

This real-life exchange started on the Chimney-L listserver, a private list for chimney professionals.

-----original message-----

Date: Mon, 7 Dec 1998 21:40:44 -0500

From: Bob Lapo fluedoc@freewwwweb.com

Subject: Flow Reversal

Looked at a multi-flue chimney venting two fireplaces (main and 2nd floor) and a unused flue leading into basement. Fireplace flues have Lok-Top dampers. When either fireplace is burning smoke enters home through the unused fireplace (Lok-Top closed), no kitchen or bathroom fans on or heater returns going. Flues intact, but Smoke chambers are poorly constructed allowing flue gas to leak out, somewhere penetrate wythe and travel along outside of unused flue and entering smoke chamber (seen it). Each fireplace has a 3" air vent in floor supplied by one intake at base of chimney.

Customer also told me that they referred this builder to a friend who had 4 flues in a single chimney built and is having identical problems (lawsuit ongoing).

My diagnosis is that they have several problems: 1) Cross over starting at smoke chamber, 2) Flow reversal caused by depressurization & 3) not enough combustion/excess air. Please reel me in if I'm getting off track. 1st problem can be fixed by applying Chamber Tech 2000, 2nd & 3rd problems fixed simultaneously by larger individual air vents or mechanical air intakes (more test burns are planned for confirmation).

Any comments and suggestions welcome. Has anybody used a mechanical air intake with success? If so what brand?

Thanks in Advance!!!

Bob Lapo
The Flue Doctor, LLC

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Date: Mon, 7 Dec 1998 21:40:44 -0500

To: Bob Lapo fluedoc@freewwwweb.com

From: Norbert Senf <mheat@mha-net.org>

Subject: Flow Reversal

Bob: definitely sounds like you have breeching, but I'd do some more tests to confirm depressurization.

If the depressurization is non-mechanical, ie., due to stack effect, then the pressure on the second floor (assuming that there is no third floor) should be positive (when it is colder outside than inside). This means that the 2nd floor fireplace should be venting positively even in standby -- ie., if the 2nd floor fireplaces leaks smoke, don't assume that house stack effect is

causing it (particularly if you open the top damper). If it is stack effect, you should be getting the most smoke from the basement flue.

Here is a cheap and easy house pressure test: It works the best on a cold day with absolutely no wind:

Turn off exhaust appliances (fans) and close all house openings. Go into the basement and open a window about 1". Hold a match or cigarette or incense stick near the window. The inward flow that you see is caused by negative pressure. Now open the window all the way and see if the flow speed is less. The reduction in speed is an indicator of how leaky the house is, ie., a lot of speed reduction means the house is fairly tight.

Now, repeat the same test on the first floor and second floor. On the second floor, the smoke should be going out the window, not in - an indication of positive pressure upstairs. If it isn't, and there are definitely no exhaust appliances operating, then the house has a big leak right near the top - I've seen this happen when an attic hatch or an upstairs window has been left open, for example. Positive upstairs pressure is why an upstairs fireplace is very easy to vent, even with a short stack - it's like having a little Exhausto on it.

You may get an indication of where the neutral pressure plane is, ie., at what height in the house there is zero effect at the window. A high neutral pressure plane means the upstairs is leaky, or the downstairs is very tight, or a combination of the two.

Here's a neat demo that I stumbled into last winter at my in-laws:

I was having a smoke, so had to go down the basement and out the patio door. Since it was minus 20F, I decided to have my smoke just inside the door. It was perfectly still outside with no wind. With the patio door cracked open a couple of inches, the neutral pressure plane in the house dropped to a level about 3/4 up the patio door -- below, the smoke would stream into the house, and above the smoke would stream out. As you opened the door more, the neutral pressure plane dropped down some more. I didn't try this (I was having a smoke, not diagnosing someone's house), but if I had gone upstairs and opened the front door, then the neutral pressure plane would have gone up.

Hope this makes sense - once you figure it out, you can do an easy house pressure diagnostic, given the right weather conditions (cold, calm).

Best.....Norbert

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From: Bob Lapo fluedoc@freewwwweb.com
To: "Norbert Senf" mheat@mha-net.org
Subject: Flow Reversal
Date: Wed, 9 Dec 1998 22:00:45 -0500

Norbert,

Thanks for your tips on testing the house, it was very helpful. You were the only one who responded to my post and I thank you.

If you don't mind I'd like to run by you the test results. Basement, 1st & 2nd floors all are negative pressure (smoke exiting window). 2nd floor has 7 recessed lights that are leaking into attic. Flow is good when basement window open. Basement flue is blocked off, but when opened cold air rushes in. Home is 5 yrs old with tight construction. Here's where I'd like the sanity check: If I understand you correctly this is not a typical stack effect, just upper level leaks & tight construction. Which could turn into stack effect once upper leaks are sealed. I need to fix recessed light fixture leaks & any others that can be found, which will lower the negative pressure plane. Increase air intake vents from the 3" to 6"-8" (?). Are there any other solutions for these problems that I haven't mentioned? I also plan to chamber tech the smoke chambers to solve the breach and see if it worked, if not then I recommend reline.

Once again I want to thank you for your help, this is my first flow and pressure problem that I'm working on and so far it's going well.

Bob Lapo

The Flue Doctor, LLC

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Date: Thur, 10 Dec 1998 21:40:44 -0500

To: Bob Lapo fluedoc@freewwwweb.com

From: Norbert Senf

Subject: Flow Reversal

Hi Bob:

Your diagnosis sounds right on. The upper envelope leaks are what you have to deal with first -- your clients should realise that they are very lucky to have you diagnose this correctly, because very few people would.

On the outside air, I'd hold off on that -- it will not affect the smoking, unless the fireplaces themselves exhaust enough air to depressurise the house. If that is the case, then the makeup air can be anywhere (ie., cracking a window is just as effective as a duct to the fireplace).

R-2000 has a booklet titled "R-2000 makeup air guidelines" that is available from

Canadian Homebuilders' Association
150 Laurier Ave. W., Suite 200
Ottawa ON K1P 5J4
FAX 613 232-8214
voice 613 230-3060

John Gulland describes this test in his seminars as well. You need a low-range Magnehelic pressure gage (75.00 from Grainger's) or a digital micro-

manometer, and measure the pressure in the basement. It should be -5 pa or above. If is less (ie. more minus) than -5pa, you supply powered makeup air electrically interlocked to the exhaust appliance (for a fireplace I guess that would be a manual switch for the fan).

Glad I was able to be of help - let me know what happens.

Best.....Norbert

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Date: February 15, 2000
From: Bob Lapo <fluedoc@freewwwweb.com>
To: <webmaster@mha-net.org>
Subject: House Depressurization Workshop

I was contacted today by a guy who was in your website and read the [House Depressurization Workshop](#) you have posted. Turns out he has a very similiar problem (as we know a lot of people do, but they may not realize it) that I was working on and he asked for some help. I received tons of help and tips from Norbert and that information is still being of help today, over a year later.

Just wanted to provide you some (positive) feedback and that your site is helping the public. Great Job!!!

Bob Lapo
The Flue Doctor, LLC
Greenfield Center, NY

Norbert,
Thanks for all your help. Ever since that customer I had that you helped me with I've helped several others, I love doing the troubleshooting.
Thanks
Bob Lapo