USGBC ALABAMA

North Alabama – Residential Code Changes
Making the Jump to the 2009 AERC

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USGBC ALABAMA

North Alabama – Residential Code Changes
Making the Jump to the 2009 AERC

Questions are welcome & if I say something you think is "unbelievable"… speak up

Like many things in life - the Code is quite simply **Black** and **White…**

with a whole lot of **Gray** in-between

I will give you my thoughts

You might have your own thoughts

But in the end… the AHJ has the last word

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- Level 2 Infrared Thermographer
- AEE Certified Energy Auditor (CEA)
- ENERGY STAR Partner & Verifier
- EPA Indoor airPLUS Verifier
- DOE's Challenge Home Partner & Verifier
- Serve on Northern Alabama USGBC Leadership Group

http://SLS-Cosntruction.com ~~~ Info@SLS-Construction.com

HTRC: http://blog.SLS-Construction.com or bit.ly/AERC13

Alabama Energy & Residential Code (AERC) ~ History

- Mandated by ARRA 2009 funding (bit.ly/BS4D-EC)
- By Feb. 17th, 2017 ALL States must be at 2012 IECC levels
- Then within 2 years of newest code(s) being "approved" each state must match or beat that code

- March 9th, 2010 – Act 2010-185 was signed into law creating a Statewide Energy & Residential Building Board
- May 10th, 2012 – the board approved a statewide AERC
- Oct. 1st, 2012 – All new Commercial projects had to meet 2009 IECC
- Oct. 1st, 2012 – All new Residential & certain renovations had to be built to the 2009 IRC & IECC with some caveats
- July 1st, 2013 – Duct testing & envelope leakage testing / checklist is mandatory

Some of the AERC issues…

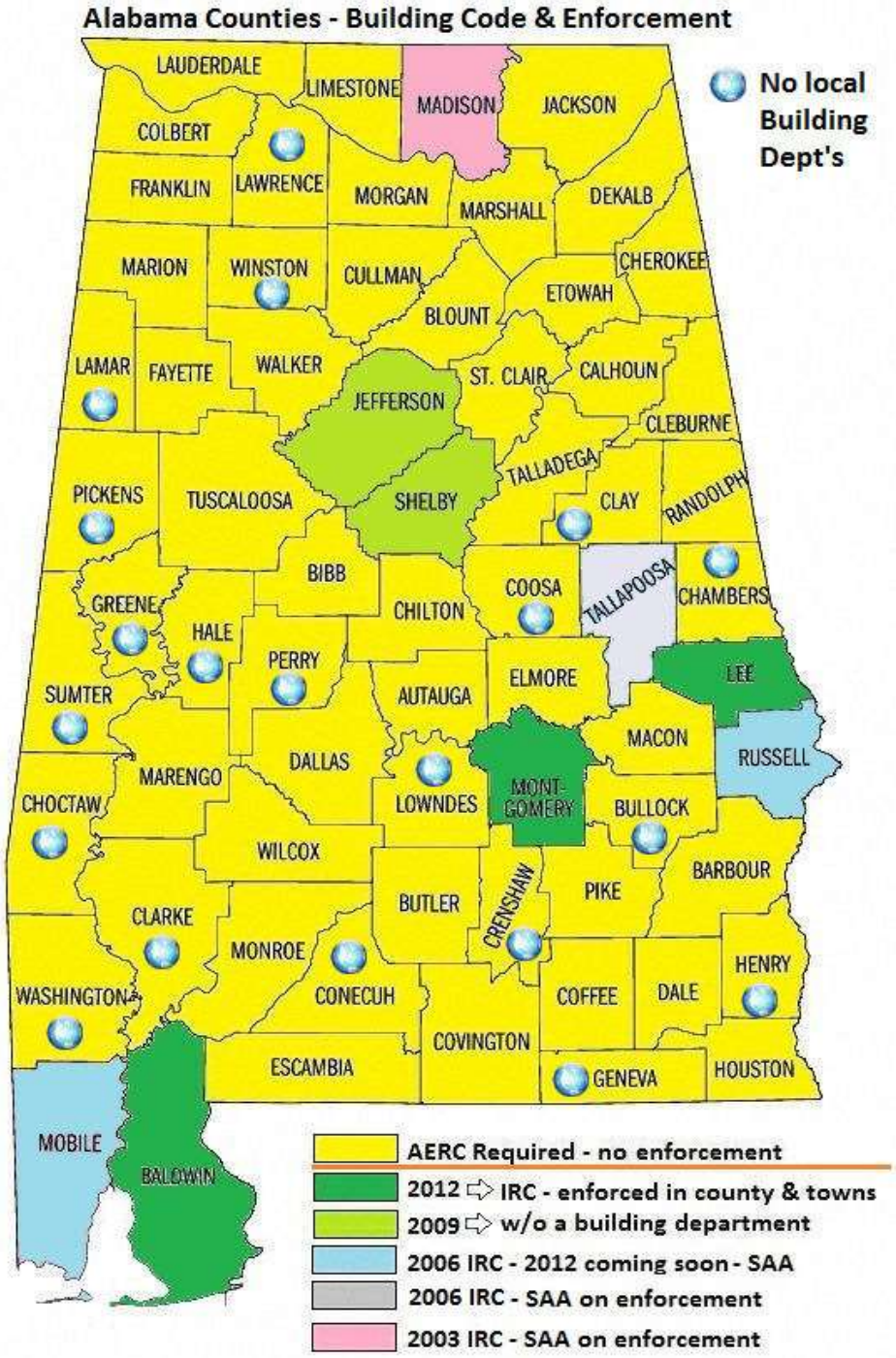
2010-185 only gave the Board the authority to create a mandatory code. The legislation **did not** give them the authority to enforce the code, force its adoption, or provide for arbitration.

The enforcement & adoption of the codes simply falls on the AHJ & the applicable boards (Home Builders, Plumbing, Electric, HAC)

As of March 2010, any AHJ deciding to start their own building department or wishing to modify their codes cannot adopt any other code besides the AERC (which wasn't released till July 2012).

However if any AHJ had an existing "building" code in place before March 2010 – well they are good to go as long as they basically adopt the Energy Chapter… but as no one can force them…

Welcome to a legal quagmire rife with possible grant issues for localities, contractor vs. board vs. homeowner lawsuits (with classes already being held on how to sue)



Building Code's Adopted

117 Jurisdictions with Building Departments & Inspectors

- 3 – other (IBC & SBC)
- 2 – 1997 IRC
- 2 – 2000 IRC
- 15 – 2003 IRC
- 32 – 2006 IRC
- 35 – 2009 IRC / AERC
- 13 – 2012 IRC (6 more planning)
- 15 - unknown

As of February 6th

bit.ly/AlaBldgCode

Energy Code's Adopted

Remember 117 AHJ were supposed to be at least on 2009 IECC code 5 months ago…

- 2 – 2003
- 6 – 2006
- 37 – 2009 / AERC (not all adopted)
- 8 – 2012

- 13 more are pushing for July
- 15 said NO PLANS or No Way
- Rest vary from 6+ months, a year, 2015, to unknown (36)

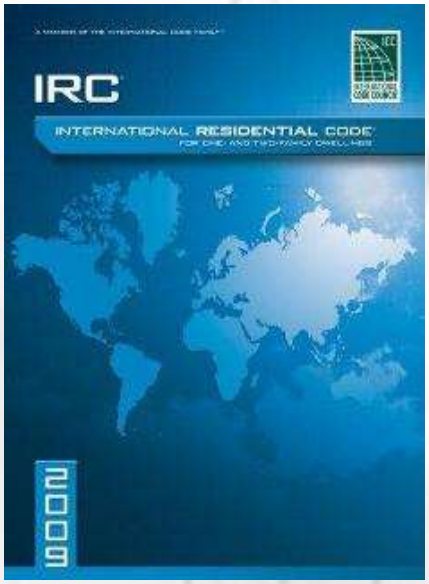
As of February 6th

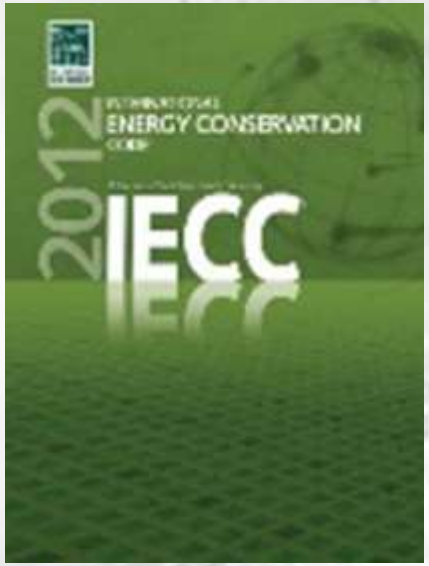
bit.ly/AlaEnergyCode

North Alabama Building & Energy Code Status

County	Location	IRC	IECC	Duct Test Req.	Leakage Vrs.	Remodel req?
Colbert	Muscle Shoals	2003	NA	No Plans		
Colbert	Sheffield	2003	NA	Still Working Out		
Elmore	Millbrook	2006	2006	Still Working Out		
Jackson	Scottsboro	2003	2003	Still Working Out		
Lauderdale	Florence	2003	NA	2014?		
Limestone	Athens	2009		Can't return calls?		
Madison	Huntsville	2003	-	Spring for AERC?		
Madison	Madison	2006	2009	July 1st	Alabama	Debating
Madison County		2003	2009	July 1st	Alabama	Sub. Change
Marshall	Albertville	2006	NA	No Plans		
Marshall	Arab	IBC 08	NA	No Plans		
Marshall	Boaz	2006	NA	+6 Months???		
Marshall	Guntersville	2006	-	+6 Months???		
Morgan	Decatur	2009	2009	Oct 2012	Alabama	50% +
Morgan	Hartselle	2009	-	March for AERC?		

Key differences between Building & Energy Code





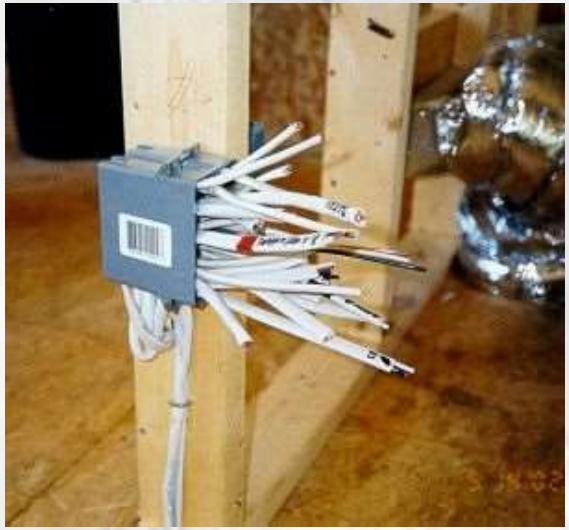
Both are quite simply a set of minimum set of standards that must be met when building or renovating a building. - AKA the **least amount you can do without going to jail**

Building Codes	Energy Codes
Prescriptive Based	**Performance** based
Based on **wind, radon, snow, seismic zones**	Based on **Climate Zones**
Safeguard public safety, health and general welfare…	This code shall regulate the design and construction of buildings for the **effective use of energy**…
Generally driven by known issues or problems (i.e. deck failures in 03 led to 06 changes, hurricanes led to…)	By 2030 the ICC, AIA, and numerous other organizations are pushing for net-zero usage (2009 - 15% better, 2012 – 30%, etc…)
bit.ly/BS4D-BC	bit.ly/BS4D-EC

Alabama Specific Changes

- The programmable thermostat section was deleted as they “were too confusing” for some people & the “HAC” contractors were up in arms on having to go back every two weeks to reset them…
- R313 Automatic Fire Sprinklers: No AHJ may require them nor can they ban them if a homeowner wants them installed
- Residential pool section, heaters & covers was deleted (however as pools are considered “commercial” here & handled by that board the deletion is meaningless)
- Foundation & slab insulation is not required – termites
  - However using fiberglass or similar product for the floor area in crawl spaces is mandated…

Specialty Trades & Codes



These 4 pictures are courtesy of Energy Vanguard
My RESNET QA Provider
EnergyVanguard.com

Specialty Codes: Masonry

I am not aware of too many modifications in this section

If you build fireplaces & chimneys be sure to check up on the minimum thickness, parging, & lining requirements

House framing may no longer be anchored to regular block foundations unless they are solidly grouted (R403.1)

Biggest issues I see are anchoring & blocked weep holes / drainage plane --- bit.ly/SpecTrades

Builders you only have one shot to get things right & that is before the brick goes up

Speciality Codes: Mechanical

Lots of changes:

- At no time may a unit supplying air to a living space supply air to or get return air from a garage – M1601 (best to keep everything out of the garage)

- Appliance Access – be aware where you are placing items in attics or basements, there are new minimums on space requirements - M1305

- No more dumping into attics – stoves, baths, etc… must vent outside (M1503, 7)

- Range hoods must have makeup air provided if the unit is capable of removing 400 CFM or more of air (M1503)

- Gas piping shall not penetrate building foundation walls at any point below grade, nor be installed in or through a ducted supply, return or exhaust, clothes chute, chimney or gas vent. (Foundation part gets switched back in 12/15 code)

Dryer Vents (M1502)

bit.ly/DryerVent

Alabama code allows for 35’ - Transition 8’ or less

4” smooth metal only

Elbows = count as 5’ unless extended radius types are used

A placard is required within 6’ of the dryer exhaust

If a space is provided for a dryer (i.e. you mark a laundry area on the plans or install wiring / gas for one) the venting must be installed, capped & marked “for future use”.

Oh & at no time should you use gutter downspouts nor dump the exhaust into the attic, crawl space, etc…

Manual E First Edition

Powered by Eyeball

Instructions:

1. Stand directly in front of the main entrance door 103 ft. away. (watch for cars)
2. Close your left eye and hold the sheet exactly 12 inches from your right eye. (if the house is blurred, try using chart before your cocktail lunch or visit an optometrist)
3. View the house by looking thru each opening.
4. When the entire house is visible and you cannot see the neighbors in the yard next door staring at you, you have found the correct size.

Warning!

- Must do a Manual J, S, T & D per the codes & the HAC Board
- If you really want a rule of thumb…
  - 1 ton per 800+ SF is avg. for 2009 codes
  - Really well built houses are easily hitting 1200 - 1500 SF per ton

Duct Leakage

There are currently 3 testing "standards"

- Alabama aka 2009 IECC 4/6/8/12
- Hoover – provide Manual D /airflow test
- 2012 IECC 4% flat

With the exception of Hoover – this is a simple percentage test based on Conditioned Floor Area

All registers & returns are sealed with the whole system being pressurized to 25 Pa

Don't want to test – bring it in conditioned space (if you foam – need ERV / HRV)

Sample Report

Alabama Duct Leakage Chart ~ N1103.2.2 ---- Courtesy of AlaGBS.com (256) 352-7235

SF	Max	CFM	SF	Max	CFM	SF	Max	CFM	SF	Max	CFM
400	12%	48	400	8%	32	400	6%	24	400	4%	16
450	12%	54	450	8%	36	450	6%	27	450	4%	18
500	12%	60	500	8%	40	500	6%	30	500	4%	20
550	12%	66	550	8%	44	550	6%	33	550	4%	22
600	12%	72	600	8%	48	600	6%	36	600	4%	24
650	12%	78	650	8%	52	650	6%	39	650	4%	26
700	12%	84	700	8%	56	700	6%	42	700	4%	28
750	12%	90	750	8%	60	750	6%	45	750	4%	30
800	12%	96	800	8%	64	800	6%	48	800	4%	32
850	12%	102	850	8%	68	850	6%	51	850	4%	34
900	12%	108	900	8%	72	900	6%	54	900	4%	36
950	12%	114	950	8%	76	950	6%	57	950	4%	38
1000	12%	120	1000	8%	80	1000	6%	60	1000	4%	40
1050	12%	126	1050	8%	84	1050	6%	63	1050	4%	42
1100	12%	132	1100	8%	88	1100	6%	66	1100	4%	44
1150	12%	138	1150	8%	92	1150	6%	69	1150	4%	46
1200	12%	144	1200	8%	96	1200	6%	72	1200	4%	48
1250	12%	150	1250	8%	100	1250	6%	75	1250	4%	50
1300	12%	156	1300	8%	104	1300	6%	78	1300	4%	52
1350	12%	162	1350	8%	108	1350	6%	81	1350	4%	54
1400	12%	168	1400	8%	112	1400	6%	84	1400	4%	56
1450	12%	174	1450	8%	116	1450	6%	87	1450	4%	58
1500	12%	180	1500	8%	120	1500	6%	90	1500	4%	60
1550	12%	186	1550	8%	124	1550	6%	93	1550	4%	62
1600	12%	192	1600	8%	128	1600	6%	96	1600	4%	64
1650	12%	198	1650	8%	132	1650	6%	99	1650	4%	66
1700	12%	204	1700	8%	136	1700	6%	102	1700	4%	68
1750	12%	210	1750	8%	140	1750	6%	105	1750	4%	70
1800	12%	216	1800	8%	144	1800	6%	108	1800	4%	72
1850	12%	222	1850	8%	148	1850	6%	111	1850	4%	74
1900	12%	228	1900	8%	152	1900	6%	114	1900	4%	76
1950	12%	234	1950	8%	156	1950	6%	117	1950	4%	78
2000	12%	240	2000	8%	160	2000	6%	120	2000	4%	80
2050	12%	246	2050	8%	164	2050	6%	123	2050	4%	82
2100	12%	252	2100	8%	168	2100	6%	126	2100	4%	84
2150	12%	258	2150	8%	172	2150	6%	129	2150	4%	86
2200	12%	264	2200	8%	176	2200	6%	132	2200	4%	88
2250	12%	270	2250	8%	180	2250	6%	135	2250	4%	90
2300	12%	276	2300	8%	184	2300	6%	138	2300	4%	92
2350	12%	282	2350	8%	188	2350	6%	141	2350	4%	94

SF	Max	CFM	SF	Max	CFM	SF	Max	CFM	SF	Max	CFM
2400	12%	288	2400	8%	192	2400	6%	144	2400	4%	96
2450	12%	294	2450	8%	196	2450	6%	147	2450	4%	98
2500	12%	300	2500	8%	200	2500	6%	150	2500	4%	100
2600	12%	312	2600	8%	208	2600	6%	156	2600	4%	104
2700	12%	324	2700	8%	216	2700	6%	162	2700	4%	108
2800	12%	336	2800	8%	224	2800	6%	168	2800	4%	112
2900	12%	348	2900	8%	232	2900	6%	174	2900	4%	116
3000	12%	360	3000	8%	240	3000	6%	180	3000	4%	120
3100	12%	372	3100	8%	248	3100	6%	186	3100	4%	124
3200	12%	384	3200	8%	256	3200	6%	192	3200	4%	128
3300	12%	396	3300	8%	264	3300	6%	198	3300	4%	132
3400	12%	408	3400	8%	272	3400	6%	204	3400	4%	136
3500	12%	420	3500	8%	280	3500	6%	210	3500	4%	140
3600	12%	432	3600	8%	288	3600	6%	216	3600	4%	144
3700	12%	444	3700	8%	296	3700	6%	222	3700	4%	148
3800	12%	456	3800	8%	304	3800	6%	228	3800	4%	152
3900	12%	468	3900	8%	312	3900	6%	234	3900	4%	156
4000	12%	480	4000	8%	320	4000	6%	240	4000	4%	160
4100	12%	492	4100	8%	328	4100	6%	246	4100	4%	164
4200	12%	504	4200	8%	336	4200	6%	252	4200	4%	168
4300	12%	516	4300	8%	344	4300	6%	258	4300	4%	172
4400	12%	528	4400	8%	352	4400	6%	264	4400	4%	176
4500	12%	540	4500	8%	360	4500	6%	270	4500	4%	180
4600	12%	552	4600	8%	368	4600	6%	276	4600	4%	184
4700	12%	564	4700	8%	376	4700	6%	282	4700	4%	188
4800	12%	576	4800	8%	384	4800	6%	288	4800	4%	192
4900	12%	588	4900	8%	392	4900	6%	294	4900	4%	196
5000	12%	600	5000	8%	400	5000	6%	300	5000	4%	200

Alabama Duct Leakage Chart:

Select Conditioned Square Footage Area (length X width based on outside wall meas.)

Select correct % based on IECC test being performed

4% - IECC 2012 (all tests) --- *2009 IECC only Rough in no AH installed

6% - 2009 IECC Rough In Test (AH & all ducts installed - pre drywall)

8% - 2009 IECC Duct Leakage to Outside (done with blower door at final)

12% - 2009 IECC Total Duct Leakage done at final

* Most AHJ do not allow this test, nor will we perform this test

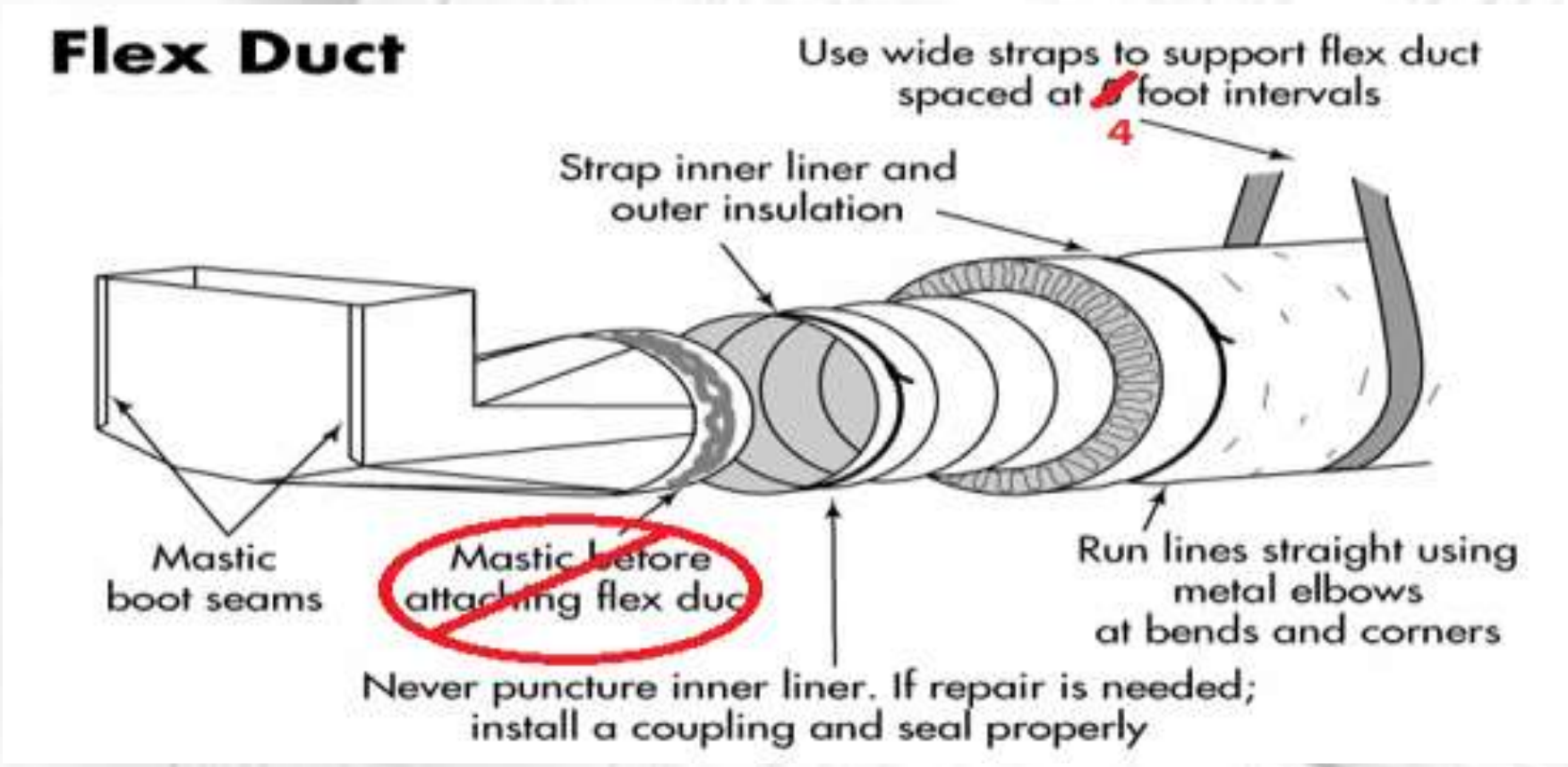
The 6% & 12% are the most common ones - only 1 test is required not both

bit.ly/DuctLeakChart

While Duct tape has a 1001 uses, using it on ducts is not one of them…

2009 IRC – N1103.2.2 Sealing. Ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section M1601.4

M1601.4.1 Joints and seams. Joints of duct systems shall be made substantially airtight by means of tapes, mastics… shall comply with UL181A and shall be marked 181A-P for pressure-sensitive tape, 181A-M for mastic or 181 A-H for heat-sensitive tape… or 181B and shall be marked 181B-FX for pressure-sensitive tape or 181B-M for mastic. bit.ly/DuctSeal



Use Tensioner & preferably 2 tie straps

Boot to floor transition needs to be sealed

Don’t forget the seams on the boots

bit.ly/DuctSeal

Metal Ducts & Other Common Issues

- Mastic is considered superior, when installed properly
  - WX crews like the term thick as a nickel
- Tape is generally cleaner & works fine when installed properly
  - One can run into issues on elbows (expansion & tightness)
- Metal fittings must be screwed together unless using snap fittings
- If there is a seam it needs to be sealed – remember this is a % test so those 2 or 3 CFM's here or there add up
- Plenums – especially the hidden or hard to get spots – big issues
- Air Handlers – cheaper means more leaks, install all gaskets, make sure water in condensate drain line, seal around penetrations

bit.ly/DuctSeal

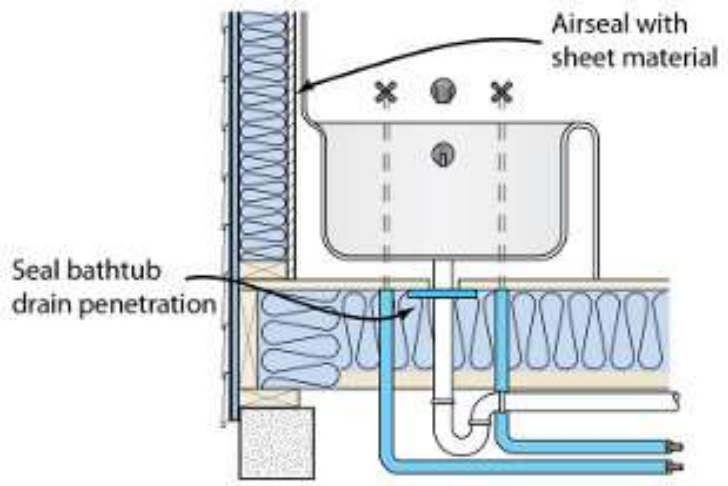
Specialty Codes: Plumbing

Lots of changes:

- 1102 – all penetrations must be sealed
- P2904 – Mandatory fire sprinklers section deleted
- P2902 – Back flow devices now required
- Tubs & showers temperature limited to 120° (2708 & 13)
- No water, soil, or waste vent shall be installed outside, in an exterior wall, an attic or vented crawlspace without adequate provisions to prevent freezing & the pipes must be buried a minimum of 12” deep &/or 6” below the frost line (P2603.6)
- P2603 - Structural & Piping protection – the pro framer/ anti-sawzall act
- P2503 – 15 minute shower pan liner test required

Before you set that tub or shower…

1102.4 requires one to insulate & air seal before you set them



Closed Cell Foam Froth Pack - $$$
CC Foam is an air barrier & insulator

Rigid foam board sheathing which is also CC Foam – less money & fuss

No you are not always stuck with this… Besides what are the chances your insulator & drywall guy want to come out for something this small?

Building Codes: Electrical --- bit.ly/SpecTrades

- 1102.4 – all penetrations must be sealed
- AFCI, GFCI & tamper resistant outlets now required (E3902)
  - GFCI = bathrooms, garages, accessory buildings, outdoor outlets, crawl space, unfinished basement, kitchen, laundry, utility, bar sink, electric radiant floors, and boathouse / boat hoist circuits
  - Arc-Fault = family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways and similar rooms or areas
  - Tamper resistant = every outlet (E4002.14)
- 50% of all light fixtures/bulbs must meet ENERGY STAR standards (75% for 2012 & 100 “bulbs” in 2015)
- For remodels - if a permit is pulled the smoke detectors must be brought up to code & a carbon monoxide alarm installed if the garage is attached or there is a fuel burning appliance inside.
- Shared neutrals / grounds = issues /// Test each outlet

Electrical Outlet Locations – E3901

- Basically all rooms should have an outlet within 6’ (so maximum spacing is every 12’) of wall space
- Kitchen Wall & islands – countertop area: any wall section larger than 12” shall have a an outlet with a maximum spacing in between them no greater than 4’
- Appliances – a receptacle shall not be located no more than 6’ away
- Bathrooms – at least one outlet must be located within 3’ of a lavatory edge
- Laundry Room – at least one
- Outdoors – at the front of the house, at the back & at each entrance &/or exit which includes balconies, decks, porches (20 SF & larger)
- Hallways – at least one if it is 10 feet or longer
- Garages & Unfinished basement or sections of unfinished basement – at least one per area
- HVAC units – at least 1 shall be located within 25’ of the unit at the same level (i.e. in an attic or crawl space you must have one there)

Electrical Branch Circuit – E3703

- Kitchen: A minimum of 2 (20 amp) GFCI rated circuits which can include other related kitchen, pantry, dining room or refrigeration appliances – Word to the wise, the refrigerator should be on its own circuit
- Laundry: 1 - 20 amp GFCI circuit for only receptacles in the laundry room
- Single Bath only: 1 - 20 amp GFCI circuit which can power the lights & all outlets in the bath
- Multiple baths: 1 - 20 amp GFCI circuit may be used for multiple baths (dependent on load calcs) but may not feed any other outlets or lights
- **No more than** 15 devices on a 15 amp breaker or 20 on a 20 amp breaker – the remainder of circuits required is based on calculated load

From Paperwork to the finishes…

Chapter 1: Admin --- bit.ly/IRC-09a

- R105.2 Work Exempt from Permit: in 2006 they lowered the "detached" building size to 120 SF – it is now back at 200 SF

- R105.9 Preliminary inspection: "Before issuing a permit, the building official is authorized to examine or cause to be examined buildings, structures and sites for which an application has been filed"

- R106 Construction Documents: expect many AHJ's to start requiring full manual J & D's, possible wall bracing details, etc…

Chapter 2: Definitions

There are numerous changes, additions & clarifications; but the one to watch out for is “Attic, Habitable”

ATTIC, HABITABLE. A finished or unfinished area, not considered a *story*, complying with all of the following requirements:

1. The occupiable floor area is at least 70 square feet, in accordance with Section R304,

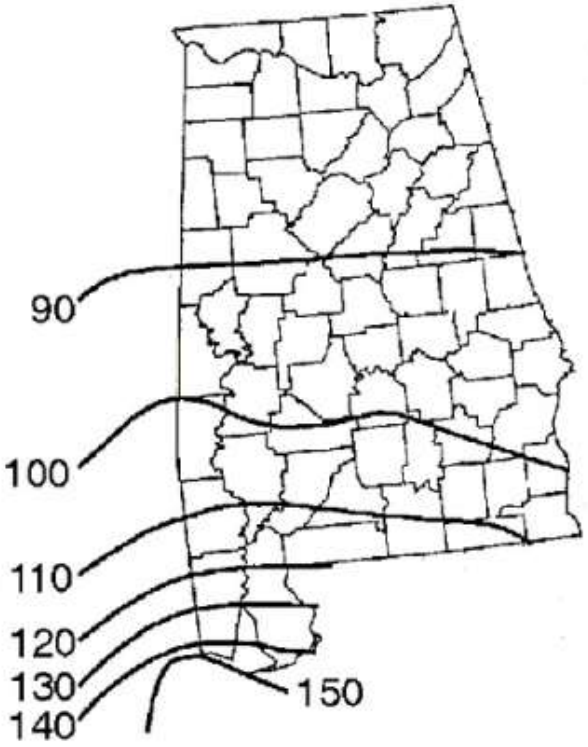
2. The occupiable floor area has a ceiling height in accordance with Section R305,

3. The occupiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides and the floor-ceiling assembly below.

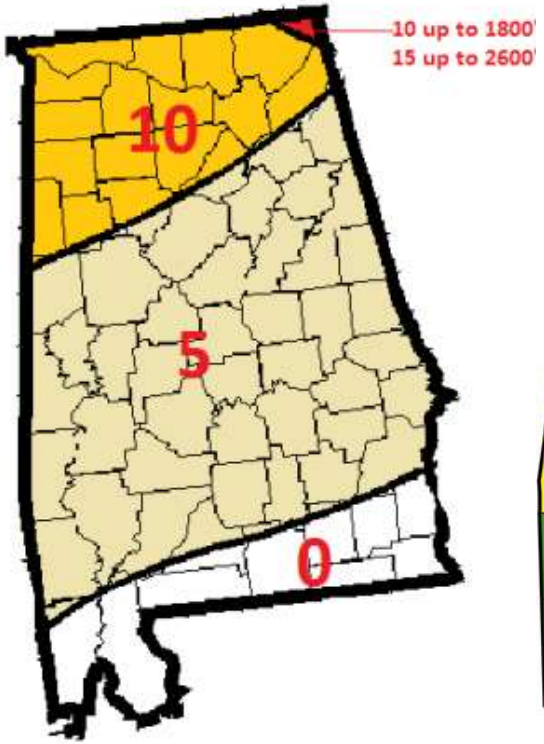
Why, because it will require an emergency egress method, smoke alarm… & you need to add 30# live load to calcs (R301.5)

Chapter 3: Planning --- bit.ly/IRC-09a

No matter where we are, we got snow loads, wind & radon to consider



R301.2(4) Basic Wind Speed



R301.2(5) Ground snow load

- R305 Ceiling Height
  - Habitable basements are now 7’ with no exceptions
  - Uninhabitable basements must be at least 6’ 8” with beams & ducts allowed to extend down only to 6’ 4” (or it is considered a crawl space)

Windows, Doors, & Stairs

- R308 Glazing: (aka Fenestration) has been completely reorganized & simplified – whatever you do, **do not remove those labels** especially where tempered or safety glass is required
- R310 Emergency Escape & Rescue Openings: Basements (Unless less than 200 SF & it only contains mechanicals), Habitable attics, and all sleeping areas must have a means of egress which does not require one to pass through a garage
- R311.3 Floors and Landings at Doors: exterior balconies that are less than 60 SF & only accessible from that door do not require a 36” landing
- R311.4 Vertical egress required for “Habitable Attic”
- R311.7 Stairways: They eased this up - maximum 3/8” difference
  - **Graspable handrails are now required on decks, etc…**
  - bit.ly/StairCodes

Fire & Safety

- R302 Fire-Resistant Construction: this is a new section that encompasses many of the items that used to be scattered throughout the codes.
  - Attached garages are required to have fire rated protection (Inc. the door)
- R314 Smoke Alarms: All devices must be interconnected
  - Located in “each” sleeping area, outside each sleeping area, on each floor, in the basement & in a habitable attic
- R315 Carbon Monoxide Alarms: They are now required if there is any fuel burning appliance located in the house or if the garage is attached.
- 316 Foam Plastic: If you are installing foam for insulation you should definitely read & understand this section

Chapter 3 - Additional "Protections"

- R317 Protection of Wood…: Basically covers where PT wood needs to be used
  - To avoid in crawlspaces needs to be at least 18" to the bottom of joists & 12" to any girders
  - If you are using PT wood you must use either Stainless Steel or Galvanized fasteners
- R318 Protection against Subterranean Termites:
  - This requires retreating any cut PT ends or notches, using chemicals, etc…
  - As for the foam inspection channels, using a termite shield with either a bait system or chemical spray specifically eliminates need for one
- R319 Site Address: if the house is visible from the street it must have 4" high numbers identifying it that stands out from the background
- R322 Flood-resistant Construction: if you are building or remodeling in a flood plain, you need to review this section
- R323 Storm Shelters: "In addition to other applicable requirements in this code (pulling a permit, getting inspected, etc…) storm shelters shall be constructed in accordance with ICC/NSSA-500"

Chapter 4: Foundations

- R401.3 Drainage: From the foundation wall out to 10’ the ground must drop by 6” at minimum
- R401.4 Soils tests: Expect to see more soils tests out in the county areas where there is insufficient data or if areas nearby have been found to have a bearing capacity less than 1500 psf.
- R408 Under-floor Ventilation: aka the crawlspace section
  - For vented crawls – 1 SF of net opening is required for every 1500 sf **IF** a Class I Vapor Retarder is installed (properly). Failure to do that drops it to 1/150. Seeing we live in a humid climate the less venting the better.
  - Ventilation openings must have a screening material with opening not greater than ¼” to prevent rodents.
  - **Debris must be cleared out**
  - Opening required – no mech. equipment = 16 x 24 minimum /// if yes = 24x24 or largest piece of equipment

408.3: Sealed Crawls

Woo hoo it is now listed in the code books - now whether certain locals drop the required “engineered” requirement…

- This requires a properly installed Class I vapor retarder (taped)
- Insulated walls per the IECC (R5 continuous)

AND

- Either a continuous exhaust fan (1 CF per 50 SF of floor)
- Or a supply & return line for the HVAC unit (also 1 per 50)

Consider going with ICF’s instead of block

Termite Shields

While one can get a “Battic” door, a door opening up from inside the house would be better – you can choose both or just 1

Air Leakage & ACH

- Per AERC (1102.4.2) you must either be below 7 ACH (Air Changes per Hour) **or verify "tightness" via a checklist**
  - Most tested average around 5 now
- 2012 IECC gets tougher
  - CZ 2 (Mobile & Baldwin) = 5 ACH
  - **CZ 3 (rest of the state) = 3 ACH**

ACH = CFM of air required @ 50 Pa

Take CFM x 60 & divide by total volume of conditioned space

So a 2000 SF house with 8' ceilings = 16,000

496 x 60 = 29760 / 16000 = 1.86 ACH (exceeds ENERGY STAR (6 & 5) but not Passive Haus @ .6)

bit.ly/ach50

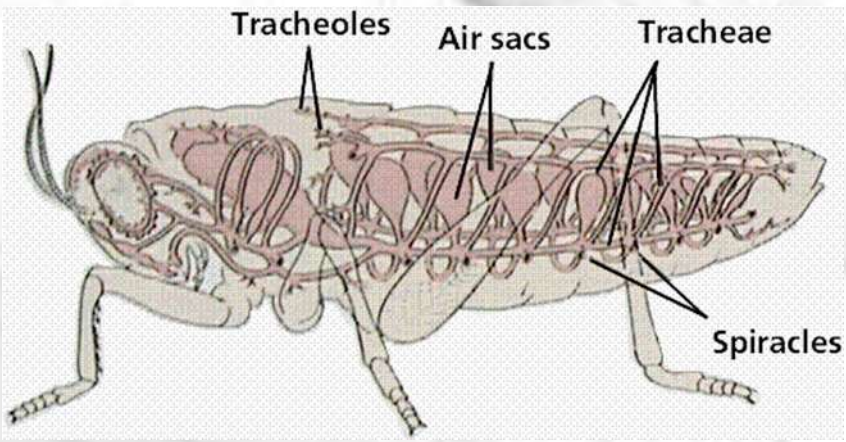
But my house needs to breathe…

No, not really - the catch of course is that humans & pets do require air… Which would you prefer?

The air infiltrating (and exfiltrating) through many small holes with no opportunity to filter or condition it?

Much like an insect…

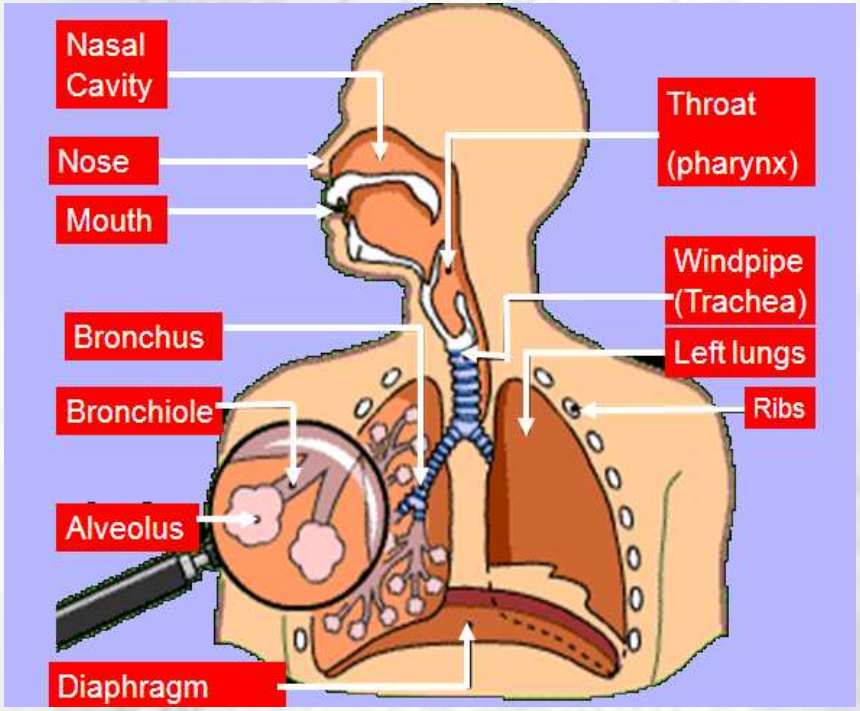
OR?

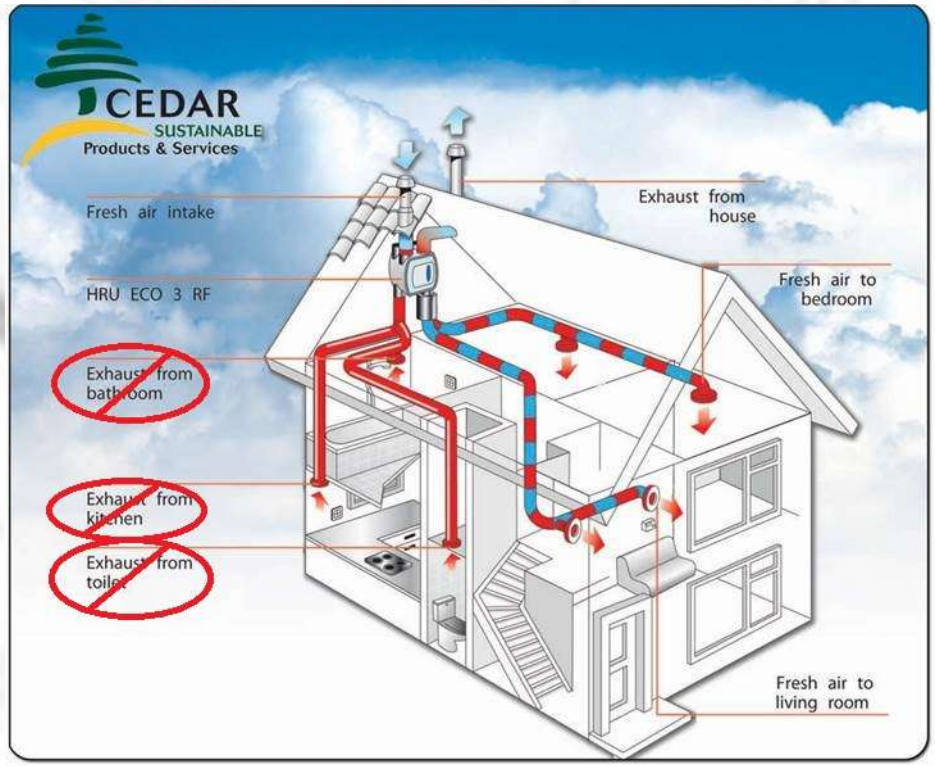


But my house needs to breathe…

Or air entering in a controlled fashion through one opening where it can be filtered and conditioned?

Much like the human body does?





The choice is yours… (for now)
2009 IECC is quite on the subject
2012 IECC it becomes mandatory

With that, if you foam a house, you had better add an ERV or HRV & it should be a stand-alone unit

The Checklist

The following shall be caulked, gasketed, weather-stripped, or otherwise sealed with an air barrier material, suitable film, or solid material:

1. All joints, seams and penetrations.
2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.
5. Dropped ceilings or chases adjacent to the thermal envelope.
6. Knee walls.
7. Walls and ceilings separating the garage from conditioned spaces.
8. Behind tubs and showers on exterior walls.
9. Common walls between dwelling units.
10. Other sources of infiltration."

TABLE N1102.4.2
AIR BARRIER AND INSULATION INSPECTION

COMPONENT	CRITERIA
Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material.
Ceiling/attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed Attic access (except unvented attic), knee wall door, or drop down stair is sealed.
Walls	Corners and headers are insulated. Junction of foundation and sill plate is sealed.
Windows and doors	Space between window/door jambs and framing is sealed.
Rim joists	Rim joists are insulated and include an air barrier.
Floors (including above garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of floor.
Crawlspace walls	Insulation is permanently attached to walls. Exposed earth in unvented crawlspaces is covered with Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.
Narrow cavities	Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.
Garage separation	Air sealing is provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures are airtight, IC rated and sealed to drywall. Exception—fixtures in conditioned space.
Plumbing and wiring	Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.
Shower/tub on exterior wall	Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.
Electrical/phone box on exterior wall	Air barrier extends behind boxes or air sealed type boxes are installed.
Common wall	Air barrier is installed in common wall between dwelling units.
HVAC register boots	HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.
Fireplace	Fireplace walls include an air barrier.

Not only do we have to worry about leakage, but also how much insulation is required

While the 09 codes didn't raise the bar on insulation…

Insulation	Ceiling R-Value		Wall R-Value		Basement R-Value		Crawlspace R-Value	
Climate Zone	2009	2012	2009	2012	2009	2012	2009	2012
1	30	30	13	13	---	---	---	---
2	30	38	13	13	---	---	---	---
3	30	38	13	20 / 13+5	5 / 13	5 / 13	5 / 13	5 / 13
4 (ex. Marine)	38	49	13	20 / 13+5	10 / 13	10 / 13	10 / 13	10 / 13
4 Marine & 5	38	49	20 / 13+5	20 / 13+5	10 / 13	15 / 19	10 / 13	15 / 19
6	49	49	20 / 13+5	20+5 / 13+10	15 / 19	15 / 19	10 / 13	15 / 19
7 & 8	49	49	21	20+5 / 13+10	15 / 19	15 / 19	10 / 13	15 / 19

Quick Note: **20** / **13+5** is an either or proposition,either you install **R20 insulation in the cavity** or **R13 in the cavity PLUS a continous layer of foam on the exterior**

2015 Codes- at this time it doesn't appear they will be raising the levels, instead it appears that the window levels are in for another shake up & they will be tightening other items up

Chapter 5: Floors & Decks

(aka the anti-sawzall act) --- [bit.ly/IRC-09b](bit.ly/IRC-09b)

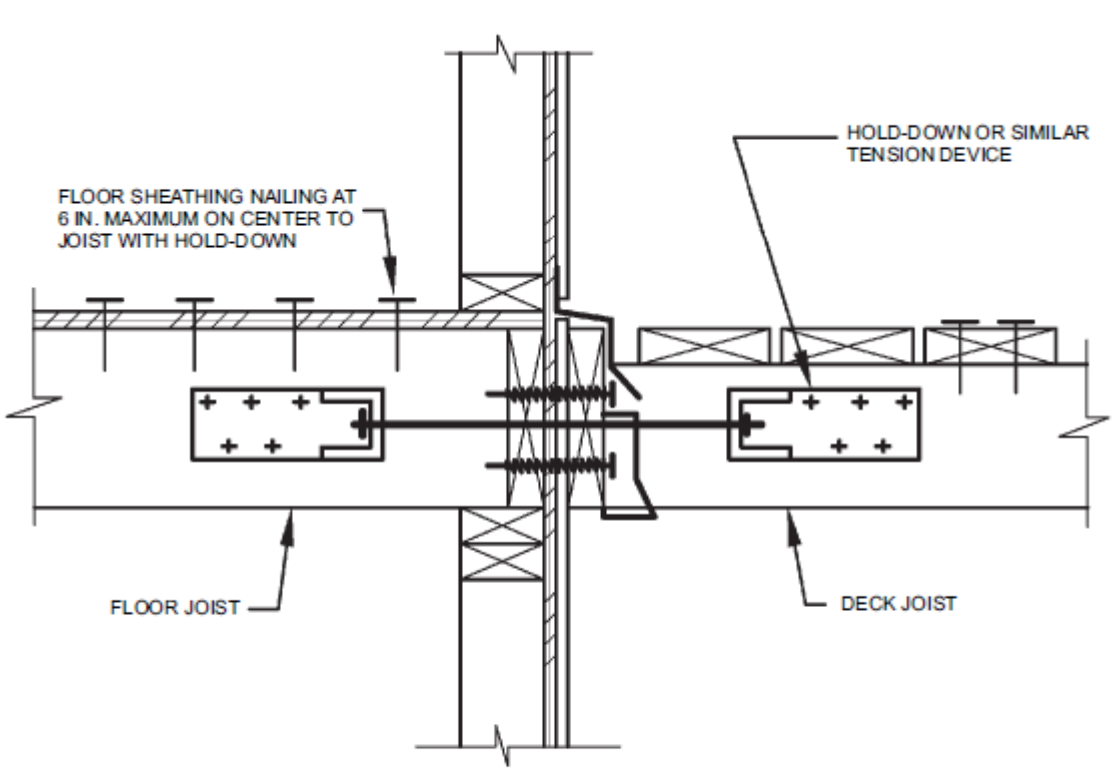


FIGURE 502.2.2.3
DECK ATTACHMENT FOR LATERAL LOADS

No matter your trade, this is a chapter to read as they have severely limited what can be notched, drilled & how

Remember all those deck collapses back in 03… Well then say hello to **R502.2.2** which is all about decks

Welcome to a brave new world of lag schedules, mandatory connectors, & even lateral load requirements.

502.2.2 - Decks

Unfortunately part of the mess is: "**R502.2.2.3 Deck lateral load connection.** The lateral load connection required by Section R502.2.2 shall be permitted to be in accordance with Figure R502.2.2.3. Hold-down tension devices shall be installed in **not less than two locations per deck**, and each device shall have an allowable stress design capacity of not less than 1500 pounds."

No worries as the 2012 code is actually worse – fortunately the 2015 appears to have made some major improvements, but it's still not all going to be fixed – best solution; go free standing or talk to the AHJ

Glenn G.A. Mathewson on YouTube & his book is definitely worth checking out - http://www.youtube.com/watch?v=f4y5JT1XH4o

Chapter 6: Walls

- Table 602.3.1 Fastener Schedule for Structural Members: it has now been modified to make it easier to find the new fastener spacing required (It was based off manufacturer recommendations & lessons learned)
- R602.6.1 Drilling & notching of top plate: Wow can you say you now need a 1½" plate that extends past the end of the notch (for plumbing or waste lines) 6" on each side with 8 10d nails on each side
- R612.2 Window Sills: In the event that the window sill is less than 24" above floor and is more than 72" above exterior grade a fall protection or limiting device must be placed on them
- R611 – ICF's (Insulated Concrete Forms)
- R613 – SIPS (Structural Insulated Panel)

Insulated Headers

One can easily buy them or make on site:

For 2x4 - insulate it with a piece of ½” foam instead and place it to the outside instead of the center?

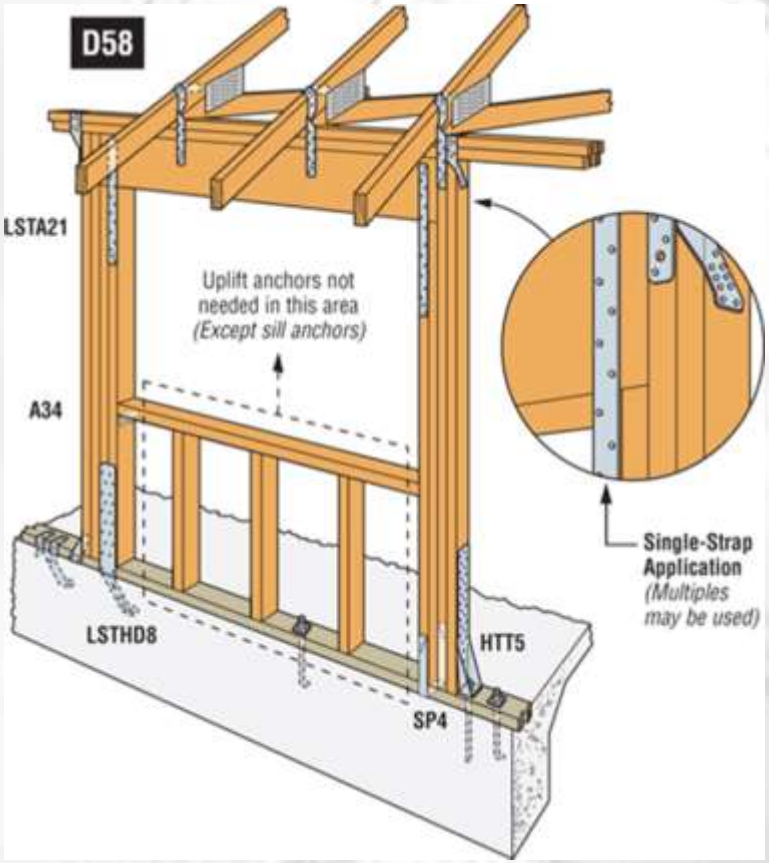
For 2x6 walls you will generally get better thermal performance than if you use traditional framing methods

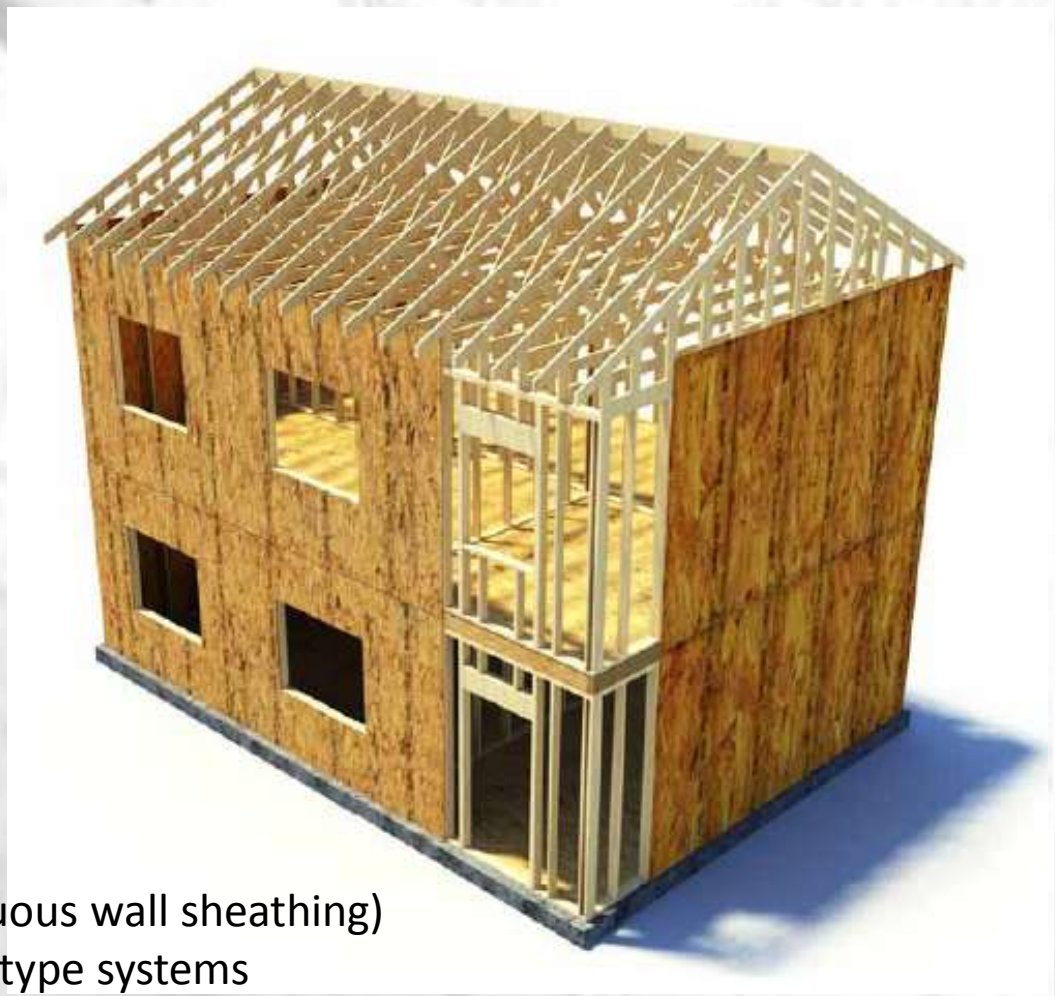
Exterior shot

Interior Shot

602.10 Wall Bracing

Due to severe storms this is one of the biggest changes as they upped the bracing requirements big time.



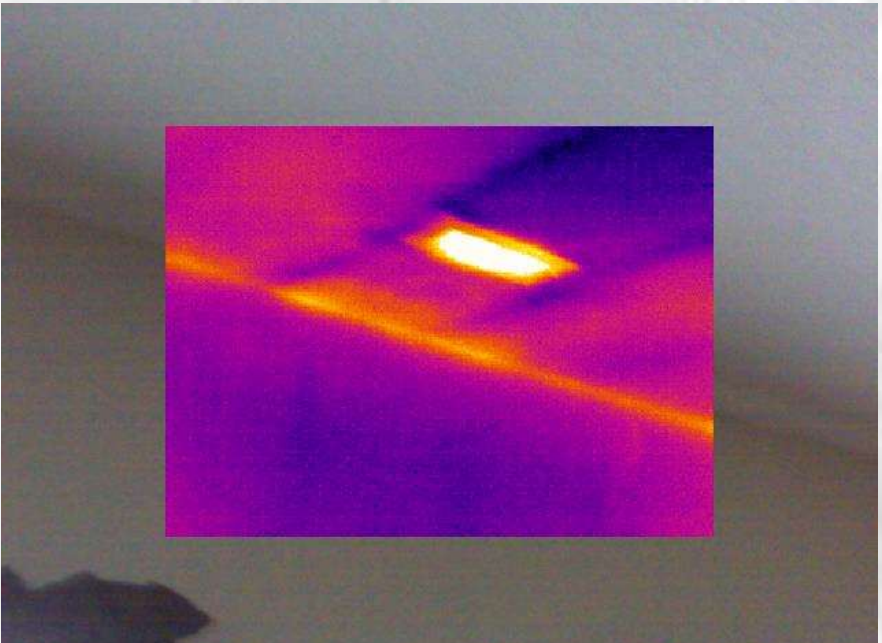


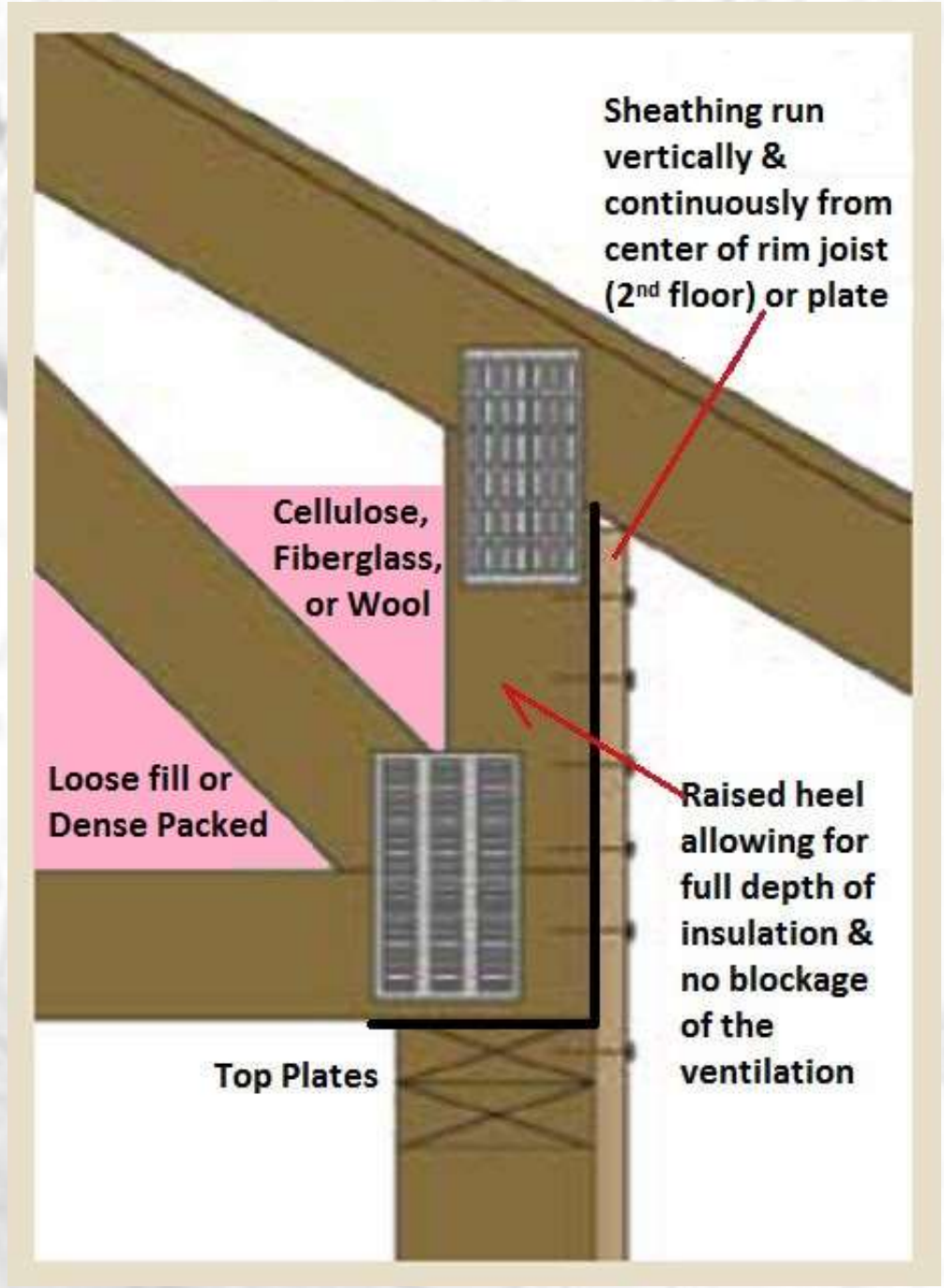
Do you want this or…. (602.10.4 – continuous wall sheathing)
You may also want to look into TrussLock type systems

Taking it up a notch

Raised heel truss & continuous sheathing installed vertically

Improved energy efficiency, & less air leakage areas – with newer codes you soon won't have a choice





Optimized Framing Tecchniques

2 stud requires clips – how do you air seal, what about expansion / contraction & kids?

3 stud is structurally stronger - no clips & still allows for insulation

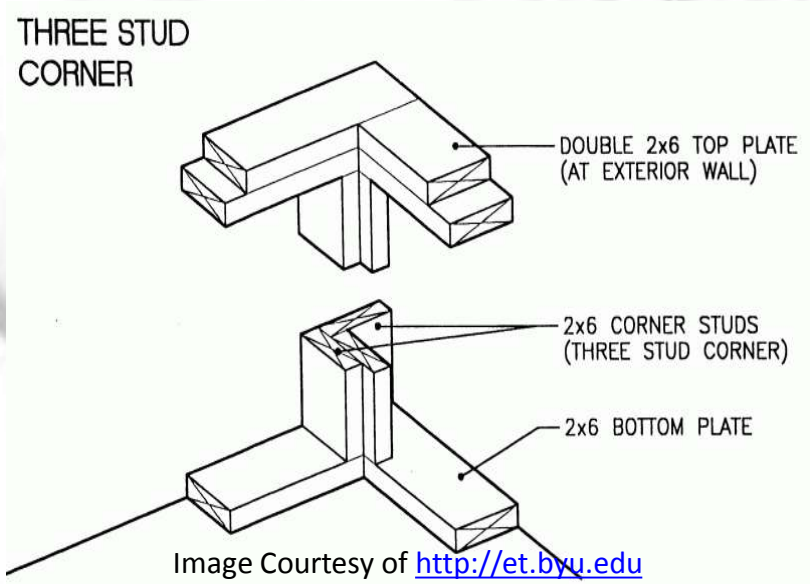


Image Courtesy of http://et.byu.edu

Ladders are another good option, especially for blown in products (cellulose, fiberglass, foam, etc…)

No clips required

bit.ly/CSB-OVE

Chapter 7: Wall Coverings

- This section is well worth visiting as it relates to Air & WRB's (Water / Weather Resistant Barriers) which are required to be installed (703.1)

- Green board is dead in the showers & tub areas (702.3)

- Save the manufacturers directions – there are numerous locations that call out for them & as one can't expect the BI to know what they require…

Don't Be this Guy

The only time you can use staples like this is… Basically **NEVER**

Most products require cap nails, cap staples or large staples like we used to use on sheathing [bit.ly/CSB-WRB](bit.ly/CSB-WRB)

Foam / Zip Systems as WRB?

It can be if tested & installed per test standards

- Seems taped with approved material
- Limit vertical seems as much as possible

As all things expand & contract

- Best practice is 2 layers (instead of 2” use 2 – 1” offset with both seams taped)
- Using just 1? – best to use both a Tyvek & board
- Location of Tyvek dependent on location of window & flashing details

Zip System – makes an excellent air & water barrier system as long as all the seems are taped perfectly

It has a built in ridge to allow for expansion & contraction

I personally still think one should use a product like HydroGap over the walls & felt or… on the roof

bit.ly/CSB-WRB

Chapter 8: Roof & Ceiling

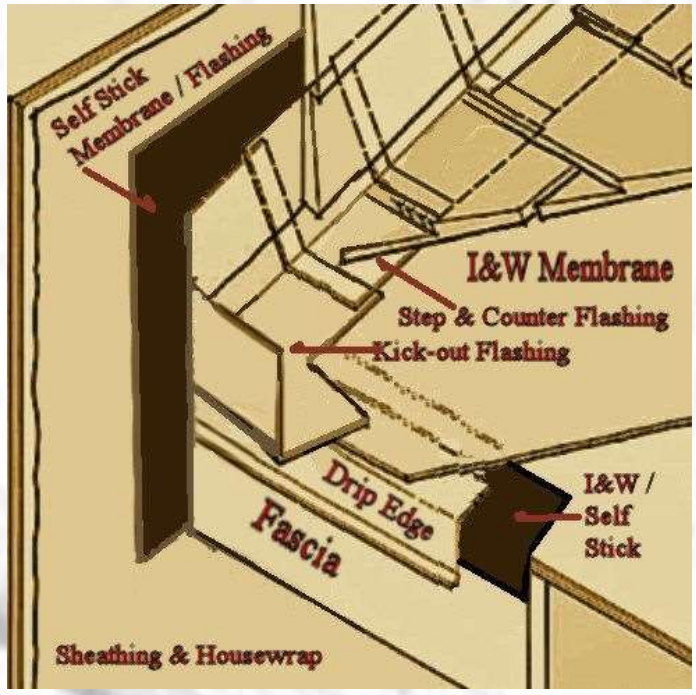
- R806.1 Attic Ventilation: the screening size has been reduced from 1/8” to 1/16” to help guard against the entry of insects (be careful when painting)

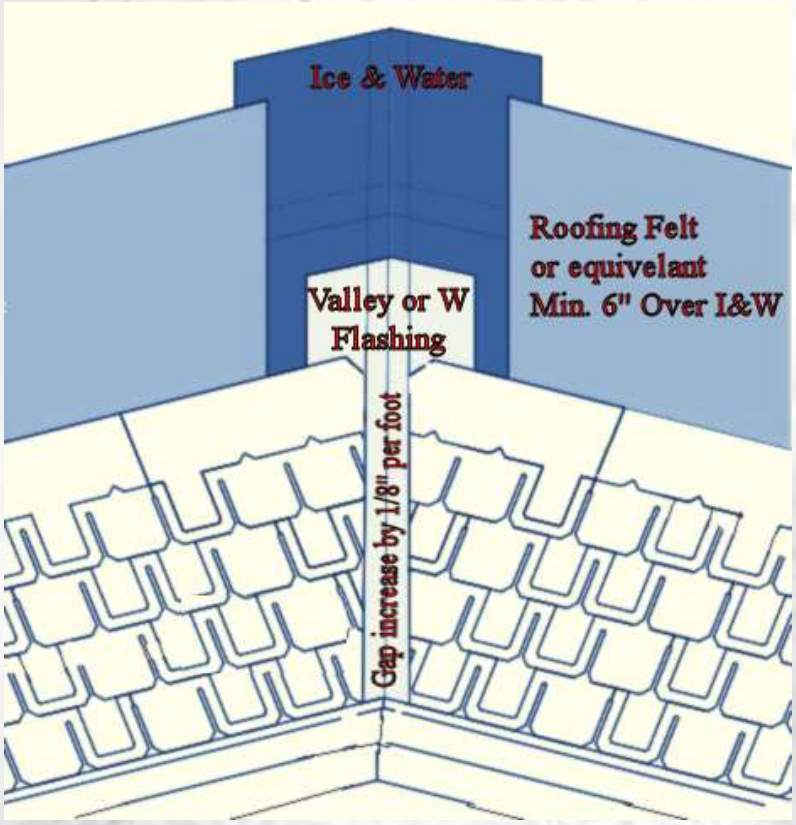
- R806.4 Unvented attic assemblies: the Hot-roof & cathedral ceiling option have been modified to allow open cell to be used in our zones without a vapor retarder (must = R30+ or Alternative UA)

Fiberglass or cellulose may be in direct contact with the roof sheathing though you **HAVE TO** install R5 foam board above the roof sheathing. (bit.ly/HotRoof)

Chapter 9: Roof Covering

As the entire state falls in one of 7 different wind zones it would be well worthwhile to review this section & the manufacturer's directions.



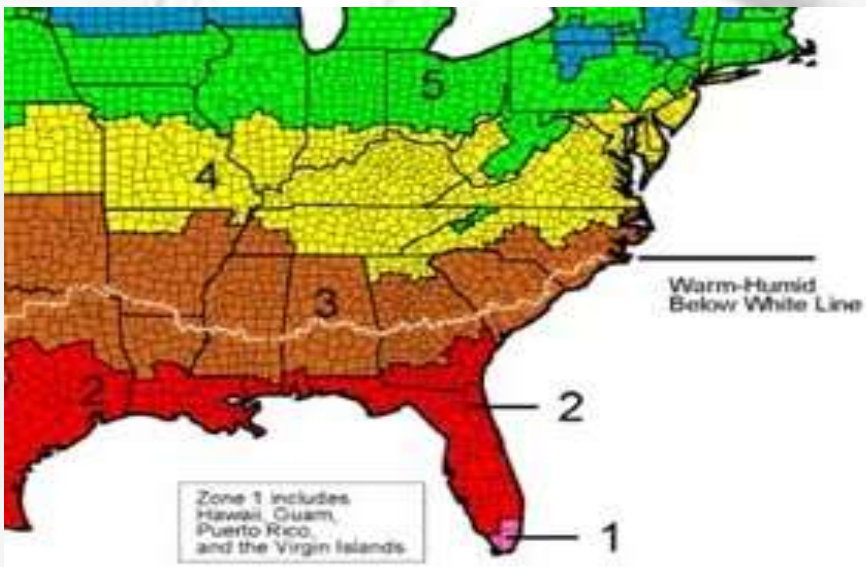


- They have increased & clarified the language for when flashing is required. (905.2)

bit.ly/RoofFlashing

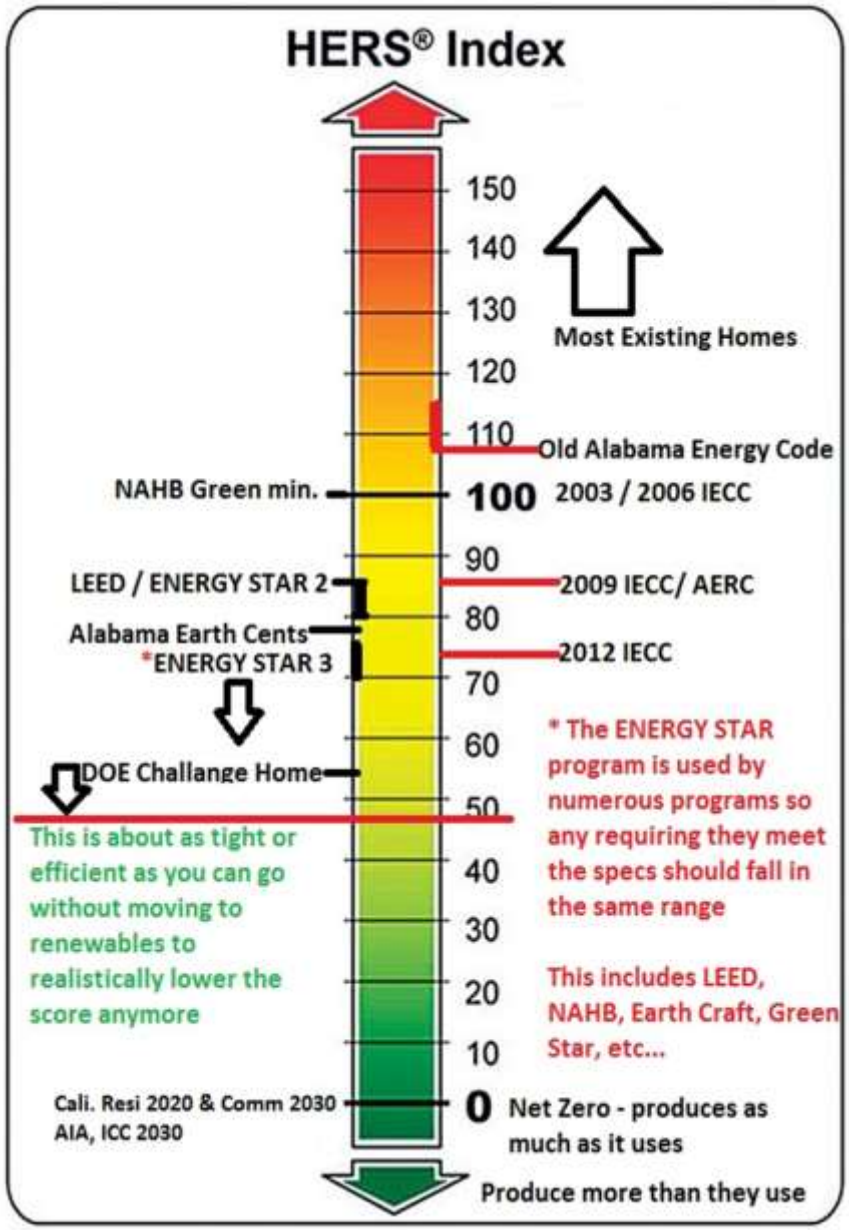
The Energy Codes

The Energy Codes are all based on Climate Zones & Energy Modeling



Don't want to install R8 on the ducts, hire a rater, do a manual UA calcs, or look into www.energycodes.gov/rescheck

bit.ly/HERSindex

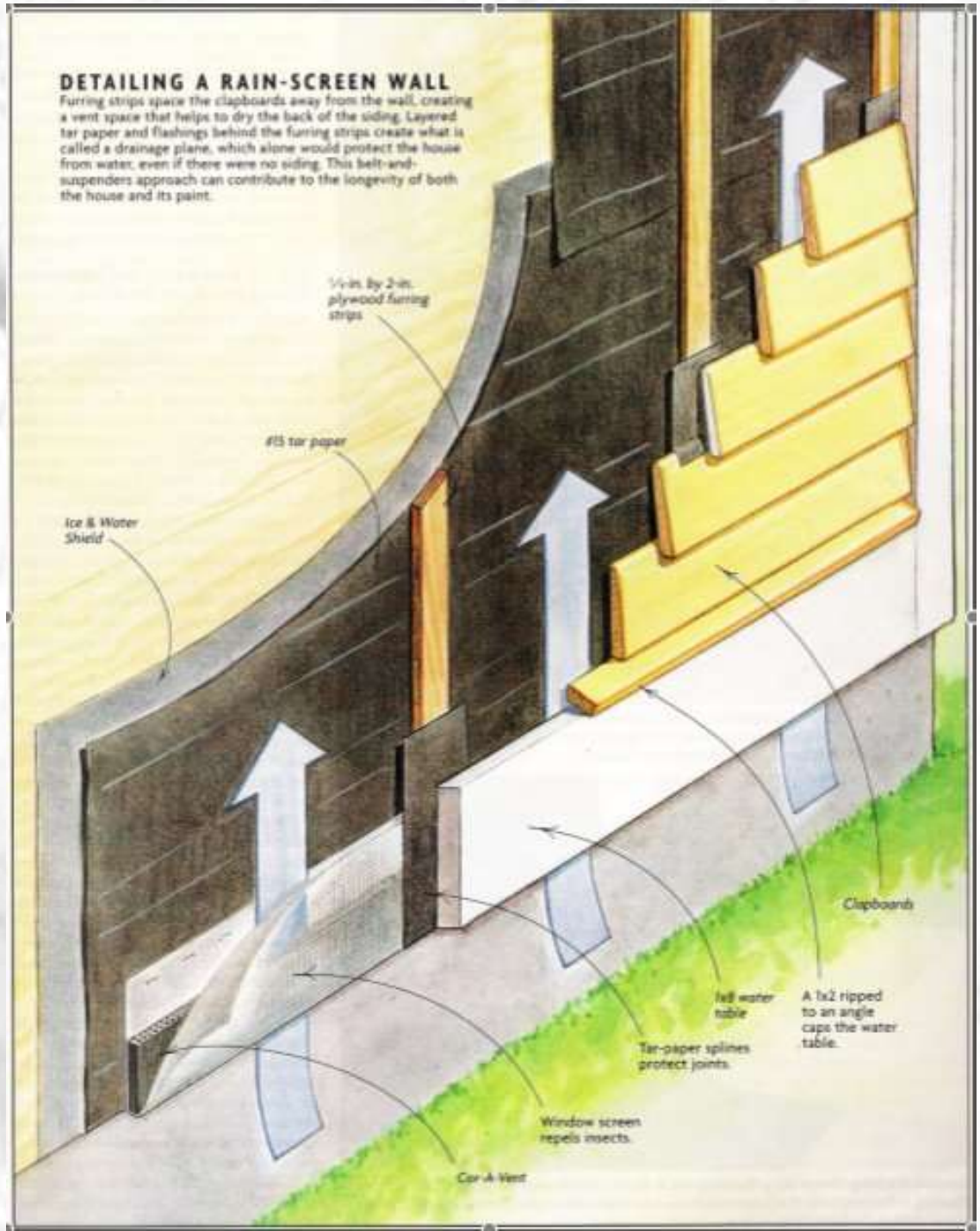


Drainage Layer

One big issue though is the tighter we build houses the less forgiving they are, especially in our humid climate…

Rain screen details are required in Oregon & certain other locales

It is a great system in our area & one reason why we see so few issues with brick homes (when done right)



Other drainage options to consider

- Benjamin Obdyke's HydroGap provides a 1mm drainage plane behind the siding
- This product can actually be stapled – no worries on capillary action allowing water past
- I would not recommend this behind foam, however over it or a zip wall… YES

Cedar Breather – works great not only behind cedar shingles, but many other siding products

USGBC ALABAMA

Thank YOU

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