



Utah IECC Residential Energy Code Training: Are you ready for July 1st, 2014?

June 19, 2014



We Partner to Build the New
CLEAN ENERGY ECONOMY



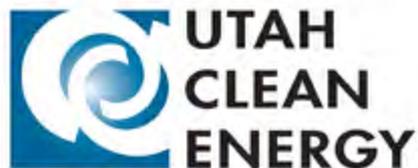
STOP
ENERGY WASTE



CREATE
CLEAN ENERGY



BUILD
A SMART ENERGY FUTURE





Southwest Energy Efficiency Project is a public interest organization promoting greater energy efficiency the Southwestern United States.

- Utility sector
- Industrial and combined heat and power
- Building efficiency
- Transportation efficiency



TODAY'S AGENDA

- 1. Overview of new energy code provisions in the Utah IECC (Brent Ursenbach)**
- 2. New air leakage and duct testing requirements in the Utah IECC (Mitch Richardson)**
- 3. Questions and discussion**
- 4. Adjourn**

TODAY'S PRESENTERS



Kevin Emerson
Utah Clean Energy



Brent Ursenbach
Salt Lake County Planning and
Development



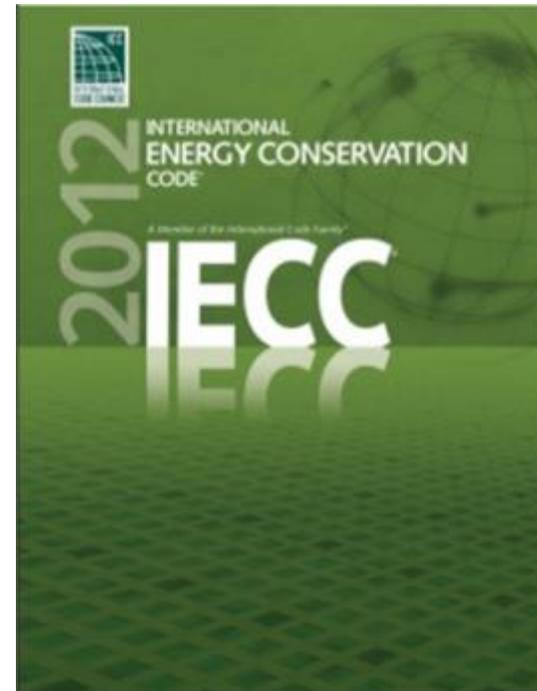
Mitch Richardson
Survey and Testing Services

2012 IECC – Residential with State Adopted Changes

Link to: State Construction and Fire Code Act

<http://le.utah.gov/UtahCode/chapter.jsp?code=15A>

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Relationship Between IRC & IECC

- ✓ IECC addresses only energy
- ✓ IRC addresses all topics (*structural, plumbing, etc.*)
 - Allows builder to carry only one code book
 - Chapter 11 covers energy efficiency
- ✓ *In 2012, consolidated with IRC energy chapter (actually a change to the IRC, not the IECC)*
- ✓ *Previous versions IRC Chapter 11 and IECC Residential were not identical*
- ✓ IECC addresses both residential and commercial; IRC addresses subset of residential, detached one- and two-family dwellings and townhouses 3 stories or fewer



Utah Building Codes

- Adopted by Legislative Action
- Uniform Building Codes Commission (UBCC) makes recommendation to the Interim Business and Labor Committee
 - Newest version of the Code considered
 - Not automatically adopted
 - Amendments for the entire State
 - Several Advisory Committees study various Codes- prepare studies and recommendations to the UBCC

Enrolled Copy	H.B. 310
1	CONSTRUCTION CODE AMENDMENTS
2	2013 GENERAL SESSION
3	STATE OF UTAH
4	Chief Sponsor: Brad R. Wilson
5	Senate Sponsor: Curtis S. Bramble
6	<hr style="border: 2px solid black;"/>
7	LONG TITLE
8	General Description:
9	This bill modifies the State Construction Code.
10	Highlighted Provisions:
11	This bill:
12	• adopts the 2012 edition of certain nationally recognized building codes;
13	• modifies certain statewide amendments to the State Construction Code; and
14	• repeals certain local amendments to the State Construction Code.
15	Money Appropriated in this Bill:
16	None
17	Other Special Clauses:
18	This bill takes effect on July 1, 2013.
19	Utah Code Sections Affected:
20	AMENDS:
21	15A-2-103, as last amended by Laws of Utah 2012, Chapter 76
22	15A-2-104, as enacted by Laws of Utah 2011, Chapter 14
23	15A-3-102, as enacted by Laws of Utah 2011, Chapter 14
24	15A-3-103, as enacted by Laws of Utah 2011, Chapter 14
25	15A-3-104, as enacted by Laws of Utah 2011, Chapter 14
26	15A-3-105, as enacted by Laws of Utah 2011, Chapter 14
27	15A-3-107, as enacted by Laws of Utah 2011, Chapter 14
28	15A-3-108, as last amended by Laws of Utah 2012, Chapter 76
29	15A-3-110, as enacted by Laws of Utah 2011, Chapter 14

State Amendments to the 2012 IECC

- Only amendments to the residential section
- Adoption delayed until DOE produced a new version of REScheck specifically modified for the Utah Amendments
- July 1, 2014, the 2012 IECC with amendments becomes effective

	Enrolled Copy	H.B. 202
1	ENERGY CONSERVATION CODE AMENDMENTS	
2	2013 GENERAL SESSION	
3	STATE OF UTAH	
4	Chief Sponsor: Brad R. Wilson	
5	Senate Sponsor: Curtis S. Bramble	
6	<hr/>	
7	LONG TITLE	
8	General Description:	
9	This bill amends the State Construction Code.	
10	Highlighted Provisions:	
11	This bill:	
12	▶ adopts the 2012 edition of the International Energy Conservation Code;	
13	▶ modifies certain provisions of the International Energy Conservation Code; and	
14	▶ modifies certain energy provisions of the International Residential Code.	
15	Money Appropriated in this Bill:	
16	None	
17	Other Special Clauses:	
18	This bill provides a contingent effective date.	
19	Utah Code Sections Affected:	
20	AMENDS:	
21	15A-2-103, as last amended by Laws of Utah 2012, Chapter 76	
22	15A-3-203, as enacted by Laws of Utah 2011, Chapter 14	
23	15A-3-701, as enacted by Laws of Utah 2011, Chapter 14	
24	Uncodified Material Affected:	
25	ENACTS UNCODIFIED MATERIAL	
26	<hr/>	
27	<i>Be it enacted by the Legislature of the state of Utah:</i>	
28	Section 1. Section 15A-2-103 is amended to read:	
29	15A-2-103. Specific editions adopted of construction code of a nationally	

Generally, the Entire State Must Follow Identical Codes

- Local Amendments are allowed
- Requires Legislative approval-
- Local Amendments Include:
 - Adjusted roof snow load requirements based on geography and weather historical data
 - Fire sprinkler requirements in hazardous wild land areas
- Executive Action- Governor's Signature Required for all Legislation

Structure of the 2012 IECC



- Ch. 1 Scope and Application / Administrative and Enforcement
- Ch. 2 Definitions
- Ch. 3 General Requirements
- Ch. 4 Commercial Energy Efficiency
- Ch. 5 Referenced Standards
- Index



- Ch. 1 Scope and Application / Administrative and Enforcement
- Ch. 2 Definitions
- Ch. 3 General Requirements
- Ch. 4 Residential Energy Efficiency
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Scope

Section R101



Residential Buildings:

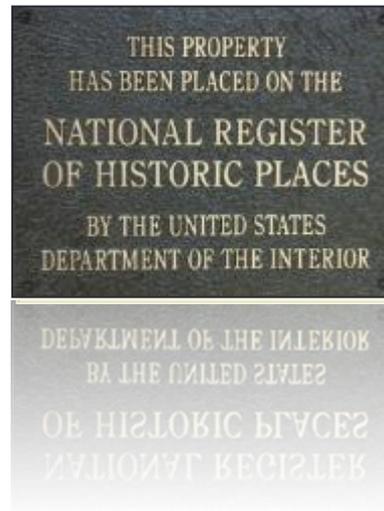
- ✓ One- and two-family dwellings, townhouses of any size and R-2, R-3, R-4 ≤ 3 stories
- ✓ All buildings that are not “residential” by definition are “commercial”
- ✓ Includes additions, alterations, renovations and repairs



Scope

Section R101.4, R101.5.2 - Exempted Buildings

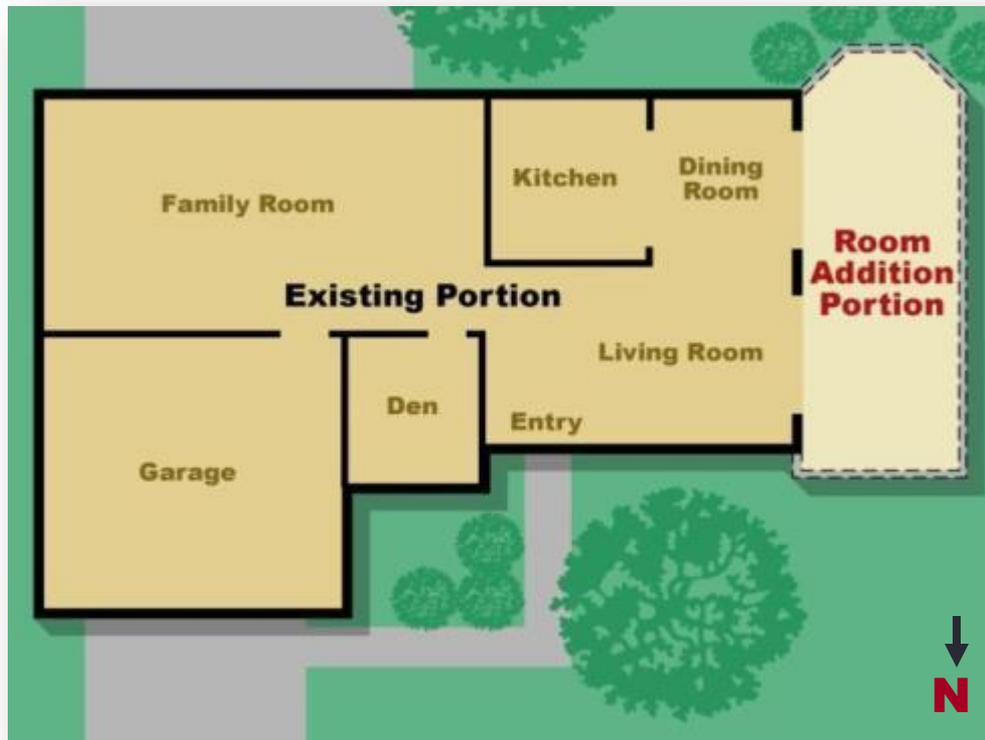
- ✓ Existing buildings (*Section R101.4.1*)
- ✓ Buildings designated as historic (*Section R101.4.2*)
- ✓ Very low energy use buildings [$<3.4 \text{ Btu/h-ft}^2$ or 1 watt/ft^2] (*Section R101.5.2*)



Scope

Section R101.4.3- Additions

- ✓ Treat as a stand-alone building
- ✓ Additions must meet the prescriptive requirements in Table 402.1.1 (or *U-factor* or *total UA alternatives*)



Scope

Section R101.4.3 - Additions, Alterations, Renovations, Repairs

Exceptions

- ✓ Storm windows over existing fenestration
- ✓ Glass-only replacements
- ✓ Exposed, existing ceiling, wall or floor cavities if already filled with insulation
- ✓ Where existing roof, wall or floor cavity isn't exposed
- ✓ Reroofing for roofs where neither sheathing nor insulation exposed
 - Insulate above or below the sheathing
 - Roofs without insulation in the cavity
 - Sheathing or insulation is exposed
- ✓ Lighting alterations if:
 - <50% of luminaries in a space are replaced
 - Only bulbs and ballasts within existing luminaries are replaced (provided installed interior lighting power isn't increased)

Scope

Section R101.4.5 - Space Conditioning

Any non-conditioned space that is altered to become conditioned space shall be required to be brought into full compliance with this code

Examples:

- ✓ Converting a garage to a family room
- ✓ Heating an unfinished basement



IECC - Overview of Structure

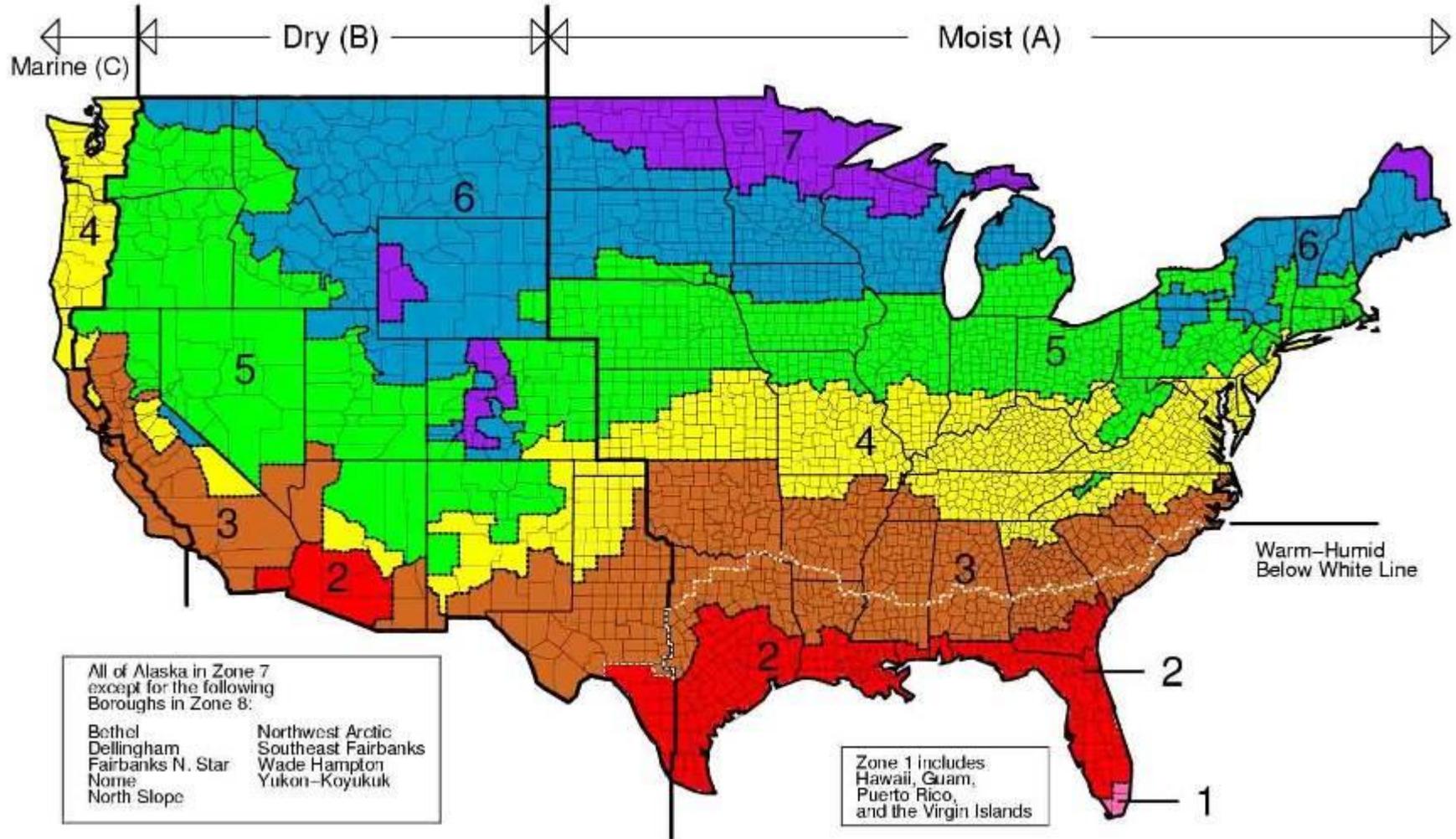
Climate-Specific Requirements:

- ✓ Roofs
- ✓ Above grade walls
- ✓ Foundations
 - Basements
 - Slabs
 - Crawlspace
- ✓ Skylights, windows, and doors
- ✓ Solar Heat Gain Coefficient in warm climates

Mandatory Requirements (apply everywhere):

- ✓ Infiltration control
- ✓ Duct insulation, sealing, and testing
- ✓ HVAC controls
- ✓ Piping Insulation
- ✓ Equipment sizing
- ✓ Dampers
- ✓ Lighting

Climate Zones for the 2012 IECC



Overview of Residential Code Requirements

- ✓ Focus is on building envelope
 - Ceilings, walls, windows, floors, foundations
 - Sets insulation and fenestration levels, and solar heat gain coefficients
 - Infiltration control - caulk and seal to prevent air leaks, and test
 - **Blower door testing is optional- State Amendment- similar to 2009 IECC- may use a comprehensive air barrier/insulation inspection**

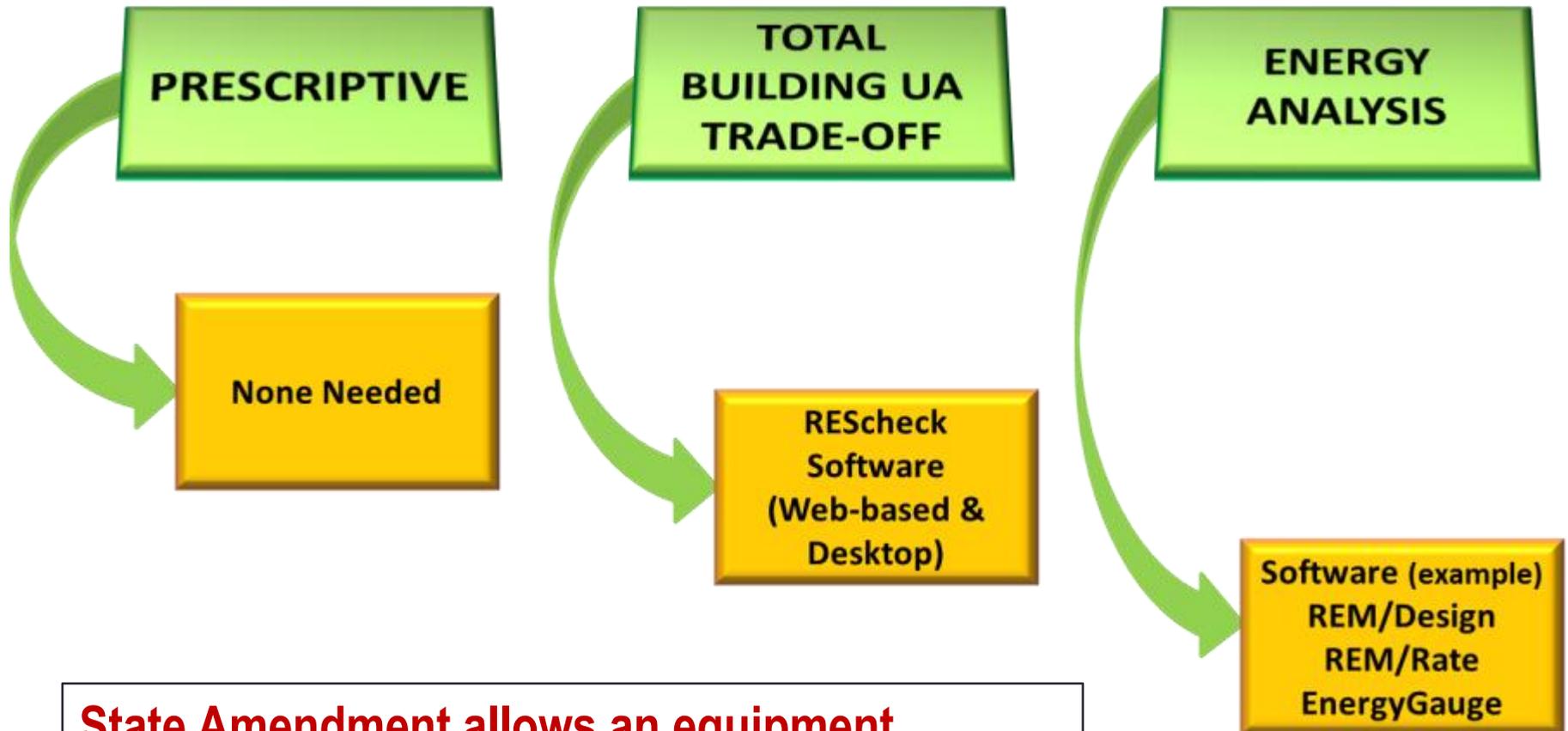
- ✓ Ducts, air handlers, filter boxes – seal, insulate, and test
 - ✓ **Testing required only if air handler or 50% of duct is outside the thermal envelope- State Amendment**

- ✓ Limited space heating, air conditioning, and water heating requirements
 - Federal law sets most equipment efficiency requirements, not the I-codes

- ✓ No appliance requirements

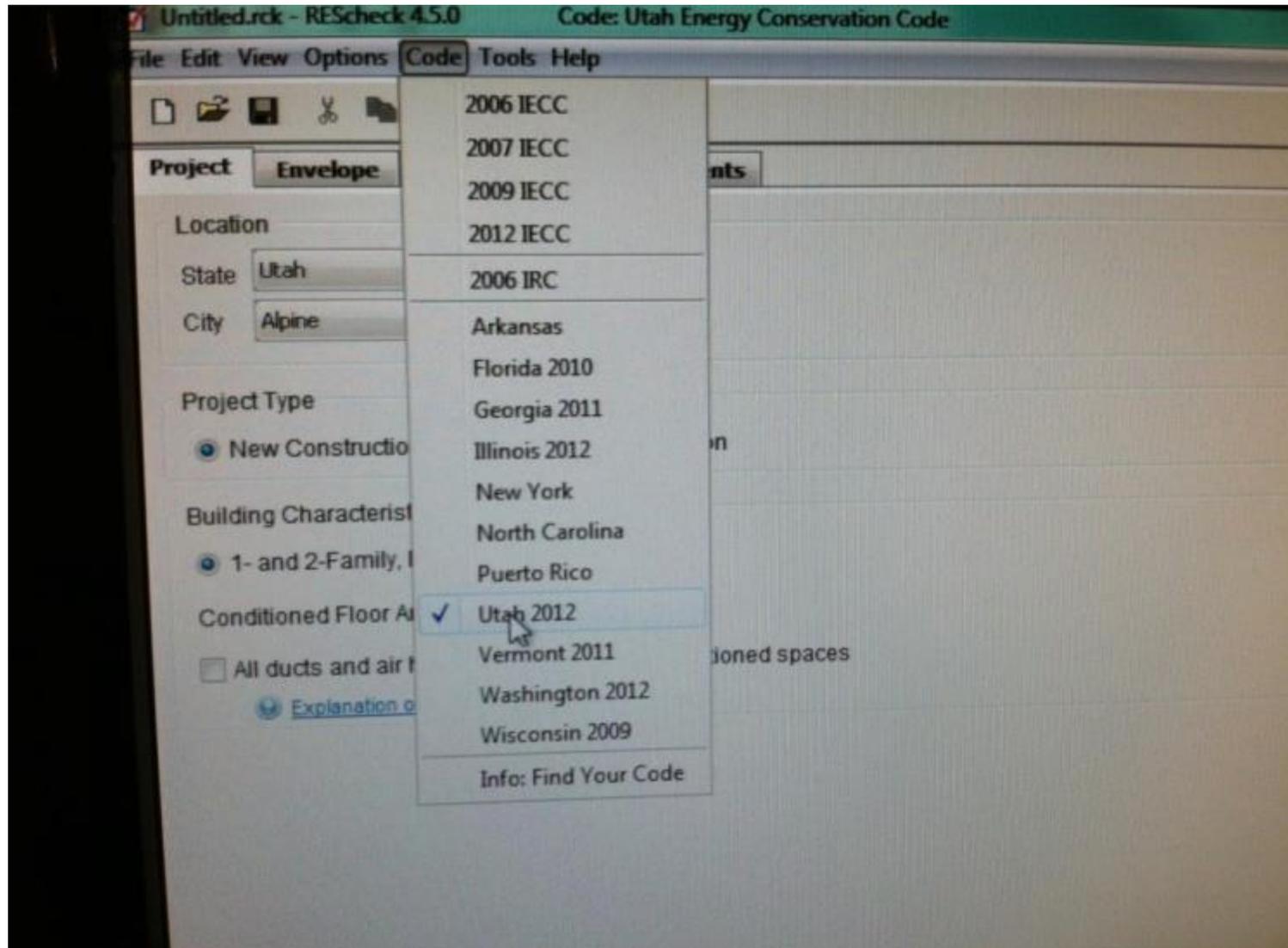
- ~~✓ Lighting equipment – 75% of lamps to be high-efficacy lamps or 75% of lighting fixtures to have only high-efficacy lamps~~ **Deleted by State Amendment**

Code Compliance Tools



State Amendment allows an equipment Trade-Off- included in the Utah 2012 REScheck

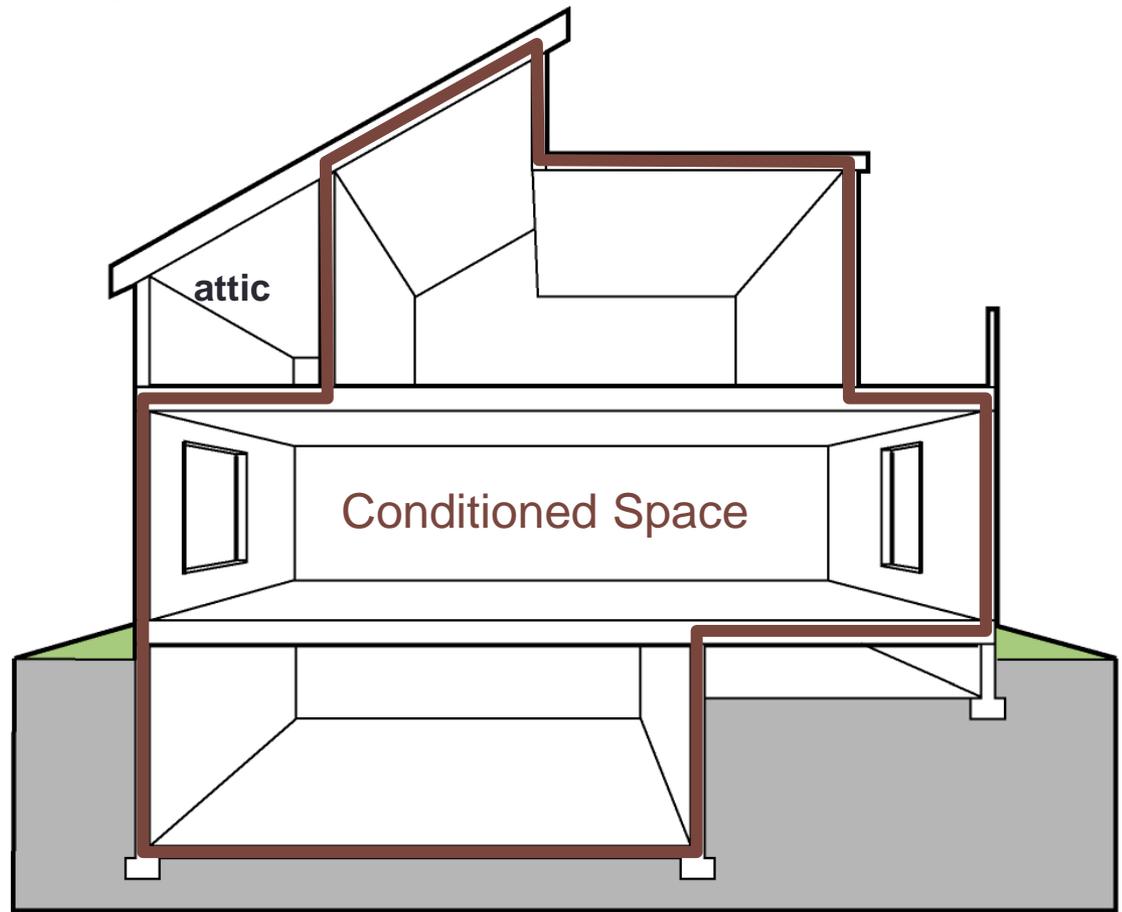
Utah REScheck- Utah 2012 Code



Building Envelope Specific Requirements

Building Envelope consists of:

- ✓ Fenestration
- ✓ Ceilings
- ✓ Walls
 - Above grade
 - Below grade
 - Mass walls
- ✓ Floors
- ✓ Slabs
- ✓ Crawlspace



Insulation and Fenestration Requirements by Climate Zone

SEE STATE AMENDMENTS- Very similar to 2006 Table

**TABLE R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, c}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ^e	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5 ^b	8/13	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5 ^b	8/13	19	10 /13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5 ^b	13/17	30 ^g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10 ^b	15/20	30 ^g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10 ^b	19/21	38 ^g	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

- R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.
- The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.
- There are no SHGC requirements in the Marine Zone.
- Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation *R*-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.
- The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

2012 AMENDED PRESCRIPTIVE TABLE- COMPARE TO 2006

**TABLE R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT***

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1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	.65	.65	.40	30	15	5	19	0	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5 ^h	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	.35	.60	NR	38	19 or 13+5 ^h	13	30 ^f	10/13	10, 2 ft	10/13
6	.35	.60	NR	49	19 or 13+5 ^h	15	30 ^f	10/13	10, 4 ft	10/13
7 and 8	0.32	0.55	NR	49	20+5 or 13+10 ^h	19/21	38 ^f	15/19	10, 4 ft	15/19

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- The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

20^j "j. Log walls complying with ICC400 and with a minimum average wall thickness of 5" or greater shall be permitted in Zones 5-8 when overall window glazing is .31 U-factor or lower, minimum heating equipment efficiency is 90 AFUE (gas) or 84 AFUE (oil), and all other component requirements are met."

Fenestration

Sections R303.1.3/R402.3

Doors and windows

- ✓ NFRC rating or default table
 - If no labeled U-factor and SHGC, use default table
- ✓ No glass area limits with the prescriptive path
 - Glass simply must meet the U-factor and SHGC requirements of the table
- ✓ Exemptions (~~*prescriptive path only*~~)
 - Up to 15 ft² of glazing per dwelling unit (*Section R402.3.3*)
 - One side-hinged opaque door assembly up to 24 ft² (*Section R402.3.4*)

State Amendment allows exemption for any method /path used

Fenestration Sections R402.3.1/R402.3.3

- ✓ Area-weighted Average
 - ✓ Some may be better than code- others weaker
 - ✓ Can be used to satisfy U-factor and SHGC requirements
 - ✓ Subject to hard limits, even in trade-offs

Hard limits on U-factor in northern U.S. (cannot be exceeded, even in trade-offs)

Climate Zones	U-Factor Maximum
4-5	0.48
6-8	0.40

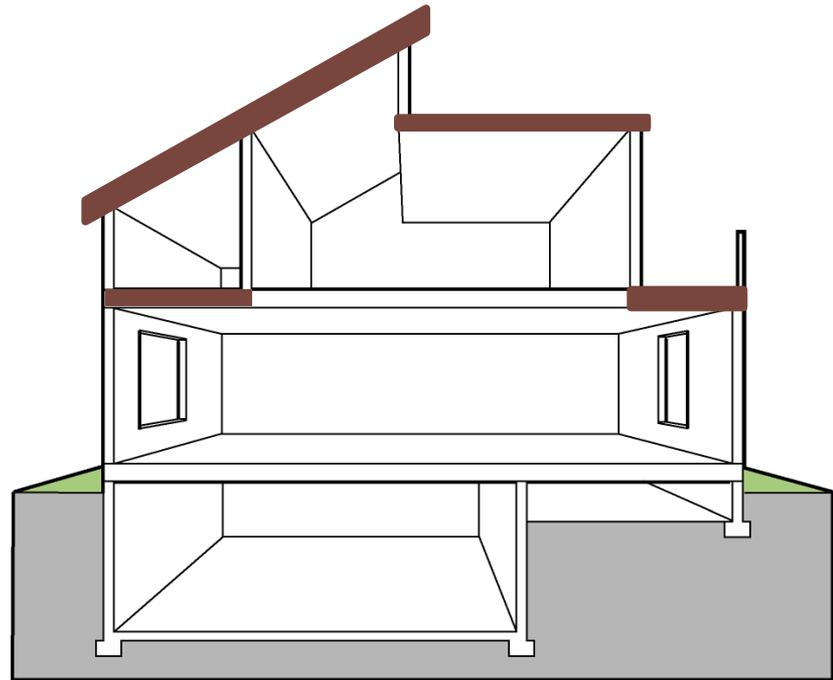
- ✓ U-0.75 for skylights in **Zones 4-8**
- ✓ U-factors of individual windows or skylights can be higher if maximum area-weighted average is below these limits.

Ceilings

Requirements based on

- ✓ Assembly type
- ✓ Continuous insulation
- ✓ Insulation between framing (cavity insulation)

Meet or exceed R-values



Ceilings *Section R303.1*

R-values are to be printed on the batt insulation or rigid foam board.

Blown-in insulation must have an insulation certificate at or near the opening of the attic.

The certificate should include:

- ✓ R-value of installed thickness
- ✓ Initial installed thickness
- ✓ Installed density
- ✓ Settled thickness/settled R-value
- ✓ Coverage area
- ✓ Number of bags installed

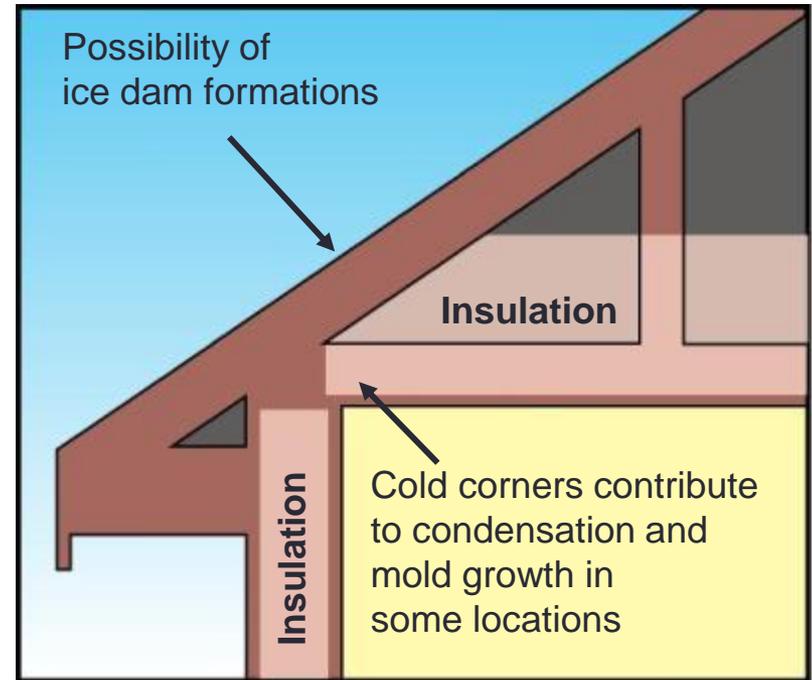


Insulation markers must be installed every 300 square feet and be marked with the minimum installed thickness and affixed to the trusses or joists.

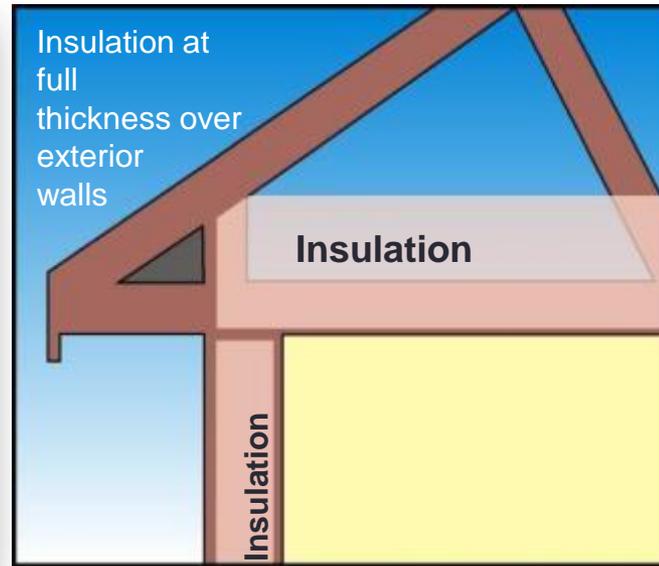
Ceilings with Attics - Section R402.2.1

Ceiling insulation requirements in R-value table assume standard truss systems

Insulation is NOT considered continuous if blown or batt into a truss ceiling



Ceilings with Attics, Cont'd. *Section R402.2.1*



Prescriptive R-value path encourages raised heel truss (*aka, energy truss*)

- ✓ If insulation is full height over exterior wall top plate
 - R-30 complies where R-38 is required
 - R-38 complies where R-49 is required

State Amendment allows with any method/path

Note: This reduction ONLY applies to the R-value prescriptive path, not the U-factor or Total UA alternatives

Ceilings without Attic Spaces

Section R402.2.2 - (e.g., vaulted)

- ✓ R-30 allowed for 500 ft² or 20% total insulated ceiling area, whichever is less, where
 - ✓ Insulation levels are required > R-30
 - ✓ Not sufficient amount of space to meet higher levels

✓ Remember there is an air impermeable insulation requirement for ceilings without attics or ventilation-

✓ Closed cell foam for condensation control IRC R806.4

State Amendment allows use of this exception for any method/path

~~Note: This reduction ONLY applies to the R-value prescriptive path, not the U-factor or Total UA alternatives~~

TABLE R806.5
INSULATION FOR CONDENSATION CONTROL

CLIMATE ZONE	MINIMUM RIGID BOARD ON AIR-IMPERMEABLE INSULATION R-VALUE ^a
2B and 3B tile roof only	0 (none required)
1, 2A, 2B, 3A, 3B, 3C	R-5
4C	R-10
4A, 4B	R-15
5	R-20
6	R-25
7	R-30
8	R-35

a. Contributes to but does not supersede the requirements in Section N1102.

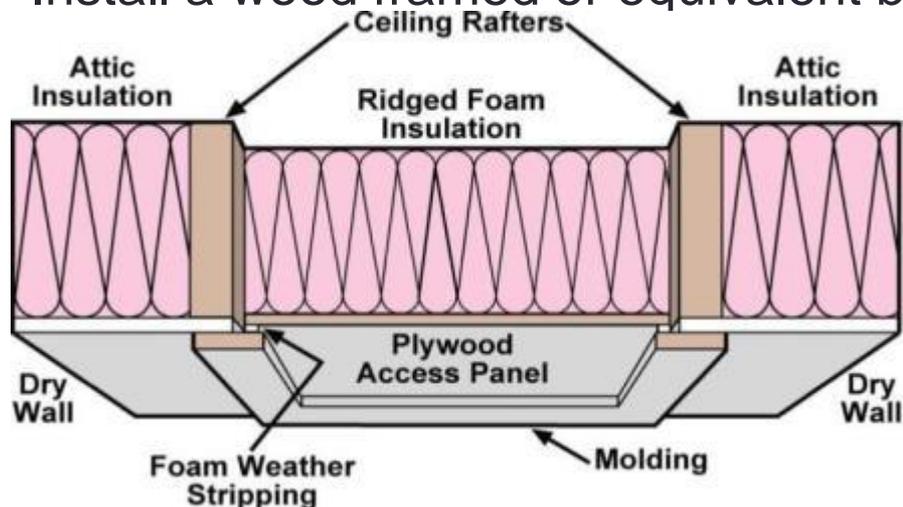
Access Hatches and Doors - Section R402.2.3 - Prescriptive

Weatherstrip and insulate doors from conditioned spaces to unconditioned spaces (e.g., attics and crawl spaces)

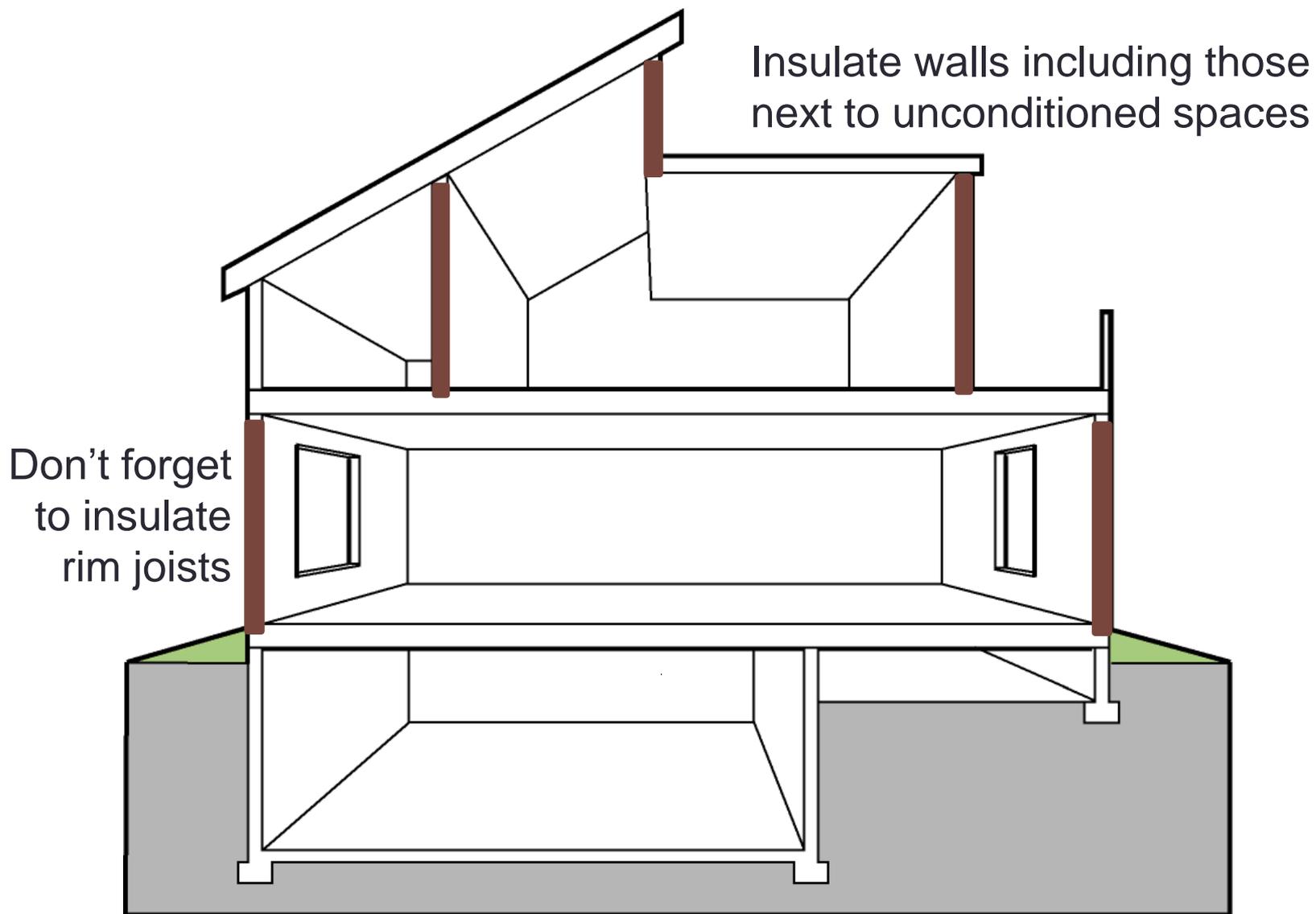
- ✓ Insulate to level equivalent to surrounding surfaces
 - e.g., required ceiling insulation = R-38, then attic hatch must be insulated to R-38
- ✓ This was a 2009 IECC requirement- remains in the 2012- New for Utah as 2009 Residential IECC was never adopted

Provide access to all equipment that prevents damaging or compressing the insulation

Install a wood framed or equivalent baffle



Above Grade Walls



Wood-Frame Walls

Section R402

Table R402.1.1

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE
1	NR	0.75	0.25	30	13
2	0.40	0.65	0.25	38	13
3	0.35	0.55	0.25	38	20 or 13+5 ^h
4 except Marine	0.35	0.55	0.40	49	20 or 13+5 ^h
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5 ^h
6	0.32	0.55	NR	49	20+5 or 13+10 ^h
7 and 8	0.32	0.55	NR	49	20+5 or 13+10 ^h

h. First value is cavity insulation, second is continuous insulation or insulated siding, so “13+5” means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

Steel-Frame Walls

Section R402.2.6

Table keys on the wood-frame requirement for the corresponding building component

✓ “R-X + Y”
means R-X
cavity plus R-
Y continuous

Table R402.2.6
Steel-Frame Ceiling, Wall and Floor Insulation
(R-Value)

Wood Frame R-value Requirement	Cold-Formed Steel Equivalent R-value ^a
Steel Truss Ceilings^b	
R-30	R-38 or R-30 + 3 or R-26 + 5
R-38	R-49 or R-38 + 3
R-49	R-38 + 5
Steel Joist Ceilings^b	
R-30	R-38 in 2x4, or 2x6, or 2x8 R-49 any framing
R-38	R-49 2x4, or 2x6, or 2x8, or 2x10
Steel Framed Wall	
R-13	R-13 + 4.2 or R-19 + 2.1, or R-21 + 2.8 or R-0+9.3 or R-15+R-3.8 or R-21 + 3.1
R-13+R-3	R-0 + 11.2 or R-13 + 6.1, or R-15 + 5.7 or R-19+5.0 or R-21+4.7

Mass Walls

Section R402.2.5

What type

- ✓ Concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth, and solid timber/logs

Provisions

- ✓ Are assumed to be above grade walls



Mass Wall Requirements

Section R402.2.5

Table R402.1.1

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT

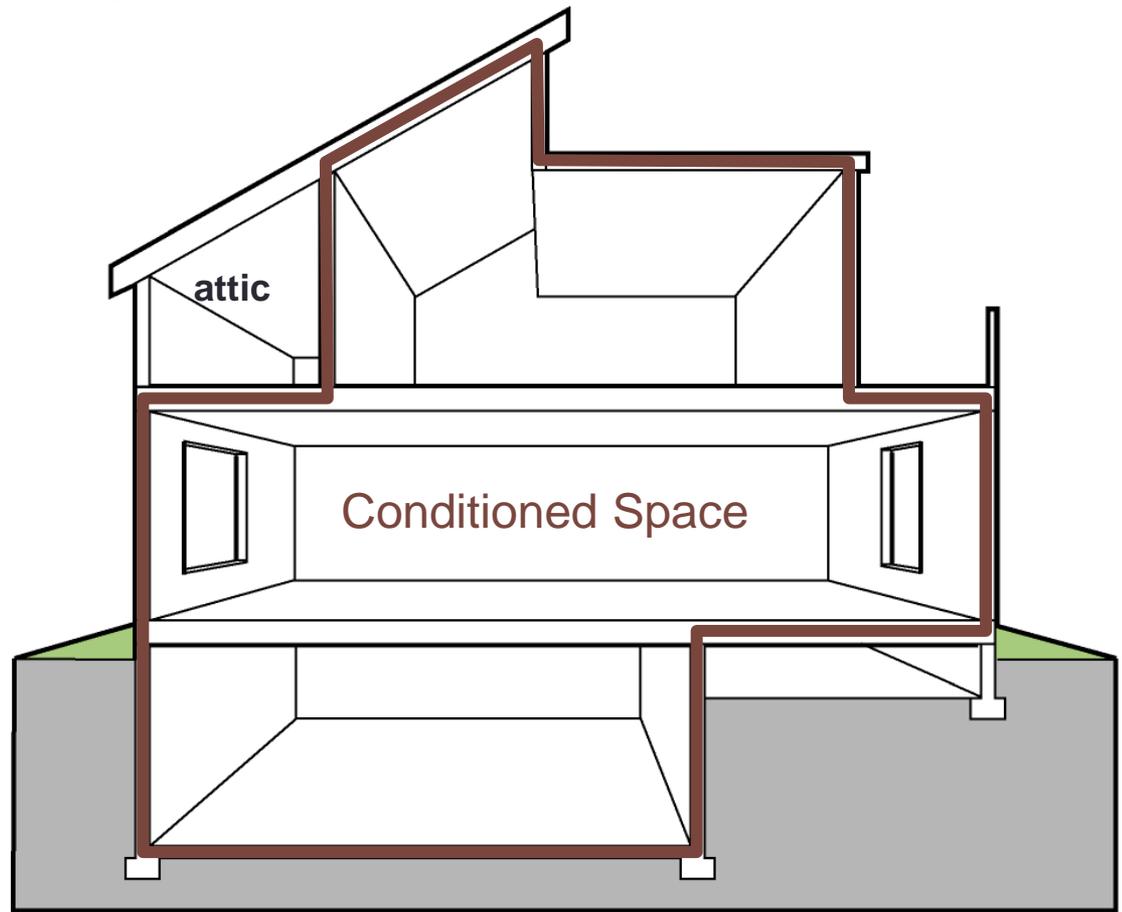
CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ
1	NR	0.75	0.25	30	13	3/4
2	0.40	0.65	0.25	38	13	4/6
3	0.35	0.55	0.25	38	20 or 13+5 ^h	8/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5 ^h	8/13
5 and Marine 4					20 or 13+5 ^h	13/17
6					0+5 or 13+10 ^h	15/20
7 and 8					0+5 or 13+10 ^h	19/21

Second (higher) number applies when more than half the R-value is on the interior of the mass (i.e., when the thermal mass is insulated from the conditioned space)

Building Envelope Specific Requirements

Building Envelope consists of:

- ✓ Fenestration
- ✓ Ceilings
- ✓ Walls
 - Above grade
 - Below grade
 - Mass walls
- ✓ **Floors**
- ✓ Slabs
- ✓ Crawlspace



Floors Over Unconditioned Space

Section R402.2.7

Table R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY
COMPONENT

Exception: If framing members are too small to accommodate R-30, insulation that fills the framing cavity, not less than R-19, complies

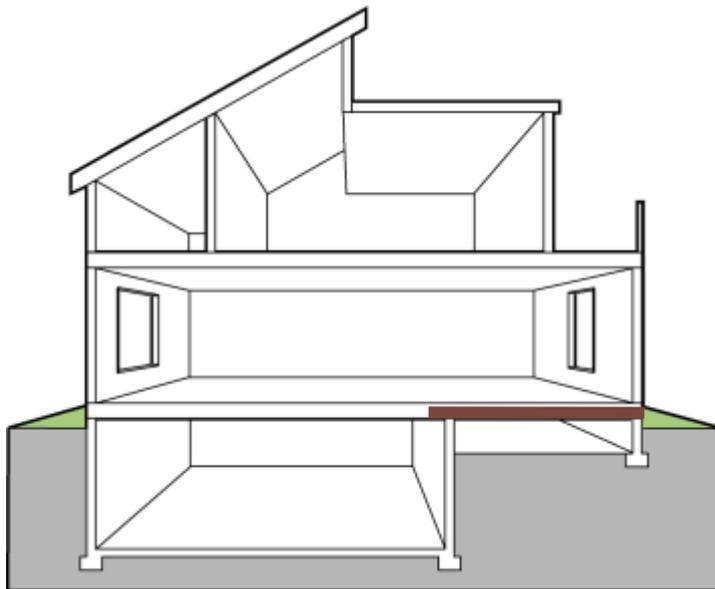
CLIMATE ZONE	...	FLOOR R-VALUE
1		13
2		13
3		19
4 except Marine		19
5 and Marine 4		30 ^g
6		30 ^g
7 and 8		38 ^g

Floors (Over Unconditioned Space)

Section 402.2.7

Unconditioned space includes unheated basement, vented crawlspace, or outdoor air

Climate Zones	R-Value
1-2	13
3-4ab	19
4c-6	30 *
7-8	38 *



Insulation must maintain permanent contact with underside of subfloor

* Exception

Climate Zones 4c-8

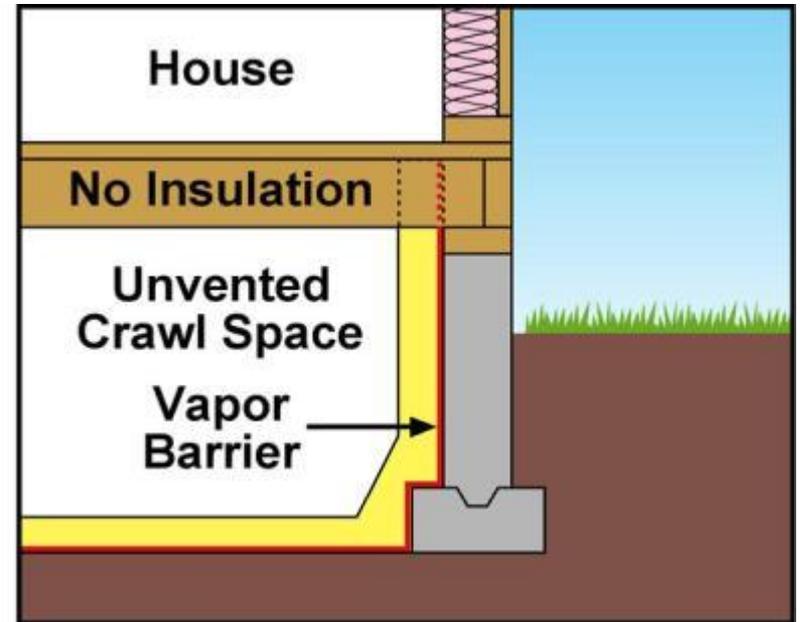
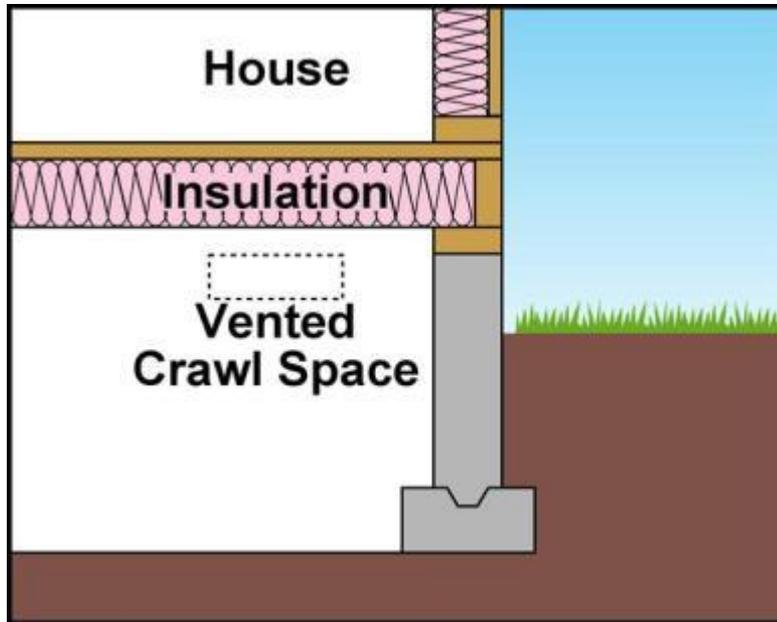
R-19 permitted if cavity completely filled

Crawlspace Wall Insulation

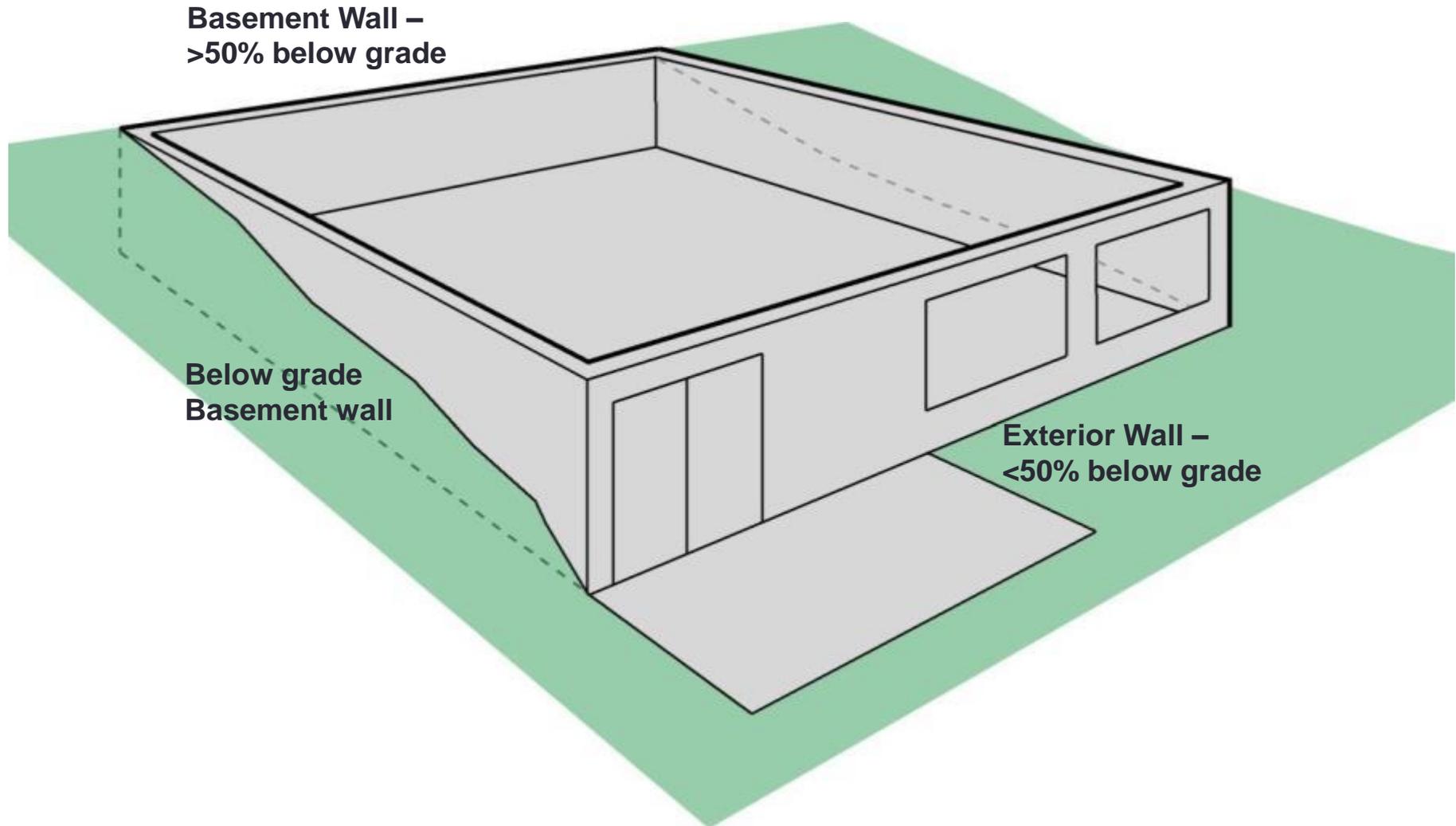
Section R402.2.10

Implies an unvented crawlspace (*aka, conditioned crawlspace*)

- ✓ Space must be mechanically vented or receive minimal supply air (*Refer to IRC*)
- ✓ Exposed earth must be covered with a continuous Class I vapor retarder



Defining Below-Grade Walls



Below-Grade Walls

Section R402.1

Table R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY
COMPONENT

CLIMATE ZONE	...	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE
1		13	0
2		13	0
3		19	5/13 ^f
4 except			10/13
			15/19
			15/19
			15/19

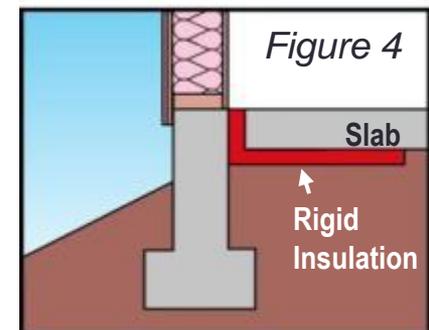
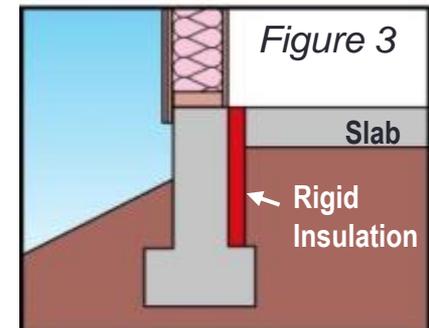
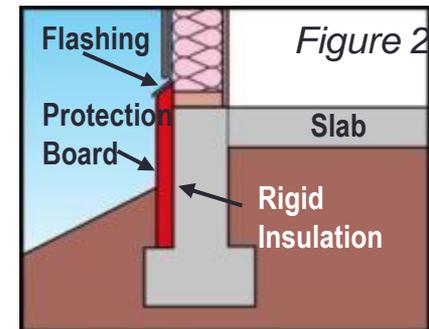
- “X/Y” means R-X continuous or R-Y cavity
- 15/19 requirement can be met with R-13 cavity (interior) plus R-5 continuous (exterior)
- In zone 3, no insulation required in warm-humid counties (footnote f)

Slab Edge Insulation

Section R402.2.9

Applies to slabs with a floor surface < 12 inches below grade

- ✓ R-10 (typically 2 inches) insulation in Zones 4 and above
- ✓ Must extend downward from top of slab a minimum of 24" (Zones 4 and 5) or 48" (Zones 6, 7, and 8)
- ✓ Insulation can be vertical or extend horizontally under the slab or out from the building
- ✓ Insulation extending outward must be under 10 inches of soil or pavement
 - An additional R-5 is required for heated slabs
 - Insulation depth of the footing or 2 feet, whichever is less in Zones 1-3 for heated slabs
- **This is not new or an amendment- it's simply one of the least enforced IECC requirements, and a source of substantial heat loss**



Requirements by Climate Zone

U-Factor Table

See State Amendments

**TABLE R402.1.3
EQUIVALENT U-FACTORS^a**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^b	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	0.50	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.082	0.165	0.064	0.360	0.477
3	0.35	0.55	0.030	0.057	0.098	0.047	0.091 ^c	0.136
4 except Marine	0.35	0.55	0.026	0.057	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.057	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.048	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.048	0.057	0.028	0.050	0.055

- a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- b. When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of 0.17 in Climate Zone 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.
- c. Basement wall *U*-factor of 0.360 in warm-humid locations as defined by Figure R301.1 and Table R301.1.

Sunrooms

Less stringent insulation

R-value and glazing

U-factor requirements

Sunroom definition:

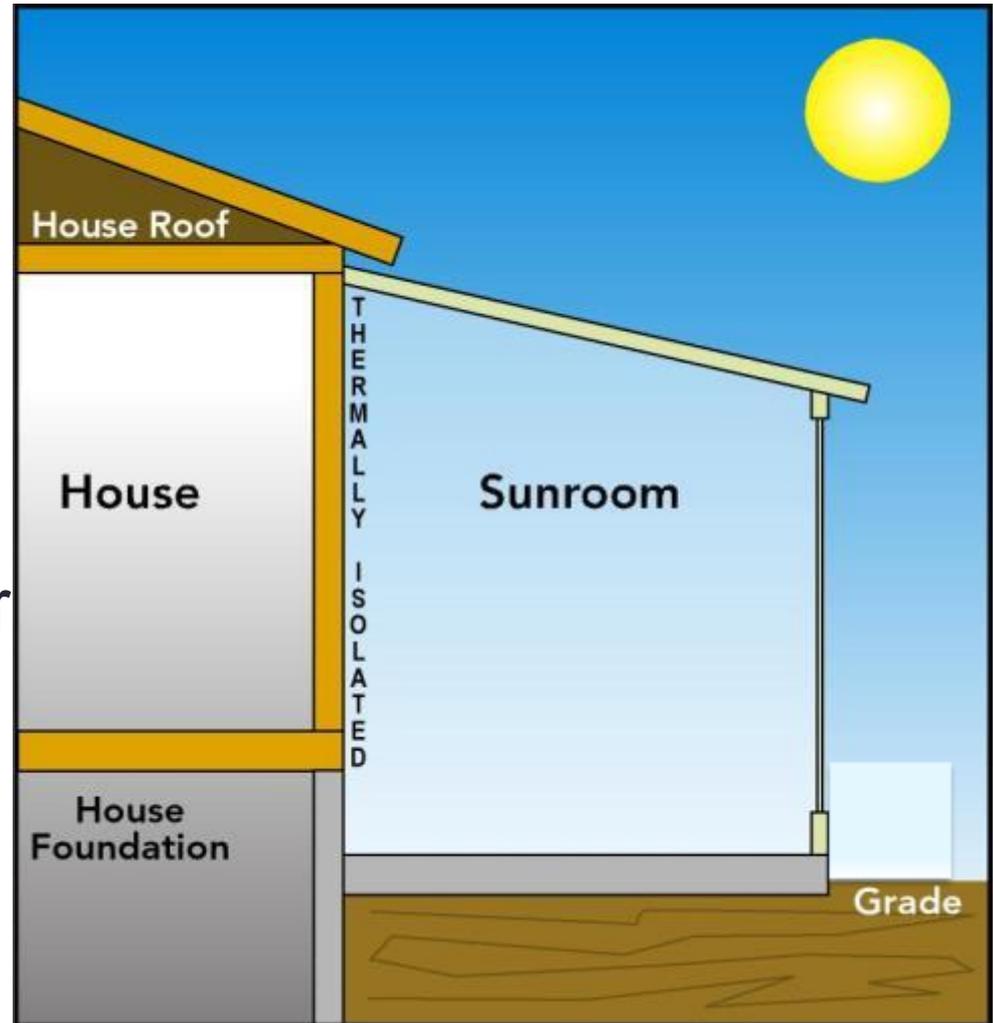
- ✓ One story structure
- ✓ Glazing area >40% glazing of gross exterior wall and roof area
- ✓ Separate heating or cooling system or zone
- ✓ Must be thermally isolated (closeable doors or windows to the rest of the house)
- ✓ Can always meet Table R402.1.1 requirements with unlimited glass



Sunroom Requirements

Section R402.2.12

- ✓ Ceiling Insulation
 - Zones 1-4 R-19
 - Zones 5-8 R-24
- ✓ Wall Insulation
 - All zones R-13
- ✓ Fenestration U-Factor
 - Zones 4-8 0.45
- ✓ Skylight U-Factor
 - Zones 4-8 0.70



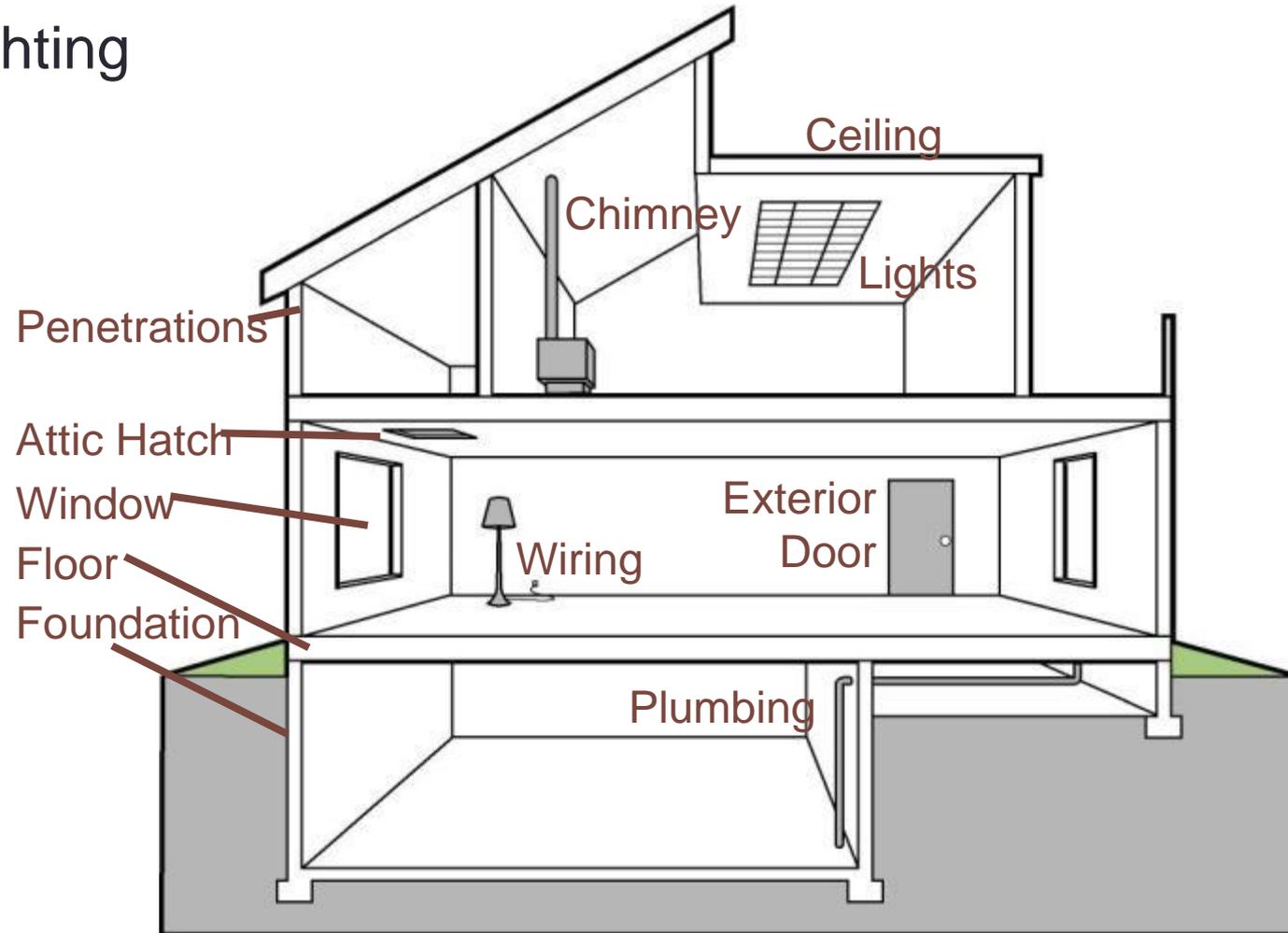
Simulated Performance Alternative

- ✓ Requires computer software with specified capabilities (local official may approve other tools)
- ✓ Includes both envelope and some systems
 - Are treated equally in standard and proposed design
- ✓ Allows greatest flexibility
 - Can trade-off tight duct systems
- ✓ Defines compliance based on equivalency of calculated energy or energy cost
- ✓ Section R405 specifies “ground rules”
 - These will generally be “hidden” in compliance software calculation algorithms
 - Very similar ground rules are used in home federal tax credits and ENERGY STAR Home guidelines

Mandatory Requirements

Section R402.4 - Air Leakage

- ✓ Building thermal envelope (Section R402.4.1)
- ✓ Recessed lighting
- ✓ Fenestration
- ✓ Fireplaces



Air Leakage Control

Section R402.4.1

Building thermal envelope must be sealed

Typical home built today leaks its entire volume of air....

every 3 hours

8 times a day!



Building Thermal Envelope

Section R402.4.1 – Air Leakage

Two options to demonstrate compliance

- ✓ Whole-house pressure test

Air Leakage Rate	Climate Zone	Test Pressure
≤ 5 ACH	1-2	50 Pascals
≤ 3 ACH	3-8	50 Pascals

- By State Amendment, all climate zones test to 5 ACH
- Testing may be by any certified testing- including contractors and sub contractors
- Testing may occur any time after creation of all building envelope penetrations

OR

- ✓ Field verification of items listed in Table R402.4.1.1

Table R402.4.1.1

Component	Criteria
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.
Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.

(partial table- to be discussed in detail by Mitch later in presentation)

Duct Sealing

Section R403.2.2 - Mandatory

✓ Sealing (Mandatory)

- Joints and seams to comply with IMC or IRC
- All ducts, air handlers, and filter boxes to be sealed (*Section R403.2.2*)



• Exceptions

- No additional joint seals required for air-impermeable spray foam product
- Where duct connection is partially inaccessible, 3 screws or rivets to be equally spaced on exposed portion of joint to prevent a hinge effect
- Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures < 2 in. w.c. pressure classification don't require additional closure systems

Duct Tightness Tests

Section R403.2.2

Duct tightness shall be verified by either of the following:

✓ Post construction test

- Total leakage: $\leq 4-10$ cfm/per 100 ft² of conditioned floor area
 - tested at a pressure differential of 0.1 in w.g. (25Pa) across entire system, including manufacturer's air handler enclosure
- All register boots taped or otherwise sealed

✓ Rough-in test

- Total leakage $\leq 4-10$ cfm/per 100 ft² of conditioned floor area
 - tested at a pressure differential of 0.1 in w.g. (25Pa) across roughed-in system, including manufacturer's air handler enclosure
 - all register boots taped or otherwise sealed
 - if air handler not installed at time of test
 - » Total air leakage $\leq 3-7.5$ cfm/per 100 ft²

Exceptions: Duct tightness test is not required if the air handler and all **at least 50% of ducts (measured by length)** are located within building thermal envelope

Building Cavities

Section R403.2.3 - Mandatory

Framing cavities cannot be used as ducts or plenums

The state amendment eliminates plenums in framing cavities--- is a floor joist space considered a plenum or a duct? Intent was to allow panning



Snow Melt System Controls

Section R403.8

Snow- and ice-melting system controls

- ✓ Automatic shutoff when pavement temperature is $> 50^{\circ}\text{F}$ and no precipitation is falling
- ✓ Automatic or manual shutoff when outdoor temperature is $> 40^{\circ}\text{F}$
- ✓ This was in the 2009 Res. IECC- requires sensor in concrete- no manual switches or timers

Pools and In-ground Permanently Installed Spas

Section R403.9

✓ Heaters

- with a readily accessible on-off switch mounted outside heater so heater can be shut off without adjusting thermostat setting
 - fired by natural gas not allowed to have continuously burning pilot lights
- ✓ Time switches (or other control method) to automatically turn off and on heaters and pumps according to a preset schedule installed on all heaters and pumps
- ✓ Note: heaters, pumps, and motors with built-in timers meet the requirement
- Exceptions
 - Public health standards requiring 24-hour pump operation
 - Pumps operating pools with solar-waste-heat recovery heating systems



Lighting Equipment

Section R404.1 - Prescriptive

~~A minimum of 75 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps or 75% of permanently installed lighting fixtures to contain only high efficacy lamps~~

Exception:

~~✓ Low-voltage lighting~~ Deleted by amendment



Additional Utah Comments

- Effective date is July 1, 2014
- Current Versions of REScheck include Utah 2012 Code
 - Specifically modified for the Utah Amendments
- A log wall prescriptive footnote is located in Tables- requires minimum 5” log, 0-31 windows and 90% AFUE furnace
- The definition for CONDITIONED SPACE has been amended to include indirectly conditioned spaces

Thank you for your participation!

- Questions/comments may be addressed to:
 - Brent Ursenbach
 - Salt Lake County
 - bursenbach@slco.org
 - bursenbach@yahoo.com
 - 801-468-2651
 - 801-381-1449

If you would like a copy of this presentation so you can print additional or larger copies, please email your request to one of the above email addresses

New air leakage and duct testing requirements in Utah IECC

Mitch Richardson

Survey & Testing Services

801-301-2017

MitchRichardson@Gmail.com

Homes must be more air tight.

Complete stringent air sealing
checklist along with photo
documentation

OR

Pass a blower door test.

TABLE R402.4.1.1

AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	CRITERIA*
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.
Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Where provided, in lieu of floor insulation, insulation shall be permanently attached to the crawl/space walls. Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated and sealed to dry wall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	Exterior wall adjacent to showers and tubs shall be insulated and the air barrier installed separating them from the showers and tubs.
Electrical/phone box on exterior wall	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.
HVAC register boxes	HVAC register boots that penetrate building thermal envelopes shall be sealed to subfloor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.

*In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

We will refer to this as the prescriptive air sealing checklist.

We will lightly touch on some of the more difficult or expensive requirements that are not typically performed.

A follow up class is probably warranted for those who intend to meet compliance via this method.

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Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Where provided, in lieu of floor insulation, insulating panels shall be permanently attached to the crawlspace walls. Exposed earth in unvented crawl spaces shall be covered with Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts of exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building envelope shall be air tight, IC rated and sealed to dry wall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind wiring.
Shower/tub on exterior wall	Exterior wall adjacent to showers and tubs shall be air sealed with the air barrier installed separating them from the tubs.
Electrical/phone box on exterior wall	The air barrier shall be installed behind electrical and communication boxes or air sealed boxes shall be installed behind boxes.
HVAC register boxes	HVAC register boots that penetrate building thermal envelope shall be sealed to subfloor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls. Fireplace doors shall have gasketed doors.

*In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

Stuffing batts in rim joist cavities will NOT pass.



There are many ways to air seal (air barrier) the rim joists, rigid foam, Caulking, mastic, spray foams, spray latex etc... None are easy or cheap.

This point alone might make 3rd party Blower door test (performance method) the More cost effective option.

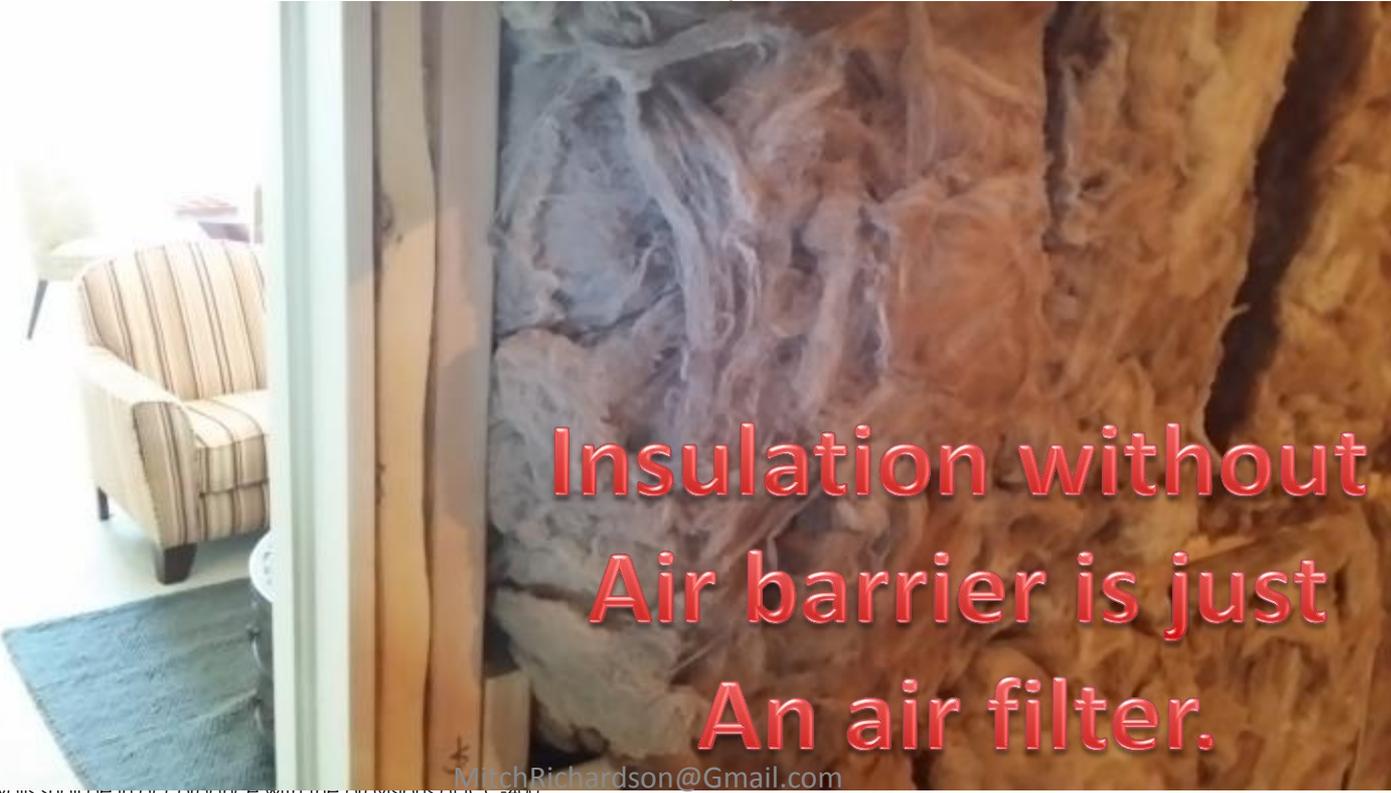
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Windows, skylights and door	The space between window/door jambs and framing and

Attic knee walls must have full Air Barrier on attic side and sealed On all 6 sides.

Knee wall must be full depth. No more trying to 'squeeze' a R-19 batt into a 2x4 attic truss.

- Rim joists
- Floors (including above-garage or cantilevered floors)
- Crawl space walls
- Shafts, penetrations
- Narrow cavities
- Garage separation
- Recessed lighting
- Plumbing and wiring
- Shower/tub on exterior wall
- Electrical/phone box on ext
- HVAC register boxes
- Fireplace



*In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

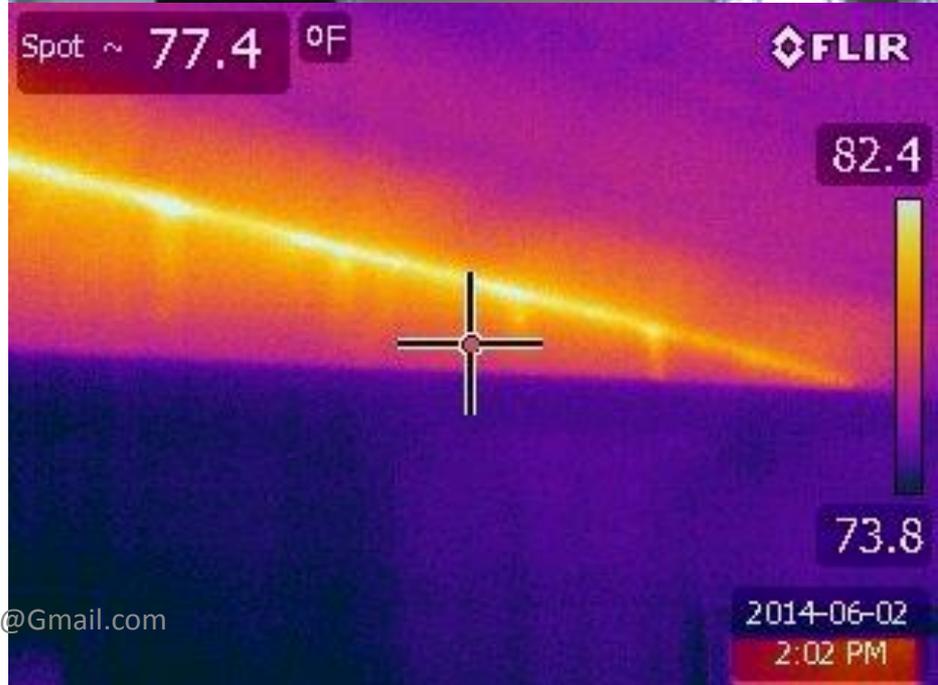
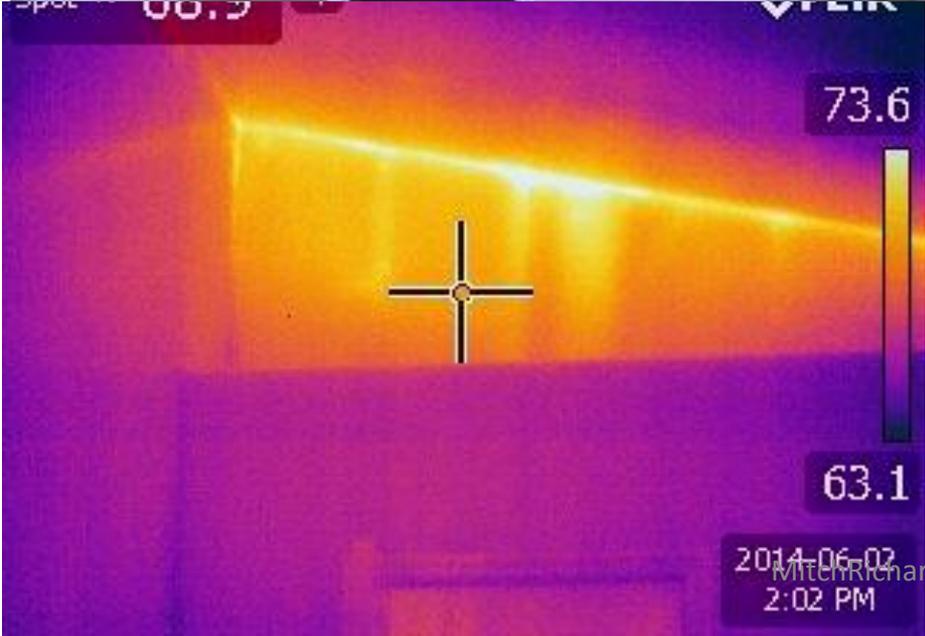
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Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Where provided, in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls. Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated and sealed to dry wall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	Exterior wall adjacent to showers and tubs shall be insulated and the air barrier installed separating them from the showers and tubs.
Electrical/phone box on exterior wall	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.
HVAC register boxes	HVAC register boots that penetrate building thermal envelopes shall be sealed to subfloor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.



Attic access hatches
Must have insulation attached
To the backside. (attached!)

Hatch must have gasket.



*In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

Spot ~ 79.2 °F

FLIR

91.2



76.8

2014-06-02
2:03 PM

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Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.

Either fill entire subfloor cavity (a R-30 batt. Will often do this)
OR must use
Props at manufacturer designated
Intervals. Typically 1 foot to 18 in.

Wire rods are non compliant as
They twist and sag and do not
Maintain permanent contact with
Sub floor.



*In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

AIR BARRIER AND INSULATION INSTALLATION

The sub floor joist area that is shared by interior space and the garage must have a rigid air barrier and be air sealed.

This can be costly if not designed for and discussed with framing crews ahead of time.

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Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts penetrating exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit, or cavities shall be filled with insulation that on installation remains in available cavity space.
Garage separation	Air sealing shall be provided between the conditioned and unconditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building envelope shall be air tight, IC rated and sealed to drywall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around plumbing in exterior walls, or insulation that conforms to available space shall extend to the exterior wiring.
Shower/tub on exterior wall	Exterior wall adjacent to showers and tubs shall have the air barrier installed separating them from the exterior.
Electrical/phone box on exterior wall	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.
HVAC register boxes	HVAC register boots that penetrate building thermal envelopes shall be sealed to subfloor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.



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COMPONENT	CRITERIA*
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.
Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
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IC rated cans must be installed (correctly!) or sealed air boxes must be installed over them.

Sparky must install the cans WITH the gasket on the finish trim piece.

That gasket almost always gets missed.



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Batt insulation must have NO gaps, voids or compressions. NO inset stapling. It must fit in just like it was blown in.



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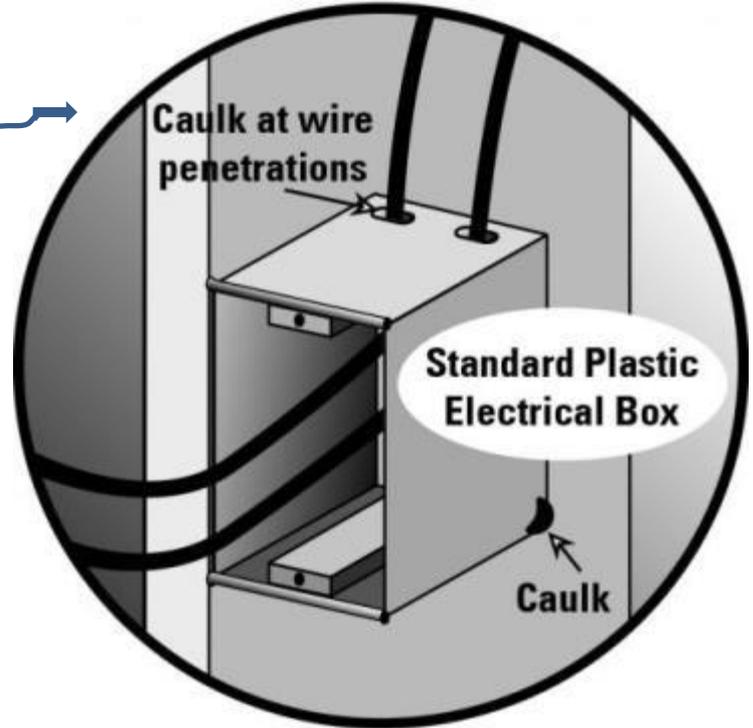
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TABLE R402.4.1.1

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Homes must be more air tight.

Complete huge stringent air sealing
checklist along with photo
documentation

OR

Pass a blower door test.

(if not passing, energy tester can tell you a
couple of improvements that will get you
there instead of the entire monster list.)



Blower Door?

- Depressurize house by 50 pascal (.2 inch of water column)
- Equivalent of 20mph wind.
- Note CFM (cubic feet per minute) of air required to do so.
- CFM is the leakage rate.

ACH calculation for Blower Door.

- Finished square feet x Ceiling Height = Volume
- $(\text{Volume} \times 5) \div 60 = \text{Max CFM allowed}$
- 5 air changes per hour (ACH) is the most you can allow a home to leak.
- In other words... ACH is how many times ALL the air in a home will leak out in one hour.

Air leakage? Big deal?

- 1/3 of your expensive conditioned air is just blowing out of the holes in your house.
- If there is a pressure difference (wind or stack effect) , a temperature difference between outside and in, OR a unbalanced (leaky) duct system, you will have leaks.





DG-700 Pressure & Flow Gauge

DEVICE	CONFIG
BD 3	
- 46.8 ADJ T.C.	1353 C.M.
PR: FL 050	

MODE TIME AVG

- DEVICE
- UNITS
- CONFIG
Cruise
Target
- MODE
- CLEAR
Stop
Fan
- TIME
AVG
- BASE
LINE
- START
Start
Fan
- ENTER
Begin
Cruise
- ON/
OFF
- LIGHT
- HOLD

INPUT
↑
B
↓
REF

The ENERGY
CONSERVATORY
CE

MINNEAPOLIS
LOWER DOOR

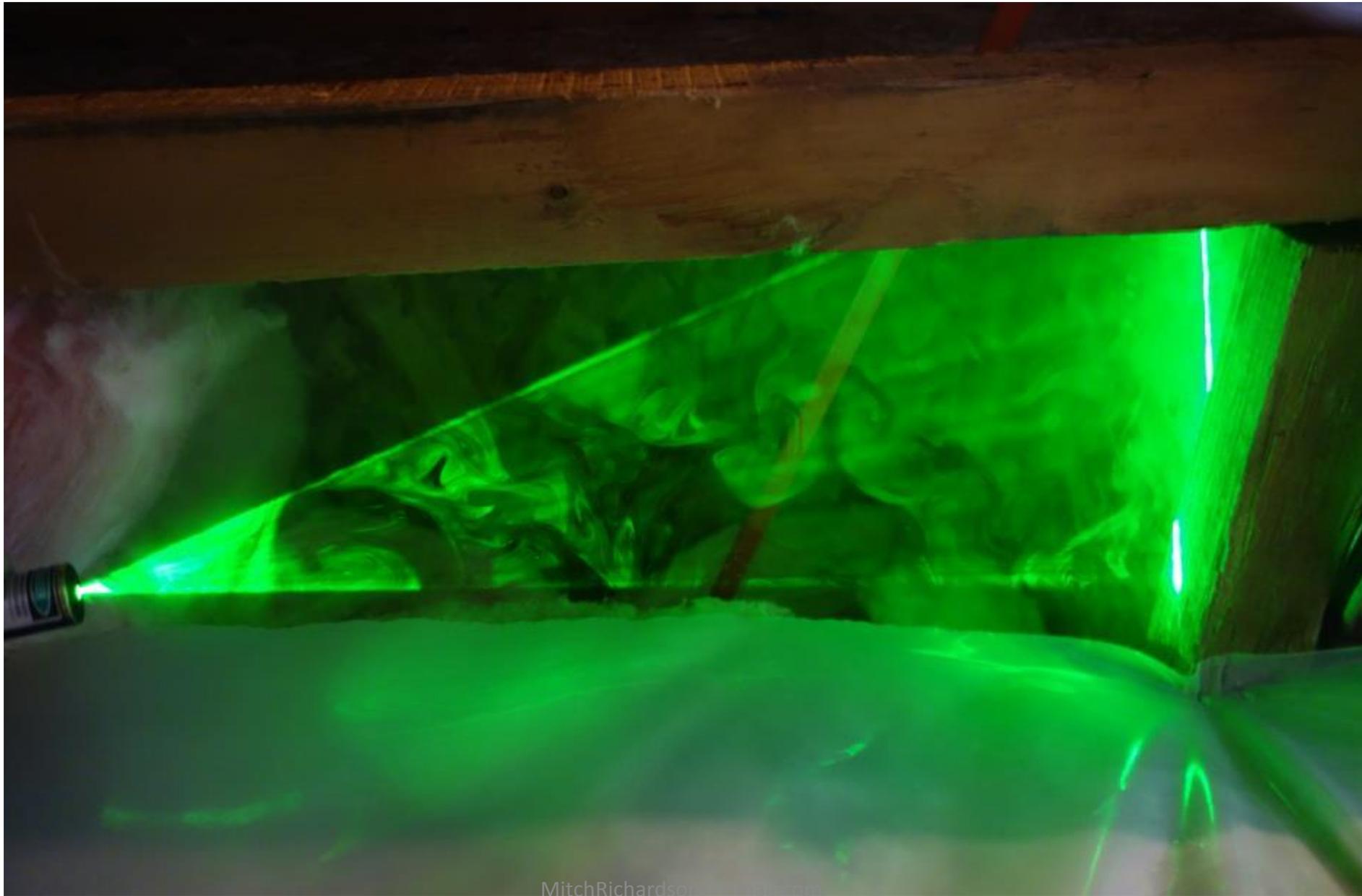
LOW HIGH
OFF







MitchRichardson@Gmail.com

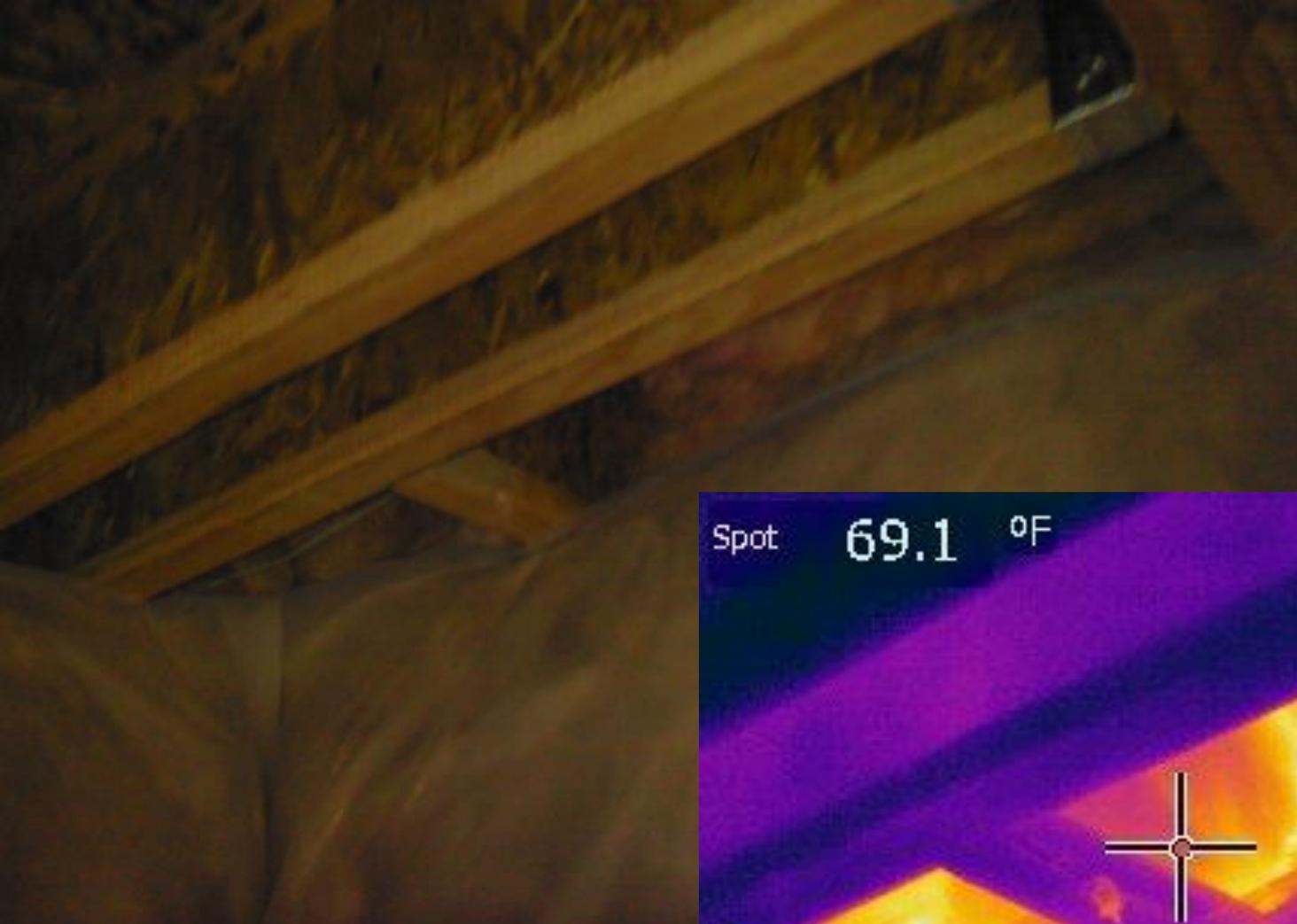




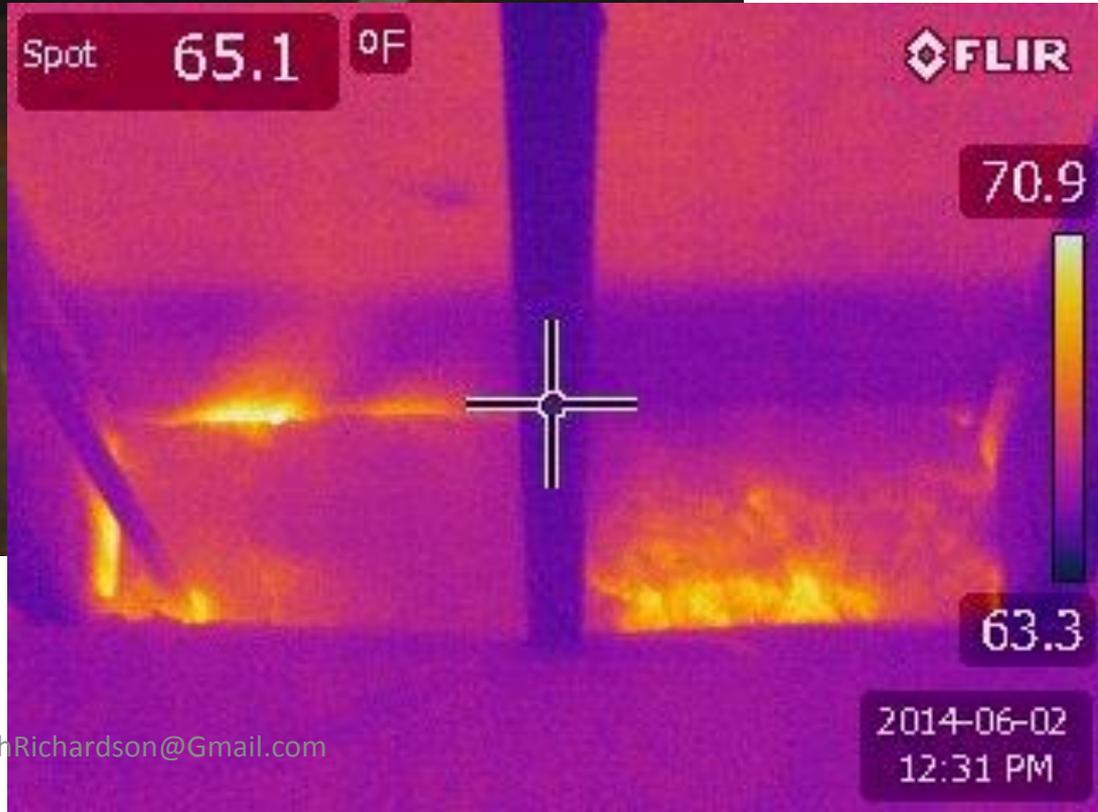
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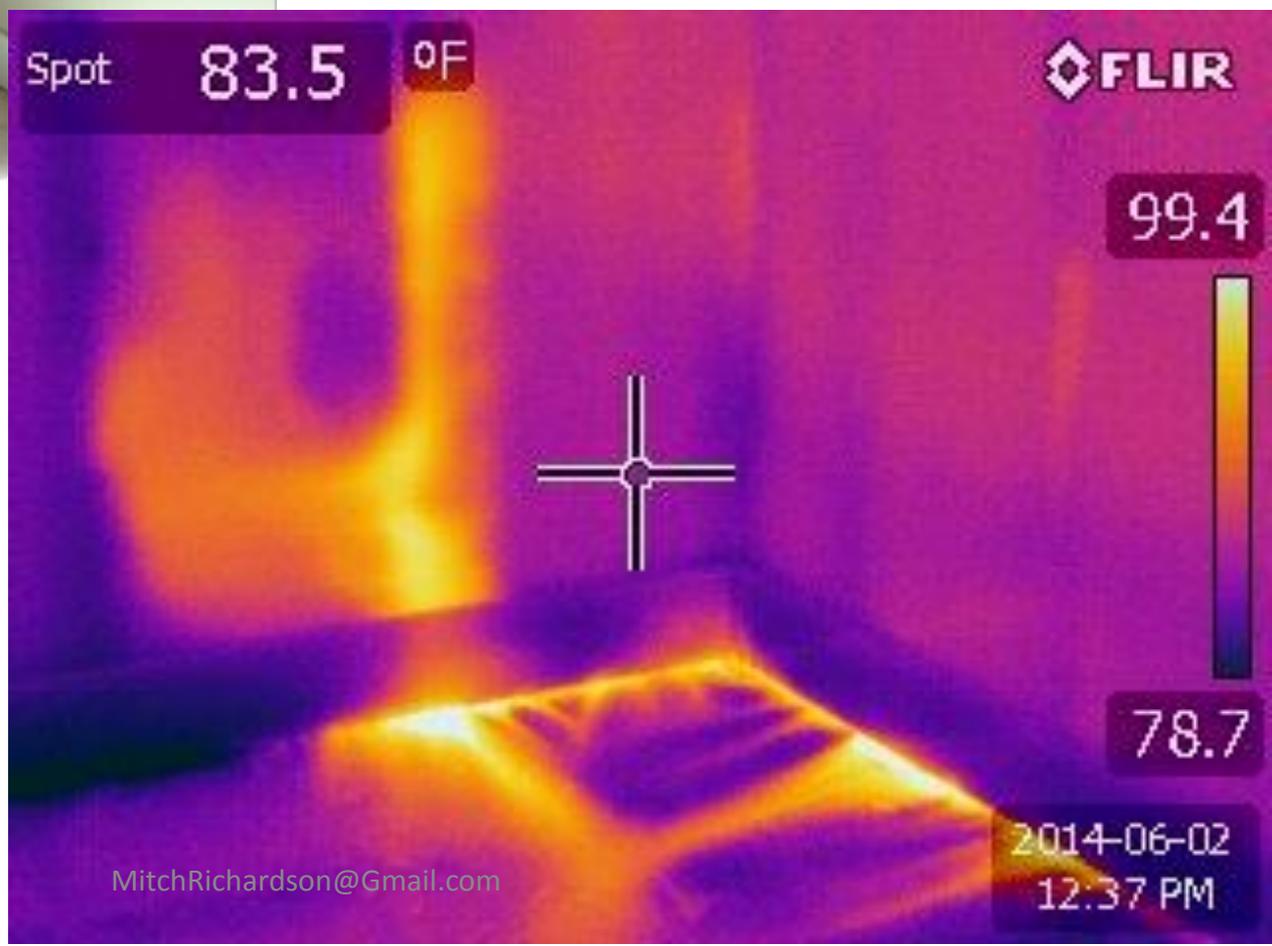


MitchRichardson@Gmail.com



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SPECIAL INSPECTION: Utah's IECC 2012: **BUILDING AIR TIGHTNESS**

Date Tested: 6/10/14

Tested By: Mitch R.

Project: ARFEN

Street Address: 698 Birch St

Unit (Lot): 5

Unit Finished SqFt: 2,000 x ceiling height 9 = Volume 18000

Observed Leakage in CFM: 1450 CFM

For Utah 2012 Compliance this unit must be less than 5 air changes per hour at -50 pascal of blower door pressure.

Calculate the leak limit of this 'home' as follows...

Step 1... (Volume of home 18000 x 5) + 60 = 1,500 Max CFM

Step 2... If the leakage test CFM number is less than the above Max CFM then the 'home' passes

Pass Fail

For Further Verification Contact: Mitch Richardson (801) 739-9933,, SurveyTestingServices@Gmail.com

Survey & Testing Services Inc. 1042 Ft. Union #549, Midvale, UT 84047

Building Science Consulting, Energy Efficiency Testing, Code Compliance Testing, Rebate Inspections & Processing

End Blower Door

- Blower door with 'performance method' compliance is typically the most cost effective way to prove compliance.
- You may have to do additional air sealing measures over what you do now, but you will not have to do all of the measures on the large checklist.
- Energy inspector will help determine which measures would be most cost effective to meet compliance

Who can provide air leakage tests?

- **Section 402.4.1.2 Testing:** “The following parties shall be approved to conduct testing: Parties certified by BPI or RESNET, or licensed contractors who have completed training provided by Blower Door Test equipment manufacturers or other comparable training.”

Duct Tightness test required if...

- Mechanicals outside conditioned space....
furnace is in attic, crawl space, garage
- 50% of duct length for a system is outside conditioned space. -- ducts running through attic. --ducts running through crawl space.



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MitchRichardson@Gmail.com









Why Duct Testing?

- Visual inspection does not work.
- HVAC crew KNEW we were going to test this home. Yet was 38% leaky. 38% of the air going to places it wasn't designed to go.
- Leaks = some rooms too cold, some too hot and lots of wasted energy, fights over thermostats. Comfort problems etc...

Why Duct Testing?

- If a home doesn't pass, we pump disco fog into the duct system to find the leaks.
- After 3 minutes pumping fog into a supposedly sealed system, this is what the basement looked like...

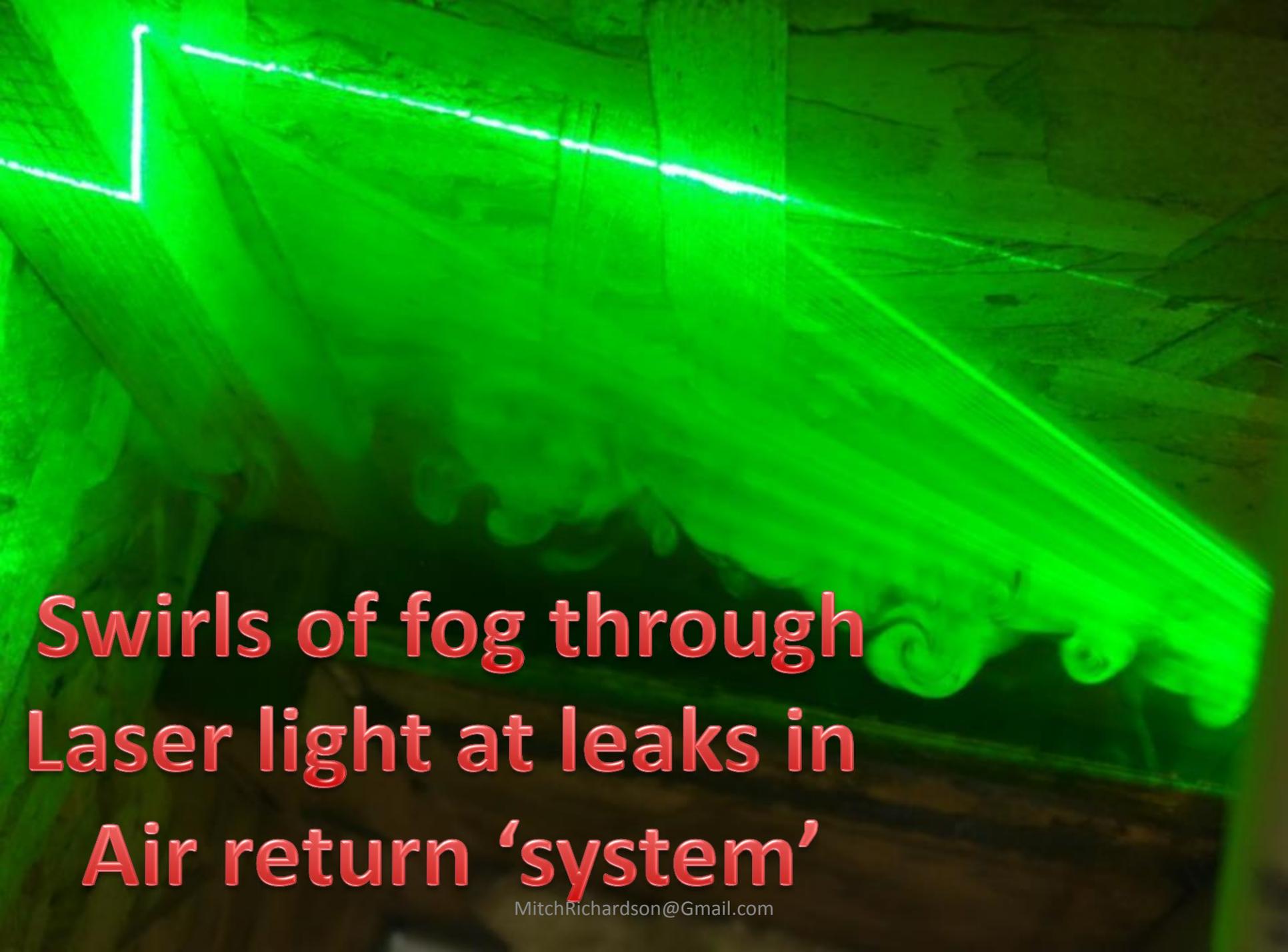


Return air pans are not sealed



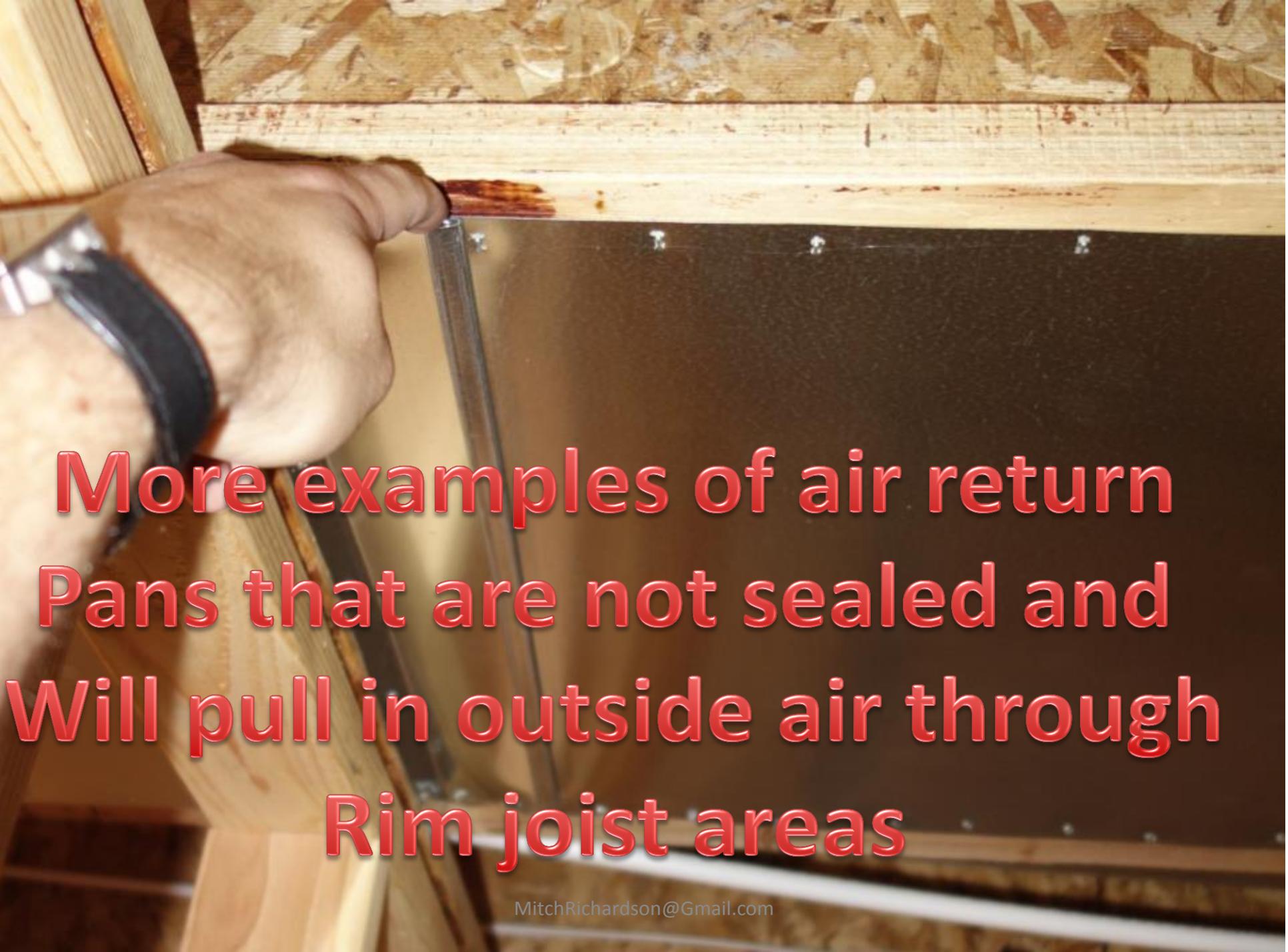


**This air return will pull
Outside air
Right through the rim joist**



**Swirls of fog through
Laser light at leaks in
Air return 'system'**

MitchRichardson@Gmail.com

A close-up photograph showing a person's hand using a metal pry bar to lift a dark metal air return pan. The pan is being pulled away from a wooden rim joist. The background shows the wooden structure of a building's exterior wall and ceiling. The text is overlaid in a large, red, 3D-style font.

**More examples of air return
Pans that are not sealed and
Will pull in outside air through
Rim joist areas**



**Sparky loves to make holes
In the return ducts.**

A close-up photograph of a hand pointing to a seam in a metal surface. The seam is a thin, dark line running horizontally across the frame. The metal surface is highly reflective, showing a distorted reflection of the hand and the background. The background is a textured, brownish surface, possibly a wall or ceiling. The lighting is warm, creating a golden glow. The text is overlaid in the lower half of the image.

**“factory” seams are small but
Very very very long.**



Fog leaking out of 'factory' seam

A close-up photograph of a pipe elbow. The pipe is dark grey or black. A white sealant is being applied to the joint. A blue marker is visible on the pipe, with the text 'PEBBY PIPE' partially legible. The background shows wooden framing and other pipes.

Elbows must also be sealed
On the side you can't see
From the ground 😊

All elbow seams MUST be Sealed in the new code.



SPECIAL INSPECTION (2014 ICC 2012 DUCT AIR TIGHTNESS)

Inspector	_____	Date	_____
Project	_____	Location	_____
Contractor	_____	Inspector's Signature	_____
Inspector's License No.	_____	Inspector's Title	_____

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ICC-ES E-1007-01 BUILDING AIR TIGHTNESS

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Project	_____	Location	_____
Contractor	_____	Inspector's Signature	_____
Inspector's License No.	_____	Inspector's Title	_____

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SPECIAL INSPECTION: UTAHS IECC 2012: DUCT AIR TIGHTNESS

Date Tested: 6/16/14 Tested By: Mitch R.
Project: HIGHLANDS Street Address: 456 OAK ST
Unit (Lot): 017 Unit Finished SqFt: 2,000
Observed Leakage in CFM: 195 Leakage as % of SqFt: 9.75%

For Utah's IECC 2012 Compliance this unit must pass one of the following standards.

-Rough In Test (Test @ 4way, NO Air Handler): Max Leakage 7.5 CFM/100ft ² (7.5% Total Leakage)-----	Pass	Fail
-Rough In Test (Test @ 4way, w/Air Handler): Max Leakage 10 CFM/100ft ² (10% Total Leakage)-----	Pass	Fail
-Post Construction Test (Finished Unit Test): Max leakage 10 CFM/100ft ² (10% Leakage to Outside)---	Pass	Fail

For Further Verification Contact: Mitch Richardson (801) 739-9933,, SurveyTestingServices@Gmail.com

Survey & Testing Services Inc. 1042 Ft. Union #549, Midvale, UT 84047

Building Science Consulting, Energy Efficiency Testing, Code Compliance Testing, Rebate Inspections & Processing

Why Duct Testing?

- Visual inspection is NOT enough.
- If homes where HVAC knew their ducts were going to be tested are failing so miserably. (but visually looked fine)
- Imagine how bad homes are where they know there is not going to be a test.

When Duct Testing?

- Furnace is outside conditioned space (attic, garage, crawlspace, basements without insulation on walls.)
- 50% of length of ductwork for a system is outside conditioned space. (flex ducts in attic, or ducts in crawlspace or unconditioned basement)

3 Ways to Pass UTAH 2012 code.

- Checklist only method (Prescriptive)
- Trade off Method (Total UA + Checklists)
- Performance method. (Section 405)

Performance Method (Section 405)

- Use an energy rater
- Extensive computer modeling (rater performs)
- Testing of home (rater performs)

- This method is the most flexible and is almost always the most cost effective way to comply with code.

Performance Method (Section 405)

- Also useful for utility rebates and tax incentives
- Also useful for internal quality assurance and reduction of liability
- Most production & multi family builders use this method... ... Ivory, Richmond, Garbett, Wasatch, ICO, Castle Creek

Mitch Richardson

- Survey & Testing Services
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- MitchRichardson@Gmail.com
- 1042 Fort Union #549
- Midvale UT 84047

QUESTIONS & DISCUSSION

THANK YOU FOR PARTICIPATING!



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