Subject: Ports and displacement volume offsets
Posted by Wayne_Parham on Sat, 23 Jun 2001 18:50:32 GMT
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When building speakers with large ports, I recommend using the rectangular port that's shown on PiAlign. It's easy to build and it works just fine. You simply cut a small box with inside dimensions equal to the recommended rectangular port. Be sure that you remember to take into account the thickness of the baffle. For example, if you use wood stock that's 3/4" thick, then the port will need to be cut so that it's 3/4" shorter. As an example, the port you want is 9 1/8" long. But since the baffle is 3/4" thick - the port glued to the back should be 8 3/8" long. 8.375 + 0.75 = 9.125.Also, don't forget to include the port when calculating internal displacement offsets. Include the entire volume of the cylinder or box displaced by the port, not just the material that forms the walls of the duct. If PiAlign recommends that a 4 cubic foot box be made, then the volumes of all things inside the box should be added because they displace the volume. Total volume will probably be a few hundred cubic inches larger. Then the inside dimensions of the cabinet can be calculated, and the wood thickness then added to come up with a final outside dimension of the cabinet.

Subject: Re: Offset volumes for woofers ?
Posted by specopsda on Wed, 27 Jun 2001 15:45:32 GMT
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Dear Wayne, (or anyone who wishes to contribute)This post leads me to a related question: what volume do you use for woofers when figuring total volume for a cabinet? "Guestimating" the displaced volume doesn't seem accurate. I've thought about putting a cheap 15" woofer in a plastic bag and dunking it in a bucket of water to get the volume, but if someone else has come up with a good number, that's o.k. with me.

Subject: Displacement calculations (or measurements)
Posted by Wayne_Parham on Thu, 28 Jun 2001 01:52:02 GMT
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Measured displacement will always be more accurate than simplified (composite solid) calculations. But then again, the differences are pretty small, and particularly with the typical slightly overdamped cabinet that tends to be toleratnt of slight parameter shifts. Using a Composite Solid Geometry method, as I will describe below, will get you within a reasonable tolerance.Composite Solid Geometry is a term used in the 3D computer modeling field. CSG uses a series of solid shape "primitives" to describe complex object. To model the speaker driver mathematically, one can almost always use a cylinder and a cone. It's a simple mathematical

model, but for this kind of displacement estimate, is really quite adequate. Just measure the depth of the cone and its diameter, and you can "model" the cone portion of the driver. Then measure the magnet length and diameter, and you can model it as a cylinder. Add these two volumes together, and you have the lion's share of the volume displaced by the motor.In the PiAlign program archive, you will find a little stand-alone program called "Volume.exe." This program is old and primitive, so you may have better and easier ways to calculate your composite solids. But it gives about a half dozen of the most common basic shapes and allows entry of their dimensions. It then returns the volume of the primitive shape, in cubic inches. That's what the "LFD Offset" field in PiAlign expects to see - cubic inches.So you can use this program or any other volume calculation you feel comportable with, and you can estimate each item in the cabinets with whatever level of accuracy you feel is required. Just keep adding the offsets of each primitive you choose. You can even get down to the terminals by using tiny little cylinders, and the basket using a series of thin rectangles or toroids.