Subject: Distortion specs for loudspeakers...
Posted by Magnus on Wed, 16 Jun 2004 22:54:11 GMT
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When considering different drivers - why do so few manufacturers publish distortion parameters for their drivers (the only ones I know are JBL and Beyma)? Well, we all know it, a THD number has little correlation to perceived sound quality but still it is more than nothing (why not publish IM numbers as well?)!Are most manufacturers afraid of telling the truth or what?Wayne or anyone else, do you have an explanation to this?PS. It would be nice to compare the numbers of "high-end" drivers like Scan-Speak, Focal etc to pro drivers like JBL, Eminence, Fane and the like! DS.

Subject: Re: Distortion specs for loudspeakers...
Posted by Manualblock on Thu, 17 Jun 2004 00:27:53 GMT
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What exactly does the THD figure represent in real time?

Subject: If....
Posted by Mike.e on Thu, 17 Jun 2004 08:37:07 GMT
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If you listen to sinewaves THD matters!ie: huge basslines ie: hiphop/drum n bassTOTAL harmonic Distortion rated in % normally.Because music is so transient..The higher in the frequency range your looking at the less id worry about THD and more about transient responses!in my opinionMike.e

Subject: Re: Distortion specs for loudspeakers...
Posted by Wayne Parham on Thu, 17 Jun 2004 09:57:30 GMT
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Most speaker manufacturers probably don't publish distortion specs because the numbers are so unflattering. 10% and up isn't uncommon, and it looks bad when compared with amplifiers having THD under 0.1%.

Subject: THD
Posted by Magnus on Thu, 17 Jun 2004 13:24:11 GMT
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Manualblock,If you apply a pure sine wave of say 1 kHz to a speaker or amp, ideally that is all you would get at the output if the speaker was perfectly linear. This is in practice however not the case, since the speaker or amp in slightly nonlinear it will produce harmonics or overtones which are integer multiples of the fundamental frequency, in this case 2 kHz, 3 kHz etc. (This has nothing to do with frequency response which is sometimes said to be linear when you really mean flat.)If you add upp the squares of the amplitudes of all harmonics and divide them with the amplitude of the fundamental frequency you get THD or Total Harmonic Distortion, usually expressed as a percentage or in decibels. A lower THD generally indicates a more linear system and thus lower distortion.The trouble with THD is that it not correlates much with perceived sound quality, nor is it a very good way of describing distortion of most practical systems. Consider playing a 15 kHz pure sine wave through a tweeter. The first harmonic will be at 30 kHz and thus beyond hearing. So no matter how much distortion the tweeter has, the 15 kHz tone will sound the same! Another example is say a 3 kHz tone applied to a woofer. If the frequency response of the woofer rolls off above 3 kHz the harmonic at 6 kHz will be attenuated and the THD number will look great! In these cases, THD will not be of much value.IMD (Intermodulation Distortion) shows greater promise in these cases and generally correlates quite good with perceived sound quality. In a simple 2-tone test two sine waves of say 15 kHz and 16 kHz are added together and fed to the speaker. If the speaker is nonlinear it will produce mixing products, in this case at 14 kHz, 17 kHz, 30 kHz, 32 kHz etc (there is a bit of mathematics involved here). So our bad sounding tweeter will show its true colors in an IMD test. Even better is to apply two line spectra and look at all the mixing products, tests have shown that this method correlates quite well with perceived sound quality.There are a lot of more things to say about distortion theory and measurement and the fact that we rarely listen to sine waves...CheersMagnus

Subject: Re: THD
Posted by Manualblock on Thu, 17 Jun 2004 15:47:30 GMT
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You made an excellent start on this one. Thanks for your post. That was my point; since while it remains easy to follow the theory it's harder to explain the effect.

Subject: Re: THD
Posted by Magnus on Thu, 17 Jun 2004 16:50:33 GMT
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An excellent lecture held at UCSD adresses the difficulties of measuring distortion and relate it to perceived sound quality can be found

herehttp://www.performancerecordings.com/capturing-music.htmlThe reason for adressing this issue is that from an engineering standpoint I can not believe why most manufacturers fail to provide even the simplest of distortion parameters. Many so called high-end HiFi manufacturers go on and on about what space-age materials they use in their membranes and such but do not publish any numbers to back up their claims for superior sound quality. True - music and sound reproduction is best judged by listening rather than looking at tables or graphs. But if their driver is so damn good - it will show in the specs!My 0.05/Magnus

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Subject: Re: THD
Posted by Manualblock on Thu, 17 Jun 2004 22:23:20 GMT
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Again thanks for that link. I seem to remmember JBL quoting THD in their literature. I may be wrong but I beleive it is a reactionary response resulting from impedance matching as well as internal resistance in the amplifier. So by definition it must be frequency dependant. It seems whatever amplifier you used to make the measurements would have an effect on the results. Thats the part I have trouble with, how do they judge accuracy? Before I go on; let me read that post you mention.
