WCDT
(Worst Case Draft Test)

What's the Reason for the Test
- To put the house in a condition that will put the Combustion Air Zone (CAZ) in the highest negative pressure
- And will make it more likely that atmospheric appliances will not draft properly.
  - Will possibly cause back-drafting or too low of a draft for the temperature)
- Make appropriate repairs
- Will allow you to sleep at night.

Timing
- Should be the last measure/test we do after any major measures.
  - May want to test every day
  - Walls, air sealing, furnace work or replacement, Attic insulation and by-pass work.
  - May do smaller work that will not adversely affect the infiltration of the home.
- Minor air sealing
- Some insulation work
1. Inspect combustion appliances and venting before test setup.

- Check for venting problems
- Duct problems
- Major furnace problems
- These must be repaired before completing the test.

2. Put dwelling in wintertime condition.

- Because you want the home in the “worst case” condition, which would be with all the windows and doors shut.
- This will make the house tighter
  - Which makes it easier to cause back drafting
- This is also when the major problems will occur
3. Record the outdoor temperature.

**WHY?**

4. Deactivate all combustion appliances and exhaust fans.

This is necessary to get a baseline reading of the house.

- The natural pressure on the home at the time of the test.
- Be aware of pressures caused by
  - Wind
  - Stack effect
5. Close all operable vents.

- Sets home up into the "worst case" scenario which is being tight.
- Needed for an accurate baseline.

6. If furnace, replace or clean filter if needed.

- We want the air handler to move as much air as possible.
  - If there is a penetration in the duct work to the outside or in the CAZ, it will have a greater influence if it moves more air.
  - This will help to put the home in "worst case scenario".

7. Check and clean lint filter in dryer.

- A clean filter on the dryer will allow it to exhaust more air while in operation.
  - This will put the home in "worst case scenario".
8. Setup and adjust manometer to measure CAZ with reference to (WRT) outdoors.

- Set the manometer to read pressure only on all channels (Pa).
  - You will **not** be measuring flow (cfm).

9. Setup pressure hoses to measure CAZ with reference to (WRT) outdoors.

To the CAZ or if you are in the CAZ, leave it alone.

To the outside.

If you don’t have a DG 700

**Damn it, Get one**
10. Open all interior doors and record Baseline Pressure, CAZ WRT outdoors.

This pressure is not caused by any mechanical problem and we will subtract it from the final pressure reading.

To the CAZ or if you are in the CAZ leave it alone.

To the outside

Pr/Pr

11. Turn on all exhaust fans and record Exhaust Pressure, CAZ WRT outdoors.

- We are trying to determine if the fans in the home are causing the problem
  - If possible turn on each fan separately and notice which one causes the largest drop in pressure.
  - Especially the dryer and jen-aire

- Be Aware of what happens
  - Why
11. Turn on all exhaust fans and record Exhaust Pressure, CAZ WRT outdoors.

- Be Aware of what happens
  - Higher depressurization numbers above guidelines mean that no matter what you do to fix the forced air distribution or the venting of the appliances, the fans are more than likely to back-draft the appliance.
  - It may be possible to "slow down" the fans
    - Disable high settings
    - Constant air flow regulator

12. If furnace, activate air handler. Record Air Handler Pressure, CAZ WRT outdoors.

- This test will tell you if the furnace blower and duct work is causing a problem
  - If the pressure goes MORE negative
    - Open return in CAZ
    - Open supply outside of air/pressure boundary
  - If the pressure goes MORE positive
    - Open Supplies in CAZ
    - Open returns outside of air/pressure boundary
12. If furnace, activate air handler. Record Air Handler Pressure, CAZ WRT outdoors.

- This test can be used as a simple way to determine how much duct sealing should be done.
  - Ideally the CAZ depressurization should not be affected at all by the distribution system
  - Distribution should be fixed before completing repairs to venting of appliances

13. Position all interior doors for worst-case depressurization in CAZ.

- Using Smoke or air flow as a Guide

  - Rooms in homes
    - Negative pressure in a room causes smoke to be sucked in. Leave door OPEN.
      - Air is infiltrating the room via exhaust fan
      - Or too much return or not enough supply
    - Positive pressure in a room causes smoke to be blown out. Leave door CLOSED.
      - Too much supply or not enough return
13. Position all interior doors for worst-case depressurization in CAZ.

Using Smoke or air flow as a Guide

- Rooms in homes
  - Too much supply or not enough return
  - A guideline pressure number is 3Pa
  - This test will indicate the need to add a dedicated return to a room or possibly just to undercut a door if there is a central return air in the home

14. Position CAZ door for worst-case depressurization in CAZ.

- CAZ
  - Negative pressure in a CAZ causes smoke to be sucked in. Leave door Closed.
    - Fans in the CAZ over power the house fans
    - Possible return air leak (wild return)
      - Lack of returns in house will decrease effect
  - Positive pressure in a CAZ causes smoke to be blown out. Leave door Open.
    - Supplies in the CAZ without returns
    - Fans in the rest of the house are dominant
15. What is the Worst Case Depressurization (CAZ WRT outdoors)

- Take the reading of “CAZ WRT Outdoors” with all the interior doors in the “Worst Case Position. (the largest negative number)
16. Record worst-case depressurization
   WCD (15) minus baseline Pressure (10)

- Subtract Line 15 from line 10
  - This gives you the total negative pressure put on the CAZ in the Worst Case Scenario.

The correct way to determine this is to calculate the difference between the Baseline and Gross CAZ pressures.
17. Is worst-case depressurization with air handler on or off? (circle switch position)

What are the dominant forces causing depressurization?

This line is to help you determine which fans, blowers or duct work is causing the problems.

18. Under worst-case conditions, fire appliance. Does it spill after 2 minutes?

If it spills, it fails.
- Determine why and correct
- Undersized flue
- Blockage
- Depressurization

If it does not spill proceed to #19.
Do we have a problem in test 1?

Do we have a problem in test 2?

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19. Under worst-case conditions, fire appliance and measure draft.

- Measure the draft immediately above the draft hood,
- If draft induced, take the draft as far as possible from the draft inducer.
- Sealed combustion units need no draft taken.
Do we have a problem in test 1?

Do we have a problem in test 2?

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Strive to know and understand this test, this is the one that will protect

- Your Client
- Your Boss
- You