



Gut Rehabs- Simple to Complex

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Energy Gut Rehabs- What Drives Them?

- Customer wishes/needs to reduce energy use and costs
- IAQ issues
- Comfort
- Budget
- Time needed to complete
- Program/incentive requirements
- Labels

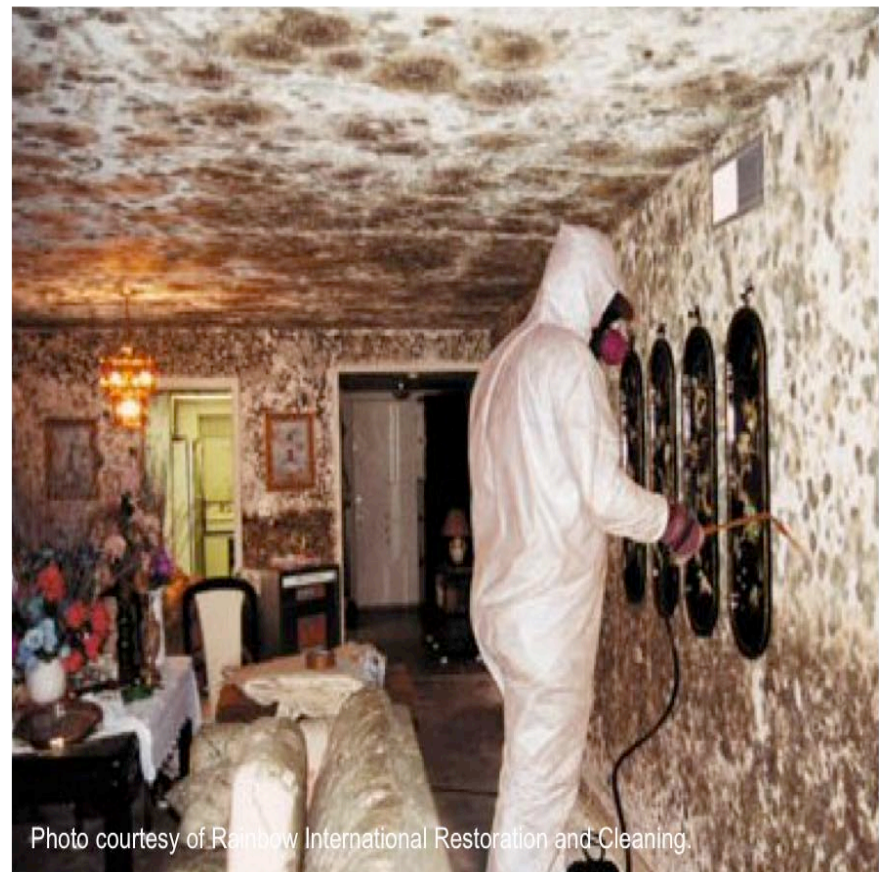


Photo courtesy of Rainbow International Restoration and Cleaning.



Elements of a Energy Gut Rehab

- Integrated building assessment
- House as a system approach
- Insulation installed correctly
- Air sealing
- Hi-efficiency heating/cooling/DHW systems
- Advanced ventilation strategies
- Hi-performance windows/doors
- Testing and verification



Energy upgrades- how not to do it



What's wrong with this? The HVAC contractor left the job like this....



Contractor stated there was enough
insulation installed



Plenty of insulation- the house has to
“breathe”



Compressed and missing insulation-
contractor stated the nail would rust
if it came in contact with the insulation



Case Study- Simple Gut Rehab



Case Study- Simple Gut Rehab

- 1,280sf single family home located on Staten Island
- Severely damaged from Super Storm Sandy
- Opportunely to include energy retrofit measures with rebuild of home
- Installation of two part foam insulation on interior walls and rim joists
- Installation of sheetrock/tape















Case Study-Deep Energy Retro-fit Gut

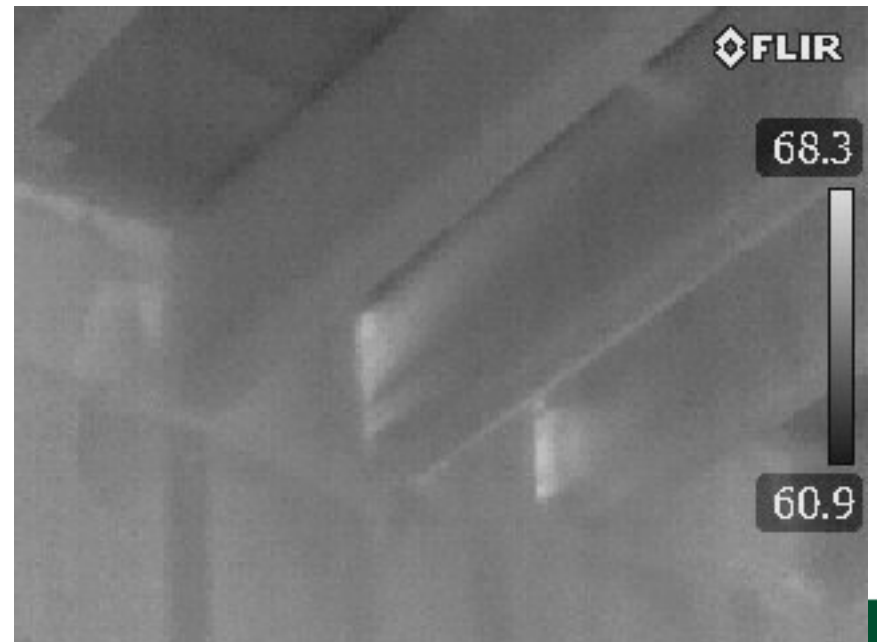
- 2,008sf single family home located in Brooklyn
- Passive-house like project
- Replacement of old steam boiler
- Install foam insulation interior walls and rim-joists
- Install cellulose insulation exterior walls and cockloft
- Installation of Mitsubishi Mini-Split system
- Installation of Zehuder ventilation unit
- Installation of 12 Zolla triple pane windows
- Installation of 2 urethane doors
- Air sealing reduction from 6665cfm to 1896cfm



















Common Passive House Myths

- It's only applicable to houses
- You can't open the windows
- IAQ in an airtight building must be awful
- Too restrictive on aesthetics
- It's too expensive \$\$\$



Passive House Facts

- 85% reduction in heating and cooling demand
- Precisely defined (21 years ago)
- 30,000+ projects
- Applies to any building type: ANY!
- Both new build as well as retrofit
- Achievable in any climate (some easy, some not)
- Focus is on the building envelope
- Major emphasis on comfort and IAQ
- Demands very high quality construction
- Design must be verified with PHPP software



Case Study- Passive House Gut Rehab

- 6,074sf single family home located in Manhattan

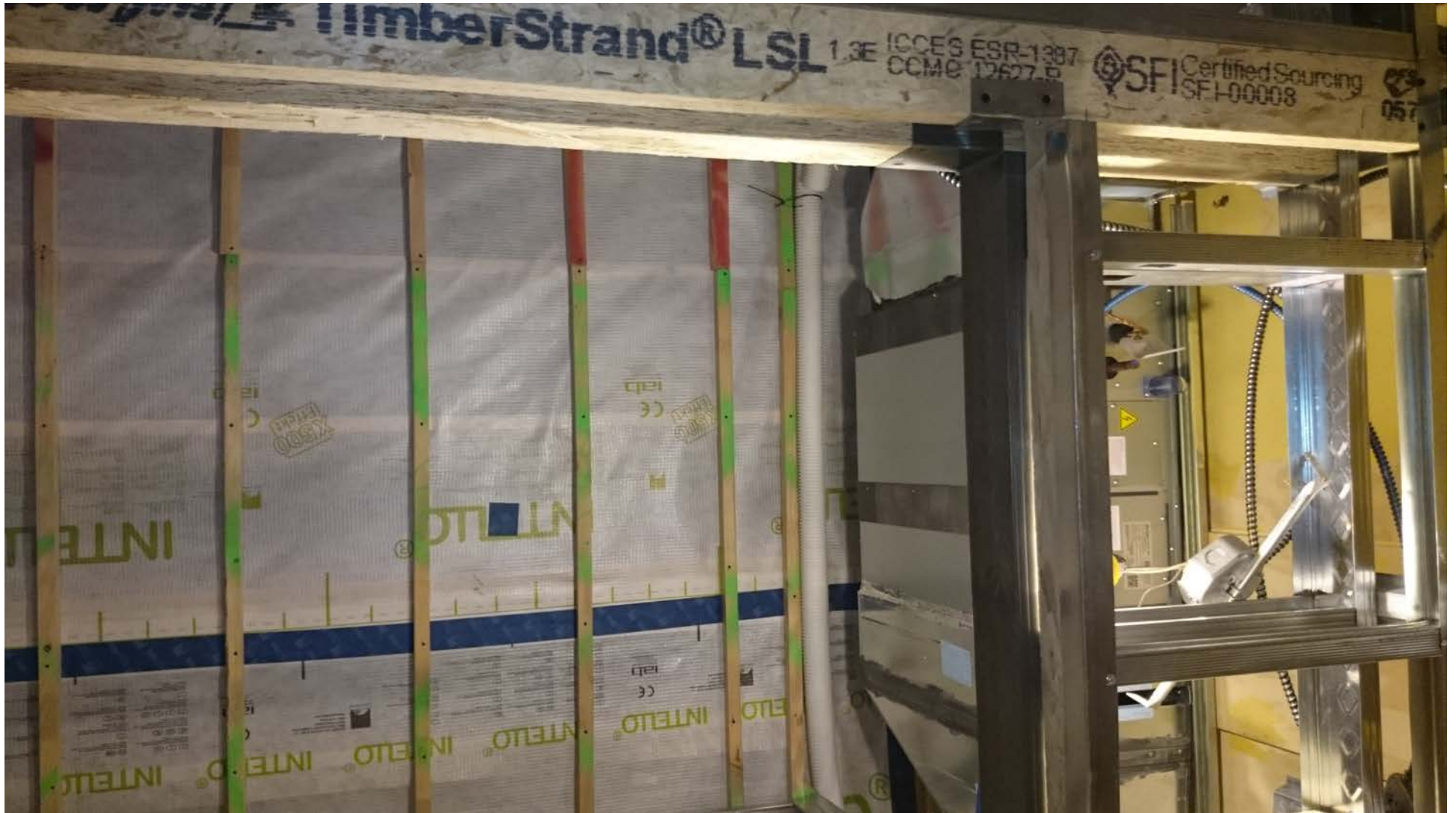












Case Study- not a Gut Rehab but..... 13,965sf 11 unit multi in Brooklyn



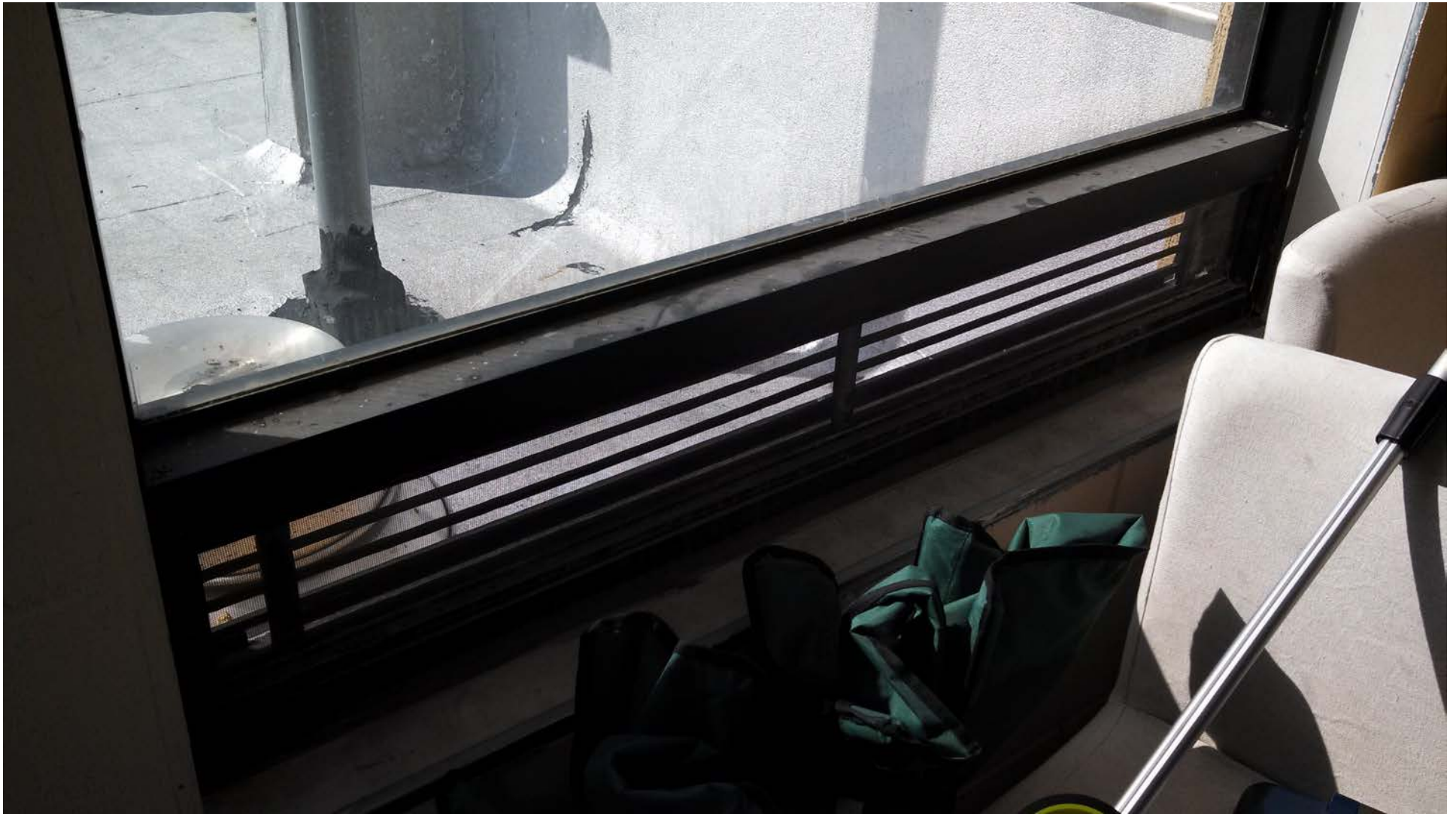
“New” construction Rehab

- Install two-part foam insulation into front wall cavity to air seal
- Install cellulose insulation in all walls and ceiling of vestibules to each apartment and main entrance
- Remove all P-Tac units (28 total) and air seal
- Install w/s to all apartments and staircase doors



Dirt marks →





Testing to verify performance

- Blower door
- Duct blaster
- Zonal pressure diagnostics
- IR
- Fan flow
- CAZ testing
- Combustion safety



Blower door guided air sealing



Duct testing

- Total duct leakage
- Duct leakage to the outside



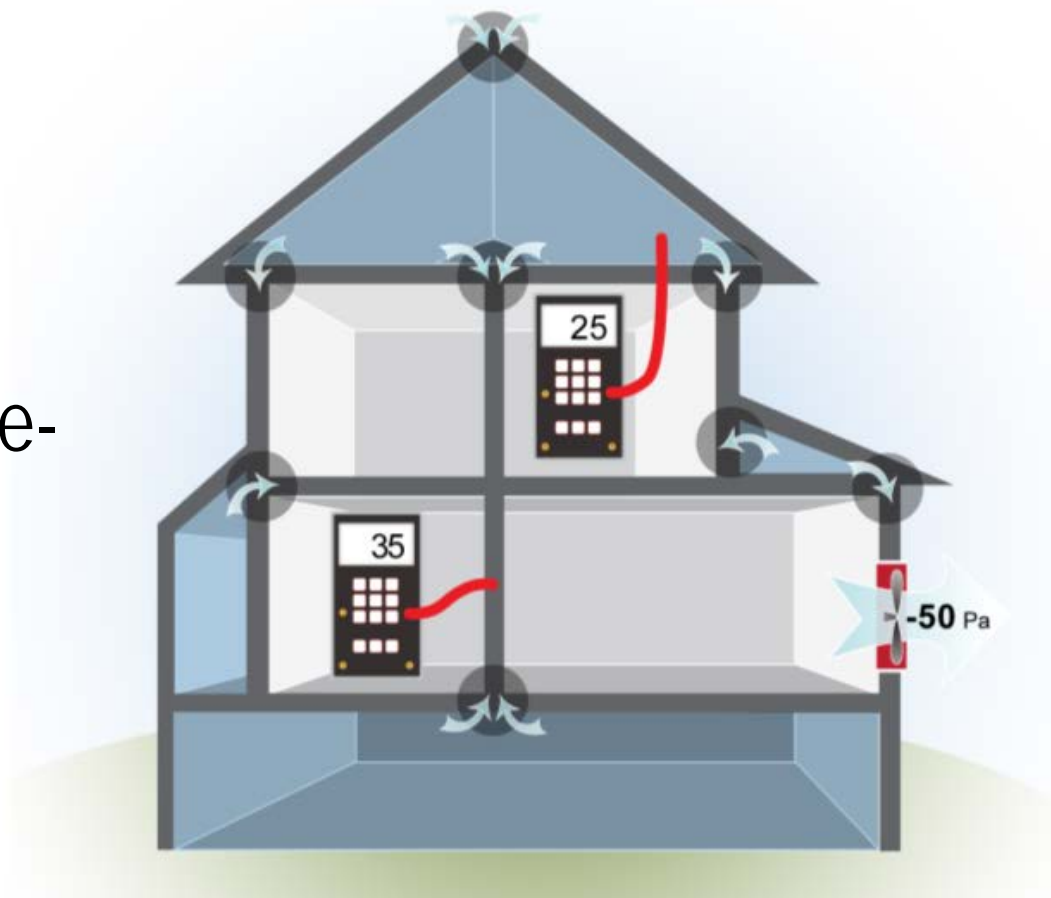
IR verification



Zonal pressure diagnostics-pre air sealing work

Pre Work: Unsealed/
Uninsulated

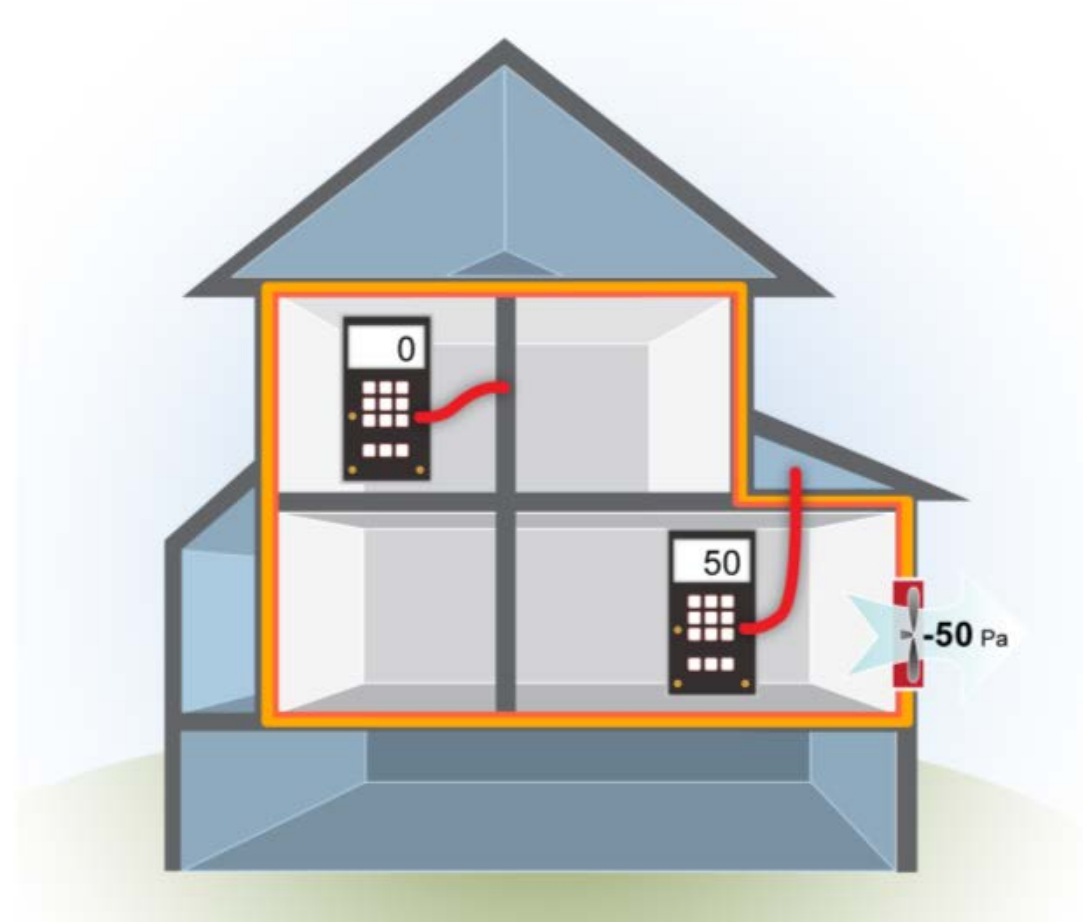
- Two-story balloon-framed house with one-story addition and unheated porch over unconditioned basement



Zonal pressure diagnostics- post air sealing work

Post Work: Sealed/
Insulated

- Air-sealed/insulated with air barrier and insulation in alignment



Summary

- It doesn't matter if the project is simple or complex
- The devil is in the details particularly if program requirements are specific to quantifiable results i.e.: ACH
- Proper sequencing with other trades is critical; especially with programs such as Passive House, ENERGY STAR®, LEED etc.
- Test and verify
- Do it right the 1st time

