EnergyLogic
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www.nrglogic.com

February 24 - 26, 2014
RESNET Atlanta

ESV3 FROM A RATERS PERSPECTIVE

February 26th 2014

Agenda

- Setting the Stage
- Stumbles
- Fumbles
- Rumbles
- Making progress/Still learning
- Where do we go from here
- When will we feel comfortable

Setting the Stage

Market Transformation

- "A strategic process of intervening in a market to create lasting change in market behavior by removing identified barriers or exploiting opportunities to accelerate the adoption of cost-effective energy efficiency as a matter of standard practice"

  ACEEE

Energy Star Numbers:

- Colorado Market share of Energy Star New
  - 2004 - 4.2%
  - 2009 - 28%
  - 2010 – 45%
  - 2012 – 19%
  - 2013 - ??

How To Explain Energy Star

House Built in 2014

Avg. house size 2349 sqft
- 2.56 people per house hold
- 840 sqft per person
- **Avg. fridge size 20 - 30 cubic feet – 481 kWh/yr**

House Built in 1970

Avg. house size 1500 sqft house
- 3.14 people per house hold
- 478 sqft per person
- **Average fridge size 15 cubic feet – 1700 kWh/yr**

House built in 1950

Avg. house size 1000 sqft
- 3.37 people per house hold
- 297 sqft per person
- **Avg. Fridge size 9 cubic feet – 360 kWh/yr**

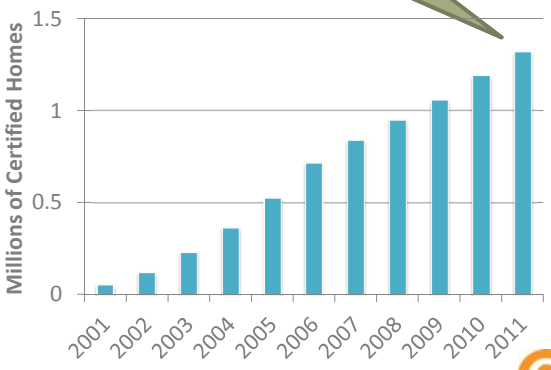
The Power of ENERGY STAR

- 84% brand recognition
- 92% influence on purchasing

> 1.3 million homes
> 30% of 2011 new homes

> 4,500 builders

ENERGY STAR PARTNER

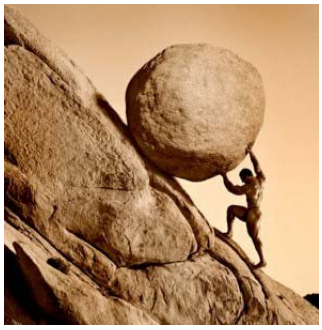


Consistent Branding

ENERGY STAR

Prescriptive vs. Performance

- We are Raters
  - Why use the Prescriptive Path
- Prescriptive requirements not Performance requirements
  - Window U-values and WFA rule
  - Energy Star qualified appliances and fans
  - Lighting 80% bulbs and fixtures Energy Star



Communication

- Maintaining your role as the expert
- Don't get undermined
  - Who finds out first about changes or potential changes

Just tell me what I have to do!


energyLogic

Key Air Sealing Items for V2.5

Sections 5 of the Thermal Enclosure checklist places new emphasis on cracks in the thermal envelop. It says, "Cracks in the building envelope are fully sealed". Below are highlights of this section of the Energy Star Version 3 checklist that will be enforced during the version 2.5 transition:

- Penetrations to unconditioned space fully sealed with solid blocking or flashing as needed and gaps sealed with caulk or foam

The HVAC checklist also requires that all duct penetrations through drywall or OSB subfloors be sealed. It would be good to begin requiring this now for V2.5 as it is part of the TEC section 5 as well.

Other penetrations that are being looked at besides Air tight recessed can lighting and gasketed attic hatches are bath fan housing and electrical outlet boxes penetrating drywall to attics or other unconditioned space.

Sump pit cover must be air tight and sealed as they connect conditioned and unconditioned spaces. This is also a requirment of the Water Management checklist.

Plumbing traps are often large holes connecting conditioned space to unconditioned space and must be sealed, especially if they are located over a garage or in a cantilever.

Traps

Sealed it !!


- Sheetrock sealed to top plate at all attic wall interfaces – Construction adhesive shall not be used

As of now there are four suggested ways of sealing the gap between the drywall and the top plate.

The first is to use a drywall gasket tacked to the vertical side of the top plate prior to standing the drywall. This could be a true drywall gasket, Blue sill seal foam, weather stripping, or some other material that would create an air tight gasket.

http://www.conservationtechnology.com/building_gaskets.html

Caulking the drywall to the top plate is another option. There are also new spray applied gaskets/weather stripping that could be used. One such material is called Energy Complete manufactured by Owens Corning.

Caulk or weather strip the top plate to the attic

Proactive Trainings

- Be the source of information
  - Accept the Responsibility and continue to be the source
- Trade Partner Partnerships
  - Framer
  - Insulator
  - HVAC Contractor
  - Architects and Engineers?

Builder News Letter

EnergyLogic ink
BUILDER SERVICES

2012: A Look in Our Crystal Ball

December 21, 2011

EnergyLogic Holidays:

Monday, December 26
Tuesday, December 27
Monday, January 2, 2012

In This Issue

Energy Star v3 in 2012
2012: Federal Tax Credits
Xcel Rebate Details
EnergyLogic Guarantee
RESNET Energy Smart Builders
RESNET 2012 Conference

2009 Code in New Communities: News from the HBA of Metro Denver

Arvada

At their November 14 meeting, The Arvada City Council adopted the 2009 family of International Codes, including the IRC, IECC, and IFC. After considerable discussion over several months regarding the requirement of residential sprinklers in the IRC, and strong

To Our Building Partners:

First and foremost, as we are in the midst of this holiday season, I want to take a moment to wish everyone we work with the Happiest of Holidays, from all of us at EnergyLogic. It has been another crazy year and we are incredibly grateful that in these continuing difficult economic times we have had another successful year and that all of our clients are showing signs of growth and prosperity moving into 2012.

Speaking of 2012, I see a year full of change. Borrowing from a tag line we developed for the Fort Collins 2012 Green Code Training we help develop and deliver, "Change is Hard... Change is Good... Change Can be Made Easier." Our goal is to help make the changes that are coming in 2012 easier for all of us. What's coming:

- Energy Star Version 3.0
- 2012 Federal Tax Credits
- Changes in Xcel Energy's New Home Program
- 2009 and 2012 IECC adoptions (see side column)

Enjoy your holiday season and consider coming through it on the other end with a New Year's resolution to embrace change. As always, we are here to help you navigate through any hurdles that 2012 may bring.

Thanks, and best regards,

Robby Schwarz and The EnergyLogic Team

opposition by the HBA, the Council voted unanimously to delete sprinklers from the IRC. Both the IRC and the IECC will go into effect on March 15, 2012.

Commerce City

At their November 28 meeting, Commerce City Council supported staff's recommendations to move forward with adoption of the 2009 codes, including removing the requirement in the IRC for residential fire sprinklers, allowing a 6-month "soft compliance" transition period for the IECC, and charging a less-flat plan review fee of $150 for exiting master plan updates and a 6-month window in which to update existing plans. It is unanticipated that the adopting ordinance will go before council in late January 2012, with second reading likely in late February. Staff will recommend an effective date of April 1, 2012.

Castle Rock

At Council direction and with the support of the HBA, town staff has drafted an ordinance to remove the previously adopted requirement for residential fire sprinklers. It is anticipated that the changes will become effective January 2013. Council has previously requested that staff conduct a series of meetings in the spring to allow discussion among all stakeholders on whether there is a need to reconsider the requirement.

For more information: HBA of Metro Denver
Or contact Kim Calomino, kcalomino@hbadenver.com or Robby Schwarz, robby@erglogic.com

Quick Links
EnergyLogic Website

For Further Information Contact:

Energy Star Version 3.0

ENERGY STAR HOMES

In 2012 we will begin seeing our first houses that have to fully implement all of the Energy Star v3 requirements. Remember that any house permitted in 2012 will be a v3 house. If your house was permitted in 2011 and will complete before June 30, 2012, it can complete using the v2.5 requirements.

As you know, we have primarily been focusing on v2.5 compliance requirements. To label a house as ES v3 in 2012, new enforcement includes:

- meeting or exceeding the 2009 IECC insulation levels
- meeting the ASHRAE 62.2 ventilation requirements
- fully commissioning the house per the HVAC checklist

Checklists: please go to our website to get the most up-to-date, live, interactive checklists (ES Checklists). These checklists have been modified so you can fill them out on your computer, and then we can scan the data directly into our iRate database. If you use the interactive checklists, you will have access to the data later. Otherwise, you will not have access to any of the data from the checklist.

If you are still feeling unsure about ESv3, please be aware that we are continuing to offer builder-specific trainings to help you train your staff and trade partners. We hope you take advantage of this great opportunity to ask questions that are specific to your communities and homes. Please contact Robby directly regarding fees and/or if you would like to schedule a training (Robby@erglogic.com).

5695 Residential Energy Credits

Federal Tax Credits in 2012?

Action on extending federal tax credits for energy efficient homes is beginning to stir in the U.S. Senate. However, there is little to no chance that the credits will be extended before the end of 2011.

RESNET's Washington representative, Carl Chidlow, reports that a group of Senators led by Jeff Bingaman (D-NM), chairman of the Senate Energy Committee and member of the

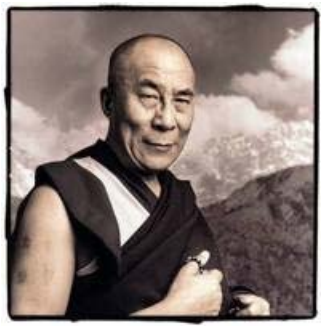
Understand

- We are no longer true "builders"
- Understand building science and how things perform
- Leaders of change and innovation
  - Design – construct – test – review – learn
- Educate our trade partners
  - Systems thinking and applied building science
  - **Air flow**
  - **Thermal flow**
  - **Vapor flow**
- Inform the trades of our objectives

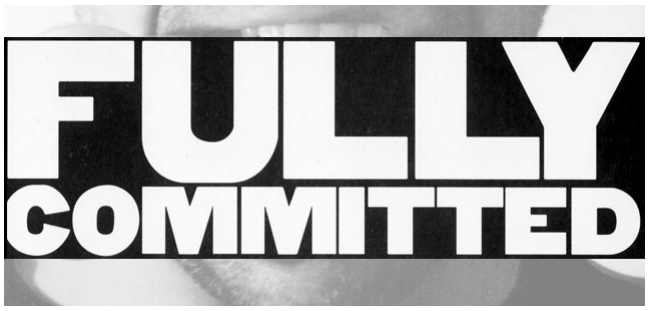
Beyond Verification

“Learn the rules so you know how to break them properly”

- Author: Dalai Lama
  Date: Feb 25, 2008



Builder’s Perspective



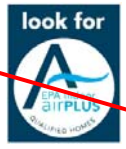
Builder's Perspective

We've run out of stumbles……

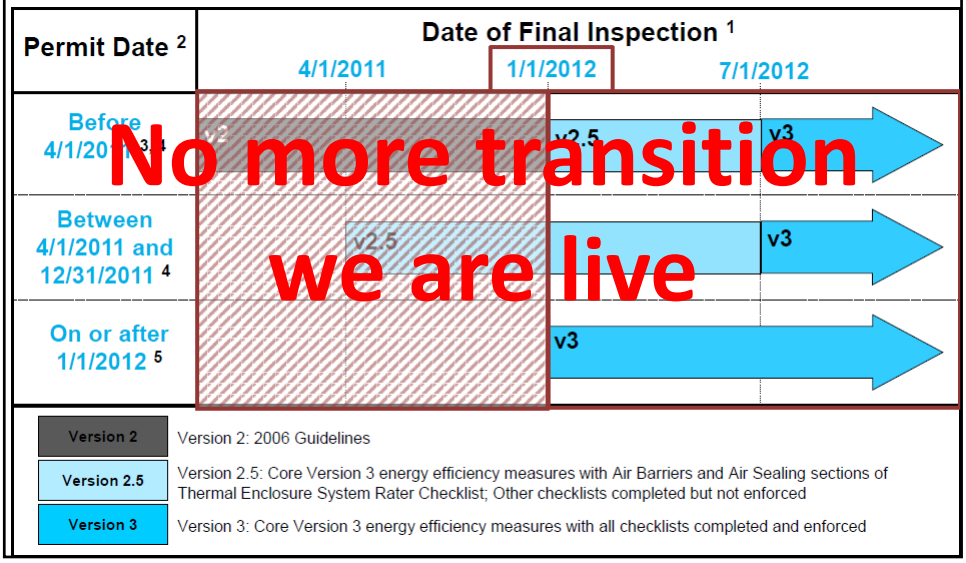
But don't worry we can make you more

Water Management System Builder Checklist

- The specifications are designed to help improve moisture control in new homes compared with homes built to minimum code
- This checklist is provided by the Rater to the Builder who completes the checklist
  - The Rater Shall review the checklist
  - If desired by the Builder, the Rater may verify any item on the checklist
- A completed, signed, and verified **Energy Star Indoor airPLUS** Verification Checklist may be submitted in lieu of the Water Management System Builder checklist
  - Rater Certification needed on this checklist



Transition Time Line



ENERGY STAR Qualified Homes, Version 3 (Rev. 04)
HVAC System Quality Installation Contractor Checklist [1]

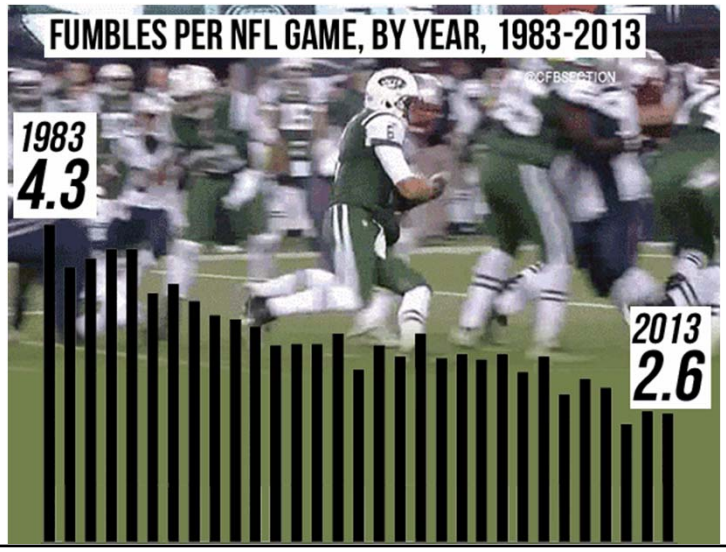
Home Address: 205 DUNSINANE City: Castle Rock State:
System Description [2]: Whole House Cooling system for temporary occupant load? [3] ☐ Yes ☐ No

1. Whole-Building Mechanical Ventilation Design [4]	Cont./Tech. Verified [5]	Rater Verified	N/A
1.1 Ventilation system installed that has been designed to meet ASHRAE 62.2-2010 requirements including, but not limited to, requirements in Items 1.2-1.5 [6]	☐	☐	-
1.2 Ventilation system does not utilize an intake duct to the return side of the HVAC system unless the system is designed to operate intermittently and automatically based on a timer and to restrict outdoor air intake when not in use (e.g., motorized damper).	☐	☐	-
1.3 Documentation is attached with ventilation system type, location, design rate, and frequency and duration of each ventilation cycle.	☐	☐	-
1.4 If present, continuously-operating vent. & exhaust fans designed to operate during all occupiable hours.	☐	☐	☐
1.5 If present, intermittently-operating whole-house ventilation system designed to automatically operate at least once per day and at least 10% of every 24 hours.	☐	☐	☐
2. Heating & Cooling System Design [7] - *Parameters used in the design calculations shall reflect home to be built, specifically, outdoor design temperatures, room orientation, number of bedrooms, conditioned floor area, window area, projection/ window performance and Qualification levels, infiltration rate, enclosed ventilation rate, presence of SEER/HSPF or better tiles, and indoor temperature setpoints = 70°F for heating; 75°F for cooling.*			
2.1 Heat Loss / Gain Method: ☐ Manual J v8 ☐ ASHRAE 2009 ☐ Other:	☐	☐	-
2.2 Duct Design Method: ☐ Manual D ☐ Other:	☐	☐	-
2.3 Equipment Selection Method: ☐ Manual S ☐ OEM Rec ☐ Other:	☐	☐	-
2.4 Outdoor Design Temperatures [8] Location: ____ 1%: ____°F 99%: ____°F	☐	☐	-
2.5 Orientation of Rated Home (e.g., North, South):	☐	☐	-
2.6 Number of Occupants Served by System [9]	☐	☐	-
2.7 Conditioned Floor Area in Rated Home: ____ Sq. Ft.	☐	☐	-
2.8 Window Area in Rated Home: ____ Sq. Ft.	☐	☐	-
2.9 Predominant Window SHGC in Rated Home: [10]	☐	☐	-
2.10 Infiltration Rate in Rated Home: [11] Summer: ____ Winter: ____	☐	☐	-
2.11 Mechanical Ventilation Rate in Rated Home: ____ CFM	☐	☐	-
2.12 Design Latent Heat Gain: ____ BTUh	☐	☐	-
2.13 Design Sensible Heat Gain: ____ BTUh	☐	☐	-
2.14 Design Total Heat Gain: ____ BTUh	☐	☐	-
2.15 Design Total Heat Loss: ____ BTUh	☐	☐	-
2.16 Design Airflow [12]: ____ CFM	☐	☐	-
2.17 Design Duct Static Pressure: [13] ____ Inches Water Column (IWC)	☐	☐	-
2.18 Full Load Calculations Report Attached	☐	☐	-
3. Selected Cooling Equipment, If Cooling Equipment to be Installed			
3.1 Condenser Manufacturer & Model:	☐	☐	☐
3.2 Condenser Rated #:	☐	☐	☐
3.3 Evaporator / Fan Coil Manufacturer & Model:	☐	☐	☐
3.4 Evaporator / Fan Coil Rated #:	☐	☐	☐
3.5 AHRI Reference #: [14]	☐	☐	☐
3.6 Listed Efficiency: ____ EER ____ SEER	☐	☐	☐
3.7 Metering Device Type: ☐ TXV ☐ Fixed orifice ☐ Other:	☐	☐	☐
3.8 Refrigerant Type: ☐ R-410a ☐ Other:	☐	☐	☐
3.9 Fan Speed Type: [15] ☐ Fixed ☐ Variable (ECM / ICM) ☐ Other:	☐	☐	☐
3.10 Listed Sys. Latent Capacity at Design Cond. [16]: ____ BTUh	☐	☐	☐
3.11 Listed Sys. Sensible Capacity at Design Cond. [16]: ____ BTUh	☐	☐	☐
3.12 Listed Sys. Total Capacity at Design Cond. [16]: ____ BTUh	☐	☐	☐
3.13 If Listed Sys. Latent Capacity (Value 3.10) ≤ Design Latent Heat Gain (Value 2.12), ENERGY STAR qualified dehumidifier installed	☐	☐	☐
3.14 Listed Total Cap. (Value 3.12) is 95-115% of Design Total Heat Gain (Value 2.14) or next nom. Size [4,17]	☐	☐	☐
3.15 AHRI Certificate Attached [17]	☐	☐	☐
4. Selected Heat Pump Equipment, If Heatpump to be Installed			
4.1 AHRI Listed Efficiency: ____ HSPF	☐	☐	☐
4.2 Performance at 17°F: Capacity: ____ BTUh Efficiency: ____ COP	☐	☐	☐
4.3 Performance at 47°F: Capacity: ____ BTUh Efficiency: ____ COP	☐	☐	☐

NOT TESTED

Fumbles:

To proceed awkwardly and uncertainly



Intent vs. 100% Compliance

- Can we go there and be successful – YES
- Thermal Bridging
  - 99% choosing advanced framing package
  - Can every header be insulated

"…except where a framing plan provided by the builder, architect, designer, or engineer indicates that full-depth solid headers are to be used. The Rater need not evaluate the structural necessity of the details in the framing plan to certify the home."

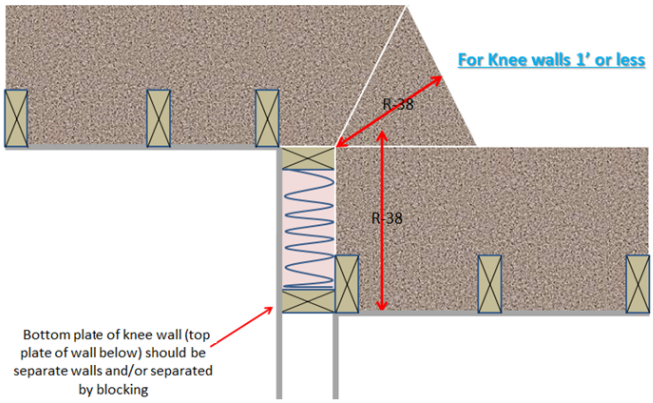
Consistency of Interpretation

- If a letter/framing plan can take the place of doing what the point is asking for what do you do?
- Make an interpretation about the intent
- Try to ensure the consistency of the deliverability of the interpretation

Rev 7 Thermal Enclosure Checklist

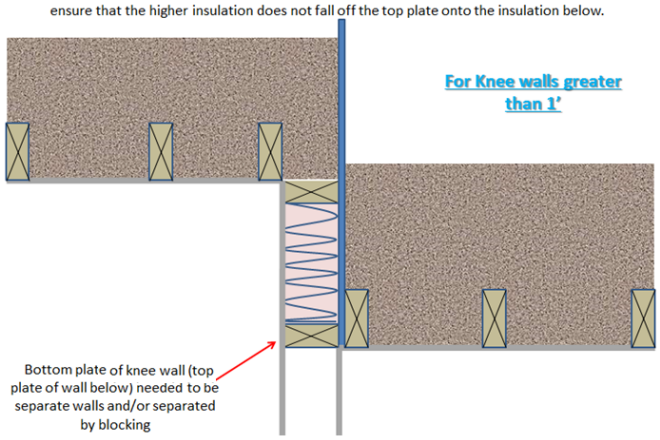
- Knee walls 1’ or Less

The installed depth of the insulation must be ≥ the height of the kneewall in order to forego kneewall backing. The installed insulation angle should not exceed 45 degrees to ensure that the mounded insulation provides a minimum acceptable insulation depth over the corner of such structures and to ensure that it will not slide off. The depth of the insulation as illustrated by the two red arrows shall be equal hence ensuring at least and R-38 over the outside edge of the knee wall.



- Knee wall greater than 1’

For short knee walls and for raised ceilings that are ≥ 1’ and or are taller than the the ceiling below, the best practice is to install a full attic side air barrier and six sided enclosed cavity insulation. The air barrier should extend above the raised ceiling, to act as an insulation dam, to ensure that the higher insulation does not fall off the top plate onto the insulation below.



Small Knee Wall Done Right

Rater Discretion

- The Rater must review all items on the Rater checklists
- "Raters are expected to use their **experience** and **discretion** to verify that the **overall intent** of each inspection checklist item has been met"
- "(i.e., identifying major defects that undermine the intent of the checklist item versus identifying minor defects that the Rater may deem acceptable)"

Rater Discretion

- If the Rater is not able to determine if the item is consistent with the intent:
  - Present and alternative method of meeting checklist requirement and consult Provider
  - If Provider also cannot make this determination … then Provider shall report the issue to EPA
- If EPA believes the guidelines are sufficiently clear to determine the intent … then they need to be enforced
- If EPA believes the program guidelines require revisions to make the intent clear, then guidance will be provided in the next revision

What's in ENERGY STAR?
When to be Firm and When to be Flexible?

Core Energy Efficiency Features +

Thermal Enclosure System Checklist	High-quality insulation & fenestration Proper installation & air sealing Reduced thermal bridging
HVAC Contractor and Rater Checklists	Fully-engineered design Best practice installation Fresh air & exhaust
Water Management System Checklist	Water-managed site, foundation, walls, and roof

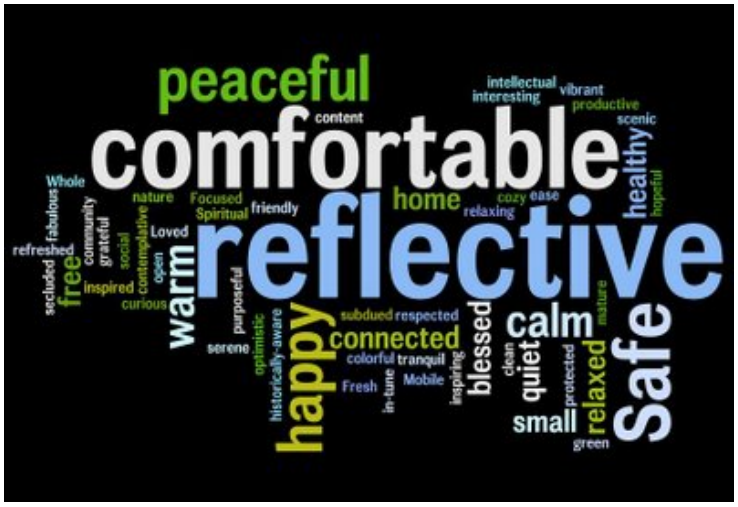
Flexibility of the Interpretation

- When to be firm
  - In training
    - Checklist items are mandatory items
  - Slab edge insulation
  - Spot ventilation Fan flow

Flexibility of the Interpretation

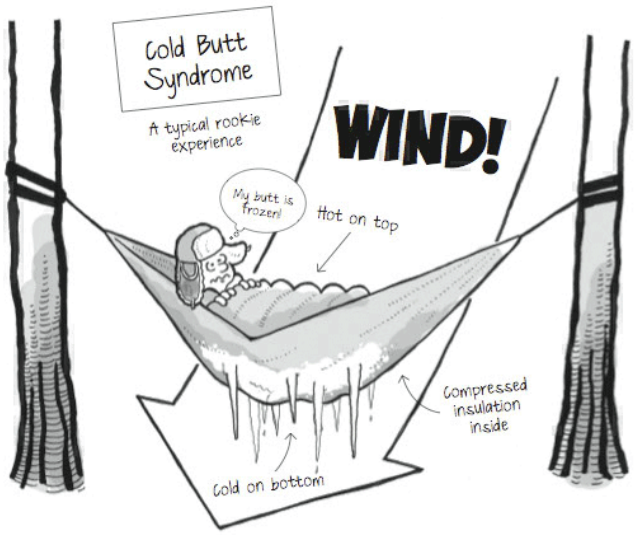
- When to be flexible
  - Builder sign off issues
  - HVAC issues
  - Thermal bridging requirements

Rumbles



Look how houses have changed

Uptick in Comfort Complaints

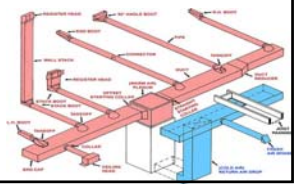


HVAC a program onto its self

- What is the real intent
  - Stop the grouse oversizing
  - Better designs
  - At times incremental Improvement
  - Tight duct systems
  - Properly charged system
  - Right sized systems that better take into account the actual features in the home

2. Heating & Cooling System Design
HVAC Design Guidelines

- **Minimize it** - Bigger is not better
  - System sizing should be just right / Get the proper Load
- **Simplify it** - More is not better
  - Simple duct systems have benefits
- **Design it** - 1st step to ensured comfort & efficiency
  - House design guidelines / scope of work - Communication / Ventilation load
  - Get the proper flow and ensure the load is distributed correctly
- **Seal it** - Tight ducts perform better
  - Building durability / Safety / Energy Efficiency / Comfort
- **Insulate it** – Even better
  - Ensure the system is inside the envelope
- **Verify it** – You get what you inspect
  - Commissioning is were it's at



Working through issues

- Bringing contractors together when Revisions are released

EnergyLogic ink
BUILDER SERVICES

Energy Star Version 7 Release!

EnergyLogic offers Free Training for Energy Star Revision 7

Energy Star just released Revision 7 of the Energy Star Checklists which is due to go into effect in August. This revision includes some significant changes

There are many questions about what is required and how to comply with the mandatory HVAC checklists of the program. In an effort to minimize future road blocks, EnergyLogic is offering a **FREE HVAC training** in an effort to get everyone up to speed as quickly as possible with what is new, as well as address old issues that continue to cause problems.

We look forward to seeing you there!

Regards,
Robby Schwarz and the EnergyLogic Team

Energy Star V3 HVAC Checklists Revision 7
What's required and how do you comply?
Presented By: Robby Schwarz, EnergyLogic

Date: July 30th
Time: 9:00 am - 12:00 pm
Where: Denver HBA Education Room
9033 E Easter Pl #200 Centennial, CO 80112

This presentation will ensure that HVAC contractors understand what exactly is being required of them by the ESv3 HVAC contractor and rater checklists and how they have been changed in REV 7.

Builders, Architects, Designers are also encouraged to attend to ensure a common understanding across the industry.

This presentation will break down the checklist and walk the HVAC contractor through the difficult sections and explain the intent and meaning of the checklist items:

- Proper Manual J and D
- Duct installation issues
- Proper Static pressure measurements
- Balancing reports and room pressures
- Measuring flows across the coil
- Measuring flows through ventilation fans and systems
- New Duct leakage Targets

Working through issues

- Continual reminders when reporting:
- Mechanical System #1 Total System Leakage at rough passes program or code
  - Passes with measured leakage of 101 CFM @25.
    - 6% target was 134. Starting on 1/1/2014 the ESv3 target will go to 4% or 4 CFM/100 SQFT of conditioned floor area and will be 89 CFM.

Working through issues

- Constantly gather information and have a dialog with your provider and or Energy Star
- Example:
  - HVAC Contractor and Rater Checklist
  - 15% oversized or next nominal size

1.2.9 Listed total cooling capacity (3.10) is 95-115% (or 95-125% for Heat Pumps in Climate Zones 4-8) of design total heat gain (2.14), or next nominal size

Making progress/Still learning

ENERGY STAR Qualified Homes
National Program Requirements, Version 3.0
ENERGY STAR Qualified Homes, Version 3 (Rev. 01)
National Program Requirements
ENERGY STAR Qualified Homes, Version 3 (Rev. 02)
National Program Requirements
ENERGY STAR Qualified Homes, Version 3 (Rev. 03)
National Program Requirements
ENERGY STAR Qualified Homes, Version 3 (Rev. 04)
National Program Requirements
ENERGY STAR Qualified Homes, Version 3 (Rev. 05)
National Program Requirements
ENERGY STAR Qualified Homes, Version 3 (Rev. 06)
National Program Requirements
ENERGY STAR Certified Homes, Version 3 (Rev. 07)
National Program Requirements

Certifying Homes

The following homes are eligible to earn the ENERGY STAR:

- Detached dwelling units [1] (e.g. single family homes); OR
- Dwelling units [1] in any multifamily building with 4 units or fewer; OR

Making progress/Still learning

Where is Energy Star Going

Where is Energy Star Going

- Continued Revisions
  - Revisions simplify things
    - 24” on center framing
  - Makes things more flexible and generally easier to comply with
    - Size adjustment
    - Duct leakage testing
- Greater alignment with the 2012 IECC
  - Potentially risky

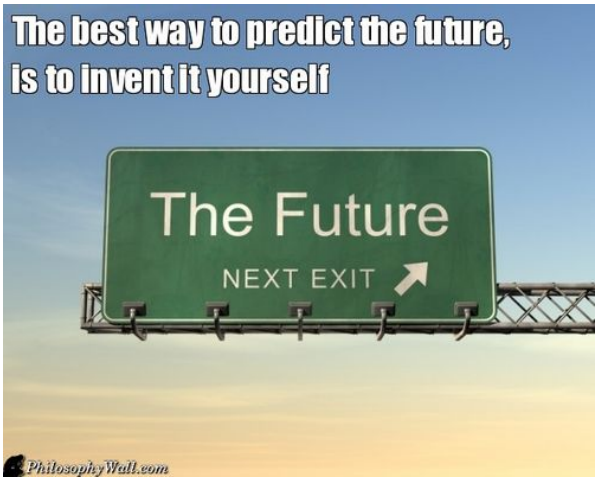
V3.1?

- Only going to States that adopt the 2012 IECC
- Changes Reference Home so ESv3.1 is 15% more efficient that the 2012 IECC
- Checklist do not change and are still Mandatory

HVAC, HVAC, HVAC

- Rater Training / Nate testing
- Webinars
  - Manual J and S
- Checklist clarifications

What would I like to add



Thermal Enclosure Checklist

- Seems perrty good as is……

Credentialing/Required Training

- Insulators
- Framers
- Rater driven training annually or semi annually

HVAC Checklists

- More guidance/clarification for the Rater on HVAC checklist reviews – better matrix's for judging design compliance
- Move to true required site specific designs
- Across the board tightening of duct leakage requirements to be consistent with the 2012 IECC
- Greater recognition of regional differences in design
  - Altitude, dryness, and climate change in Colorado for example

Sizing / Duct Installation / Air delivery

- More emphasis on Duct installation
- Myopic focus on HVAC Sizing
  - Right sized equipment?
- Colorado Example

"I think I've figured out why you're having air flow problems."

10 Additional Inspection Points

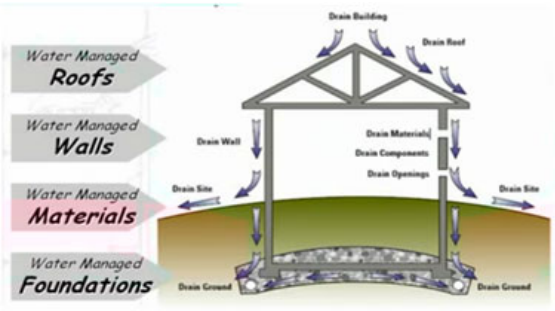
- Duct layout in house follows duct layout plan provided for house
- Multiple supply takeoffs taken from very end of trunk line
- Long trunk line has no reduction to increase back pressure
- All and/or the majority of the supply duct runs and/or supply boot registers are one size
- Centralized return system only provided on one floor

10 Additional Inspection Points

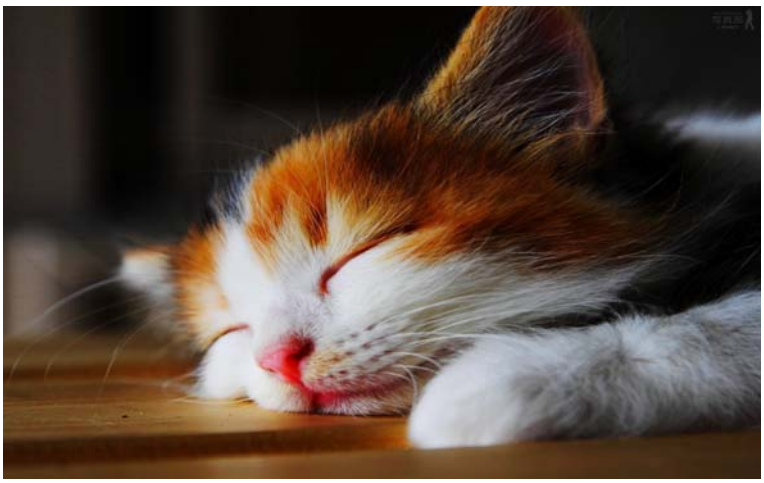
- Return grill opening is not equal to the return duct size. i.e. return air chase restricted and return air flow is reduced
- Riser not installed between HVAC cabinet and AC coil for static pressure measurements. The cabinet will have to be drilled for this test
- Space not provided between Return air filter and HVAC cabinet for proper Static pressure testing
- No sign of installed method for balancing the system (i.e. no balancing dampers or different duct sizes installed)
- Gasketed Filter slot undersized for proposed MERV filter and/or constructed so return air can bypass filter

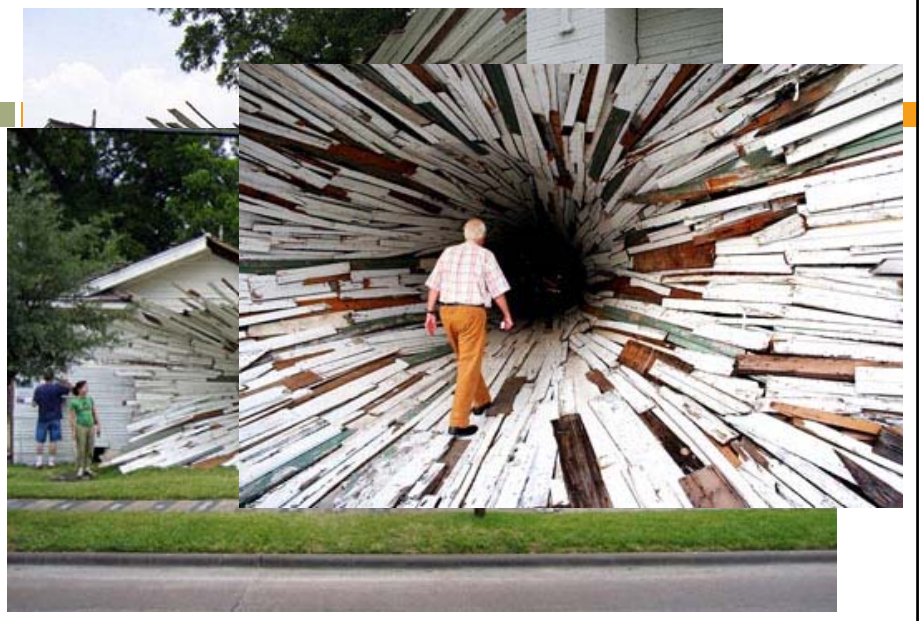
Water Management

- Greater Rater oversight or review.
- Is a builder generated checklist so it has not been looked at in any real depth.



When Will we Feel Comfortable with the Program





Tunnel House

ENERGY STAR PARTNER

Thank you!

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