

Testing In & Testing Out

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Testing In

- Importance - what you do will effect the home for decades
- Homeowner interview
- Overall visual assessment
- Determine what test this house needs
- Complete tests
- Write work scope / report
- Overseeing work / consulting

Homeowner interview

- Valuable information on what works and does not work
 - Comfort issues
 - Moisture issues / basement water leaks
 - Ice dams

Overall visual assessment

- Process – neighborhood / yard / house
- Confirm what homeowner told you
- Document with photos

Determine what tests this house needs

- You can't do every test on every house

Complete tests

- Document result

Write work scope / report

- Detail level depends on who you are writing the work scope / report for

Overseeing work / consulting

- Again it depends on who you are writing the work scope / report for

Testing Out

- Safety tests
- Visual inspection to verify work was done according to scope
- Testing as needed to verify work scope

Safety tests

- Combustion safety
 - Carbon Monoxide
 - Depressurization
 - Combustion spillage
- Ventilation

Visual inspection to verify work was done according to scope

- Insulation
- Mechanical

Testing as needed to verify work scope

- Blower door test
- Infrared camera scan
- Duct leakage test

Priorities

- Safety
- Ventilation for the occupants
- Air sealing
- Insulation
- Minor air sealing

Safety

- Combustion gasses
- Major moisture
- Lead / radon

Ventilation

- House tightness
- Number of occupants
- You must deal with drainage issues and roof leaks

Air leaks

- Major air sealing
- Attic bypasses
- Details where you can achieve air sealing and insulation in one step

Insulation

- Bring up to code levels
- Be careful with foundation insulation

Minor air sealing

- Weather-stripping
- Caulking
- Outlet gaskets

Models used by large successful programs

- Sound Insulation Program
- Low Income Weatherization
- Operation Insulation / Project Insulate

Sound Insulation Program Model

- Insulation and mechanical specs
- Price per unit are agreed upon
- Insulator writes insulation scope
- Mechanical contractor writes mechanical scope.
- IAQ consultant does pretest
- Testing out at the end

Insulation specs

- Visual inspection only
- Minimum insulation levels
- Construction details
 - Attic hatches
 - Kneewalls
 - Pull down stairs
 - Whole house fans

Mechanical specs

- Contractor may measure pressures or air flows
- Ventilation systems
- Attic ductwork
- Power vent water heaters
- 1 ½ story home ductwork
- Chimney liners

Process

- Price per unit are agreed upon
- Insulator writes insulation scope
- Mechanical contractor writes mechanical scope.

IAQ consultant does pretest

- Make sure there are not any show stoppers
 - Water leaks / missing sheetrock / major hazards
- access house tightness and design a ventilation system
- Combustion safety test and design

Testing out at the end

- Blower door test
- Infrared camera
- Insulation
- Mechanical
- IAQ

Low Income Weatherization Model

- Energy analyst does a home assessment
- Energy analyst writes up the work scope
- Final inspection

Energy analyst does a home assessment

- Access health and safety
 - Combustion safety test
 - Moisture issues
 - Lead-safe
 - Electrical
- Inventory insulation levels
- Pressure diagnostics
- Client education
- Water heating energy savings
- Appliances and lighting

Energy analyst writes up the work scope

- SIR directed insulation and air sealing work scope
- Mechanical scope
 - Furnace tune up or replacement
 - Water heater
 - repair / replacement
 - insulation jacket / pipe wrap
 - turn down temperature
 - ventilation
- Balance duct induced room pressure imbalances

Final inspection

- Blower door test with pressure diagnostics
- Combustion safety tests
- Verify that work was done according to scope and standards

Other models

- The consultant model
- The remodelor / consultant model
- The whole-house contractor model

Thank you – Questions?



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Remodeling and In Door Air Quality. The opportunities and pitfalls!



Customer satisfaction! It's all about giving customer chooses



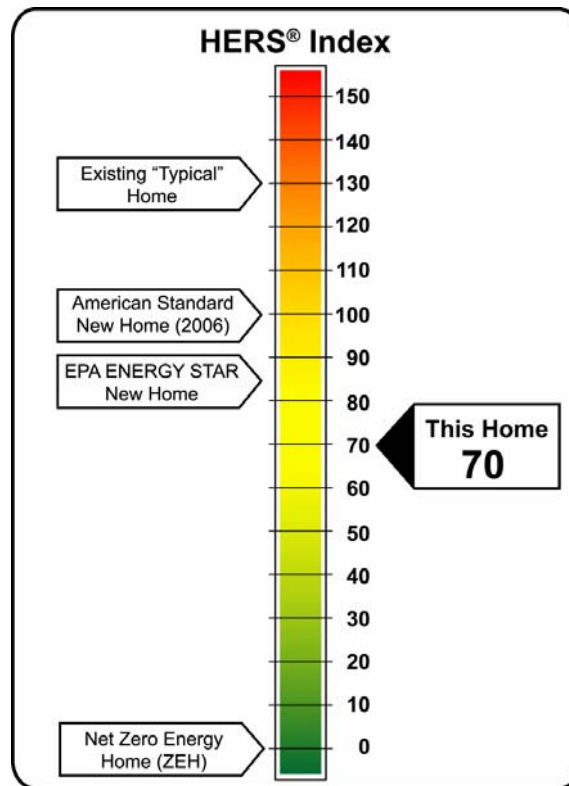
What is a HERS rating?

- Home Energy Rating System was developed for Energy Efficient Mortgages.
- Scoring system created by the Residential Energy Services Network (RESNET)
- Helps to compare efficiency of all homes against one another by establishing a standard (think MPG)
- Show the energy use reductions from energy retrofits
- Heating and cooling uses estimates (Think Buts' not Money!)
- Not perfect.

How does the score work?

- Compares the model to HERS reference home (based on 2006 IECC)
- HERS reference home scores 100 on the HERS index
- Net Zero energy home scores a 0 on the HERS Index
- The lower the better

How does the score work?



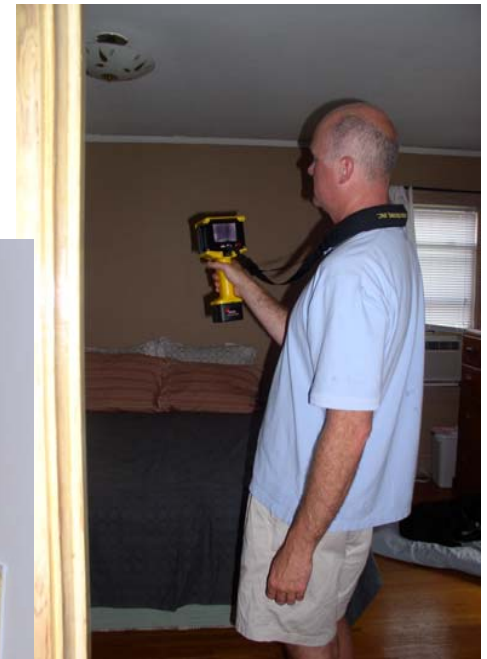
How does the score work?

- Each point equals 1% reduction in energy consumption (from base index of 100)
- Thus a home with a HERS Index of 85 is 15% more energy efficient than the HERS Reference Home and a home with a HERS Index of 80 is 20% more energy efficient.
- Energy Star is 25% better than the National Energy Code. Energy Star homes score 75-80 (20-25% more efficient)

Existing Homes!

- Home energy ratings involve an on-site inspection by a residential energy efficiency professional – a home energy rater. Home energy raters are trained and certified by a RESNET accredited home energy rating system.
- Most older homes have a hard time meeting the guidelines to be called an ENERGY STAR home.
- Project is given a pre-construction HERS index score
- Opportunity for improvement exists immediately in Design. Rater can help with strategies for better performance
- Your consulate can model energy upgrades (insulation, windows, mechanical systems & air tightness) to help builder and homeowner make choices

The tools of the trade: Blower door, Duct blaster & infrared scans.



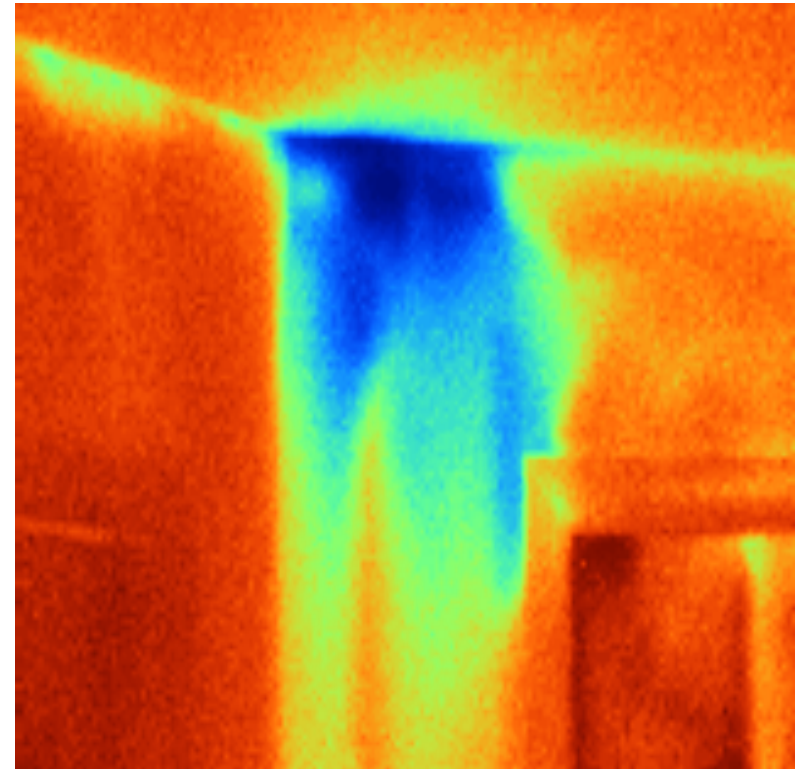
Blower door!

- A **blower door** is a device for testing the air tightness of a building.
- The air tightness of a building is useful knowledge when trying to increase energy conservation or decrease indoor air pollution.
- Blower door tested can be measured in Ach or CFM per sq ft of surface area.
- Can be used to document reduction in air leakage rates.

Duct Blaster!

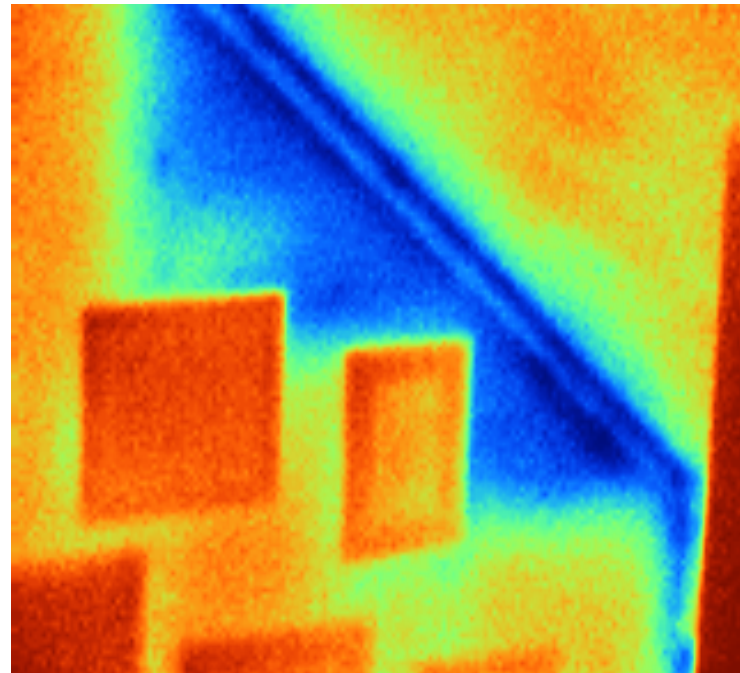
- A **duct blaster** is a device for testing the air tightness of duct work.
- The air tightness of ducts is useful knowledge when trying to increase energy conservation or increase comfort.
- Duct leakage testing can be measured CFM .
- Can be used to document reduction in duct leakage rates.
- Should always be done when ducts run thru unconditioned spaces.

Infrared scans



Infrared scans

- Used to find missing insulation
- Unseen air leakage pathways
- Quality control for insulation work performed



How to protect your business & increase profits!

- Test
- Walk away
- Take your chances
- Train your staff to do the testing

Why Test?

- Could add profit by allowing homeowner's a choose to do more work to fix problems they were not aware of
- Reduce risks of litigation if problem is resolved or have owner sign off on not doing additional work to resolve problems

Per-existing conditions!

Experience with testing over 8,000 homes in the metro area found potential for combustion spillage (exhaust from the furnace or water heater entering the house) in 10 to 20% of homes before any work as started. Many homes are tight enough that they could benefit from having mechanical ventilation

How do you know what your getting into without testing?

- Blower door test: test of shell tightness
- Infrared testing: Missing insulation, air leakage pathways, and moisture
- Worse case draft testing: Test draft of atmospherically vented systems when all exhaust devices are operating

How do you know what your getting into without testing?

- Exhaust fan flows: Test Cubic Feet per minute flows (CFM) of exhaust fans, assure proper people ventilation
- Supply air flows: Test Cubic Feet per minute flows (CFM) of supply vents
- Duct leakage: Test duct leakage for duct that are locate out side the thermal envelope
- Carbon Monoxide testing: Heating system, water heater and cook stoves

What's the first step?

- Find a rater
- Meet with your rater before the project starts
- Work them into your work schedule for site visits and testing
- They are a great resource of information

Thank You!

- Jimmie Sparks at 651-221-4462 ext 123
- Our Web site: www.thenec.org
- For more information on the ENERGY STAR programs visit www.energystar.gov or call 1-888-STAR YES.