Subject: sensitivity: conversion of units
Posted by Floyd Andrews on Wed, 08 Jun 2005 16:32:25 GMT
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Can anyone tell me how to convert the sensitivity of a speaker that is expressed as a percentage to db/watt or db/2.83volts?

Subject: Re: sensitivity: conversion of units
Posted by Earl Geddes on Wed, 08 Jun 2005 16:49:52 GMT
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I can tell you how, but I don't have time to work out the details.The % times the input watts tells you the watts radiated as sound. At one meter these watts would cover an area of 4/3 PI R^3. The radiated watts are "proportional to" Pressure^2/unit area, with the area of the spher as noted. So multiply the radiated watts by the area of a sphear at 1 meter and you have pressure^2 (within some constants). From this you can get the dB with a log and some more constants. You can look up the constants.

Subject: Re: sensitivity: conversion of units
Posted by GM on Wed, 08 Jun 2005 18:31:18 GMT
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Greets!I've seen various values used for half space pressure, from 112 -112.2 dB/m, though 112 seems to be the most common. FWIW, I calc'd it at 112.018, so rounding it off to 112 and 1 % eff..... dBv = ~112+10*(log10(0.01)) = ~92 dB/~2.828V/mSince 1 W = E^2/R = ~2.828^2/8 = 1, then dBa = ~92 dB/W/m for 8 ohm nominal loads. To convert other nominal resistances (R) to dBa, add 10*log10(R/8) to the dBv, so if the above is a nominal 4 or 16 ohms, then dBa = ~89 or 95 dB/W/m.GM

Subject: Re: sensitivity: conversion of units
Posted by Earl Geddes on Thu, 09 Jun 2005 19:34:35 GMT
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How did you get the 112 dB? Thats nice to know.I think that 1/2 space is incorrect since sensitivity is ususally an anechoic measurement which is full space. The correction for speaker impedance is hardly ever used.

Subject: Re: sensitivity: conversion of units
Posted by GM on Fri, 10 Jun 2005 13:44:50 GMT
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Greets!?? 120+(10*LOG10(1/'space')), where 'space' in this case is (2*pi), or half space. GM

Subject: Re: sensitivity: conversion of units
Posted by Earl Geddes on Fri, 10 Jun 2005 17:48:44 GMT
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OkSo where does the 120 come from? This seems too simple to me to be correct. Could you fill in the details?

Subject: Re: sensitivity: conversion of units
Posted by GM on Fri, 10 Jun 2005 21:32:35 GMT
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Greets!Fairly simple, or I wouldn't understand it:Lw = 10*log10(1 Wa/10^-12W) = 120 where:Lw = sound power level in dB1 Wa = one acoustic watt10^-12W = sound power standard reference for the threshold of hearingGM

Subject: Re: sensitivity: conversion of units
Posted by Earl Geddes on Mon, 13 Jun 2005 16:08:20 GMT
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I guess it is simpler than I though at first, but quite obviuos now.Thanks

Subject: Re: sensitivity: conversion of units
Posted by Walt on Thu, 23 Jun 2005 19:46:26 GMT
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Maximum efficiency is 109db fullspace, which translates to 112db halfspace.Best regards,Walt