

Duct Testing Transcript

This is a graph from Washington State Energy. And real basically, (we'll go ahead and do this test in just a minute) what we're doing is we've got our Duct Blaster is a brand name, so we'll go ahead and call it our "duct pressurizing jig." And we've got a really big monometer right here. And what we do is we tape off all the intentional holes. Now the intentional holes are the registers and grills. And we pressurize it, and in this case, we pressurize it to 50 and we see what our fan pressure is. Because we're using a smart monometer, we can then tell how many CFM.

So this is the part where hopefully, I will not crash my computer system, and we will.... We have our own world's biggest monometer. This actually will read this monometer directly. Kind of cool. I didn't write the software, trust me. What we've done here, is we have two registers in the whole house because we got kind of stretched on the HVAC budget, and we take one off. This is the one our pressure tap is in, and I use the foam block on this one. This is supposed to be our UHaul air handler box right here. It's green. It's a recyclable furnace. And this is lovingly called the snorkel, and it fits to the fan. We're not going to get into the nitty-gritty of how to do this, but at the center of this, we have this pressure sensing ring.

So what I'm going to do here (just keep your eye on one of the giant monometers and your fingers crossed), and we're going to see what the leakage is at. This is a really common mistake when you test duct leakage, which is not to connect the hoses. I did that on purpose. So I'm going to bring this up to 25 on the left-hand side and because I've programmed this ultra-smart monometer, it's going to tell us what the leakage is. I'm not going to argue over a couple tenths of a Pascal here. We'll just turn it down just a little bit.

So roughly speaking, our duct system here has a leakage of about 50 cfm at 25 Pascals. Here's the real interesting thing. I was in Idaho two week ago and we saw a 2,000 square foot house that had a total of 36 cfm. And this box is actually pretty taped together and we didn't go out of our way to make holes. So, again, it's a flow rate. I'm saying when I pressurize the entire duct system, to 25 Pa it leaks 50 to 52 cfm. When we talk about this code, keep that 52 number in your head, okay?

This, to me, is a really encouraging picture over here. This is a serious guy, Apollo heat out of Kennewick, Washington. Got his hard hat on and a safety vest, and he's going through these houses, and at every house, he's got a number that he's got to hit. The other picture is one of David Hale's on a finished house. David works for Washington State University. And these are typical ways you hook up. David is hooking up to the largest return grill and this individual is actually hooking up to the furnace tab itself.

There's two tests that are in the new code. One is called the total test, and that's just the one we did there. Regardless of where the duct is located, whether it's in an attic, a crawlspace, a garage, over the house, between floors, or any place else, it's going to see that hole. The other test it talks about, which is sort of hard to understand until you see it a few times, is called the leakage to outdoors. The disadvantage of this test is that you need two pieces of equipment. You need this duct tester here, and you also need a blower door. The first time you see this test, it's a little confusing. There's a couple monometers, two drums rolling around and fans on all over the place. Lots of ways to mess it up. But the way it works is you need two things for a leak. You have to have a hole, and you have to have a pressure difference. So what the blower door does is it pressurizes the house to 25 Pa. And if you pressurize the ducts to 25 Pa, and if you have a leaky duct inside the house, how much air will go through that hole? Zero! That's why you sit in front of the class, isn't it? Zero's the right answer. So it's kind of a cool trick. Disadvantage: you need two pieces of equipment. This is sort of the test shown schematically. So this is the blower door pressurizing the house to 50, which is the same pressure you're going to bring the ducts. That's how the duct leakage to outside test works.

When you're doing a duct blaster test, if I keep saying 50 Pa, it's because here in the northwest, for whatever reason, we test everything at 50 Pa and not 25. The reason that is is because we're twice as good. I don't know why it is! It doesn't matter whether you do it at 25 or 50. But when you do a duct blaster test, you are getting everything in the duct system to your test pressure. This is really different from when the ducts are in operating conditions. You might see 125 Pa right underneath the furnace on the supply side. And you might only see something like 2 Pa. Your duct blaster doesn't care. If you had a hole this big at the boot and this big at the air handler, it will give it equal weight. In terms of saving energy, and money, if you're giving direction on where to get the most exact about duct sealing, the closer you are to the fan, the more important it is to seal that hole well. Just remember, duct blasters don't care where that leak is. The energy does.

So, our crews had a motto: boots for show and plenums for dough. When you're trying to save money, focus on the plenum. You've sealed some ducts in your life, haven't you? The further you are away, the less the pressure is. The greater the pressure, the more important it is to seal that hole in a way that will last forever, and not leak at all. This is just another highly stylistic chart, and again, this one is in **inches/water column**. What it just says is the closer you are to the fan, the higher the pressure.

They give you two options. One is the post construction test and one is at rough in. At post construction, they are allowed up to 8 cfm per hundred square feet at 25 Pa or **1 inch water column**. That's leakage to outside, that's the one with the blower door. The other way to express that is 8% of the floor area. Total leakage, you're allowed to go up to 12 cfm. At the rough in test, that's before the sheetrock goes up, so you can't use a blower door, you're allowed 6 cfm with the air handler in place. If the air handler's not in place, you're allowed 4 cfm. Exemption: if the air handler and ducts are inside the conditioned space, no duct leakage test is required. One of my secret hopes out of this code is that people find duct testing so disgusting and so discouraging and so laborious that they start to put their ducts inside so they don't have to do it. It's really a much better answer.

Sensor ring: care and feeding. This is actually what's at the center of the duct blaster. I can get damaged, some people like to use a chemical fog and it actually plugs the sensor rings and sometimes the hoses can also. For whatever reason, people (I don't know why) they like to put the rings on backwards, but they do. They're supposed to face in, not out. The way I get people to remember that is innies not outies. The bad news is you'll get a number.

That was my dog chewing my pressure hose. Hoses do develop leaks. Okay so where do we put the pressure tap? I don't know. I like to put it some distance away from my fan. On new construction, it shouldn't matter too much in most cases because the duct system should be tight enough that it doesn't matter. However, if you put your pressure tap behind... Let's just say we have a teddy bear here. If I put my pressure tap here, I can crank and crank and crank and my pressure tap might not ever see anything. I think it's a good idea to go around and test the pressure in a few places. Post testing duct leakage happens. Do you know what plumbers call flex duct? Knee pads. So, I have to put a drain here. It can happen. The one on the left was caused by somebody putting a screw through the interior lining of a flex duct, which is against the manufacturer's warranty advice. So obviously if you put your pressure tap on either one of those registers, you would think you had an infinitely leaky duct system, when in reality you just had something a plumber or an electrician damaged.

This company right here uses two different kinds of furnaces, and they made a sheet metal jig that they just take off the blower door compartment, put that on, and it saves about 10 minutes of futsing around with tape and cardboard. It's pretty fast. Here's a partial answer to your question. Yea, it is important to seal it. Also keeps the mice out of the cupboard, which is another nice thing.