Subject: Horn lens and SPL
Posted by Paul C. on Mon, 26 Sep 2005 03:53:50 GMT
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If this has been asked and answered before, forgive me.How do various horn lens affect the perceived SPL of a particular horn driver? Some spread the sound out, others are made to concentrate the sound directly to the front. It would seem that those that spread the sound more would yield a speaker that would have a consistent sound within a reasonable listening position in front of the speaker, that is, not change tone as the listener moved around.On the other hand, a horn lens design that concentrated the sound in one direction would have a higher SPL directly in front of the speaker system, but the tone would change more (treble dropping out) as the listener moved to the side.So, how does this all work out? If a horn driver were rated at, say, SPL = 105 db, what would be its perceived SPL directly in front with a constant directivity horn lens? with other various horn lens types?

Subject: Re: Horn lens and SPL
Posted by Wayne Parham on Mon, 26 Sep 2005 04:13:31 GMT
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There are a few things that determine on-axis SPL from a horn. One is the conversion efficiency of the driver, itself. Another is the amount of loading from the horn, how effectively it is matched with the driver and how well it matches the driver's acoustic impedance with that of the environment. And the other is the radiating angle, how much sound is focused or spread out.

A horn has changing directivity with respect to frequency, so that's an important consideration too. If directivity narrows considerably at high frequencies, then on-axis SPL will rise at high frequency because HF energy is more tightly focused. But off-axis tonal balance will be non-uniform as a result.

You can model a horn with a program like Hornresp to get an idea of its performance. It also has a feature that will allow you to include directivity in your model. It assumes the diaphragm moves as a rigid piston, so it cannot include the additional response generated by the driver when the cone enters breakup modes. But it is a very useful modeling tool, nonetheless.

Subject: Re: Horn lens and SPL
Posted by Paul C. on Mon, 26 Sep 2005 12:58:56 GMT
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Thank you, Wayne. How are horn driver SPL's measured? What type of lens? Is there a

"standard" test regimen?

Subject: Re: Horn lens and SPL
Posted by Wayne Parham on Mon, 26 Sep 2005 15:29:42 GMT
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One of the best ways to measure is to run the horn at 100 watts and set the measurement microphone 10 meters away. This will give the same reading as 1W input measured at 1 meter and it serves to scale the measurement so that errors are reduced. Some horns are longer than a meter so this helps deal with that.
