Subject: Heat exchangers Wayne
Posted by Leland Crooks on Mon, 24 Oct 2005 19:45:20 GMT
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Got my exchangers for the hl10c's today. I know you advised me to do some testing, which I will. Which parameters should I be specifically looking at, and how much swing should be allowed within them?Using my pc for a tone generator seems to be problematic. About 2 minutes in it reboots due to overheating the processor! I've even got an additional fan on the cpu and the case. First ran into this when doing video capture. Leland

Subject: Re: Heat exchangers Wayne
Posted by Wayne Parham on Mon, 24 Oct 2005 21:32:30 GMT
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Check all the T/S parameters. If there's blockage of the cooling vent, you'll probably see an increase of Fts. The parameter that shifts the most from voice coil heating is Qes.If any of the values change at low signal levels when the plug is inserted, that's definitely a problem. So test Fts first. If it is OK at low levels, try it again at higher power levels. If it doesn't shift when the plug is inserted, then you'll know no restriction has occured. Then, using a cool driver to start with, test Qes at various power levels.I suggest comparing two identical drivers, one with the plug and one without, comparing the two at various power levels. Alternatively, you can test using the same driver at two different times, making sure the second test group is run after a long period of time has passed, giving the driver time to cool. Start out at low power levels and work your way up, making measurements at consistent predefined points.The T/S parameters are non-linear, meaning they don't remain consistent as power is increased. They'll shift depending on signal level. So compare a driver with the cooling plug to a driver without using the same drive signal to test with. Also, don't use one woofer that's brand new and compare with an older one that's seen a lot of high-power use. Either compare two woofers that are similar to begin with, or use a single woofer and compare at two different times, giving ample time for woofer cool-down between test runs.Ultimately you'll want to test at high power levels, because that's where the problem lies. What you want is the driver with the cooling plug should have basically the same T/S values as the one without - except at very high power levels. As power increases, the woofer with the cooling plug should not shift as much as the one without, particularly in voice coil resistance, which is reflected in Qes. So what you want to see is voice coil resistance remaining low and therefore Qes remains low.The ultimate test is to measure response, compression and power handling. If the heat exchanger is working well, then response will remain consistent at high power levels. It won't develop as much of a bump in LF response because Qes won't rise as much. Compression will be reduced so total output will rise and power handling will increase. If the device provides these things, then I'd say it has done its job.

Subject: paradigm shift

Posted by Leland Crooks on Mon, 24 Oct 2005 23:07:53 GMT
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Being an old hardware store owner I got to wondering about the screen used in the vent. It's just a piece of screen wire. When you design HVAC systems you have to account for the grate blockage on your vents. So I decided to caculate it.The screen has 29 strands. Eliminate 2 due to being so close to the sides. Diameter of screen wire strand is .011. As the screen wire plug is also .75, caculate avg length of strand to be .5".

Subject: Re: paradigm shift
Posted by Leland Crooks on Mon, 24 Oct 2005 23:19:24 GMT
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Didn't finish and somehow hit post. Here goes again.Being an old hardware store owner I got to wondering about the screen used in the vent. It's just a piece of screen wire. When you design HVAC systems you have to account for the grate blockage on your vents. So I decided to caculate it.The screen has 29 strands. Eliminate 2 due to being so close to the sides. Diameter of screen wire strand is .011. As the screen wire plug is also .75, caculate avg length of strand to be .5". Caculate the surface area of a cylinder .5" long, .011 in diameter. Divide by 2 as only half the area is seen by the vent. Gives surface area of .00873 per strand. Mulitply by 27. Gives blockage of .235". Subtract from area of 3/4 vent, .44179 - .235 = .20679" effective vent size. The holes in my sinks are 1/2". Area of .1963. Difference of 1/100th. You probably increased instead of decreased the area available in the bigger vent on the labs. Losses to grates are considerable when you design hvac systems for back pressure in the system. I'm still going to do some tests. But mathematically the only change in vent volume is neglible. I may get out the dremel and thin it a tad. Increase the size I told you for these by about 1-2/100. Mine are just a little looser than I anticipated.

Subject: Re: paradigm shift
Posted by Wayne Parham on Tue, 25 Oct 2005 01:21:47 GMT
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Yes, I agree with you about the bug screen. Somewhere in one of these threads, I made a similar observation. By removing the mesh, you remove an obstruction. And since it isn't just about area, but also about turbulence verses laminar flow, there is complex fluid flow motion to consider. A round pipe is one thing, but when it has an obstruction or a bend or something else, then the flow and pressure drop is best measured on a flow bench.The only thing that concerns me is those HL10C vents are already pretty small. I am comfortable with the cooling plug in the LAB12 because I have done so many measurements. I think it is reasonable to assume it will work well in an HL10A also, because displacement is lower so velocity is probably lower too. But the HL10C is a different animal, and you'll probably want to do a few measurements to check it out.

Subject: Re: paradigm shift
Posted by Leland Crooks on Tue, 25 Oct 2005 10:25:08 GMT
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"turbulence verses laminar flow"Always a pleasure to have a discussion with a well read person. I plan to test. The owner of the video/audio store here in town is a friend of mine, I think I'll see if he'll let me use his shop for an afternoon. About all I have is a DVM, which I mostly use for house and vehicles. Rather than kludge something up with it and my computer, a real scope and tone generator would be easier. I'm also going to do some spike testing with "real world" program. Because the chamber is larger than in a lab or the Pi, my rod's longer than yours I'm going to slot the vent side rather than drill holes, due to laminar flow. It will have far less turbulence even than the bug screen. Not to knock eminence, but I'd bet that the vent size is rather arbitrary. Just make it as big as the coil and gap allow, and see what happens. Reality in the mfg world. You have to design something marketable, and cannot take every factor into account. You're on to something here, whether PSW likes it or not. If I can gain 3db with chunk of aluminum, or save a $130 driver, that's a bargain.

Subject: Need to get some work done.
Posted by Leland Crooks on Tue, 25 Oct 2005 12:28:40 GMT
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About all I've done the last day or two is think about this. Gotta get some real work for profit done. BUT, I had another thought.I'm going to taper the end of the inlet. Venturi shape like in a jet well pump. It should increase the velocity of the airflow on the return stroke of the diaphragm. Might even cause a low pressure zone at the outlets, increasing movement even more.

Subject: Re: Need to get some work done.
Posted by Wayne Parham on Tue, 25 Oct 2005 15:14:31 GMT
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Those are very good ideas. These are the same sorts of things done on car intake and exhaust manifolds and head ports to improve flow.