in the Azura horn.Is there any benifit in using a phase plug for a driver intended to be used from around 150Hz and up to around 2kHz in a horn?Looking at several pro drivers that use a phase plug. I see that they are mostly midrange types like the Beyma 6M180, that have a fairly high frequency extention of 6kHz or more.Are there any specifications for a midrange, or midwoofer that would help indenify possible use for horn loading?ThanksNorris

Subject: Re: Basic requirements for phase plug in horn loaded cone driver?
Posted by JLH on Tue, 02 Dec 2008 23:49:19 GMT

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Norris,You are exactly correct. A phase plug is not required for basshorns but is productive in horns used at high frequency.Rgs,JLH

Subject: Re: Basic requirements for phase plug in horn loaded cone driver?
Posted by Wayne Parham on Wed, 03 Dec 2008 02:20:05 GMT
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Another thing to consider is the low-pass acoustic filter formed by the front chamber. In my midhorn, for example, I really don't want output above 2kHz because of cone breakup. The volume of air between the cone and the throat forms a low-pass filter that attenuates high-frequency output, and that's good in this application.To me, you have to consider the cone material and shape when deciding how to horn load it. Just because electro-mechanical parameters are suitable for horn loading doesn't necessarily mean the cone will hold up under compression. The acoustic resistance seems to exacerbate cone breakup modes, so you have to consider that when making a midhorn.I've seen lots of horns like the Oris that have no compression, and they seem to be one of the most popular ways to implement a front loaded fullrange driver. I suspect this is partially due to the breakup modes. Rear loaded horns and transmission lines are also done without compression.On the other hand, there are some midhorns with phase plugs that offer pretty clean output up high. They usually have cones that are purpose designed for horn loading, and a phase plug specifically shaped for the cone and the horn they're mated with. This is a great approach, but not one for the casual DIY'er, I don't think. There's lots of testing involved on the front end, and fabrication and machine work for making the driver, horn and phase plug.So for me, the best approach was to make a cone driven midhorn with front chamber volume appropriate for low-pass. This sets a lower HF limit than a similar horn with a phase plug and cone that allows higher compression. But it has the advantage of being relatively easy to make. The requisite passband is easily obtainable too, when crossing over to a compression horn tweeter.

Subject: Thanks JLH and Wayne, very enlightning (nt)
Posted by Norris Wilson on Wed, 03 Dec 2008 06:49:11 GMT
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nt

Subject: EAW implemented it in their Midbass horn.
Posted by noviygera on Tue, 18 Aug 2009 06:49:14 GMT

The model is MR102L. Do a search.
They claim (and I believe them) that a mid horn that has a 12" driver can be used 200hz to 1.2kHz with the help of a phase plug. Otherwise it would only go up to 900Hz or 1K.
That means it's useful above 900Hz on a 12" driver.

-Herman