Duluth Energy Design Conference

Date: Tuesday February 25, 2014
Session: 8:30 – 10:00 AM

As presented by

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In accordance with the Department of Labor and Industry's statute 326.0981, Subd. 11,

"This educational offering is recognized by the Minnesota Department of Labor and Industry as satisfying **1.5 hours** of credit toward **Building Officials and Residential Contractors** continuing education requirements."

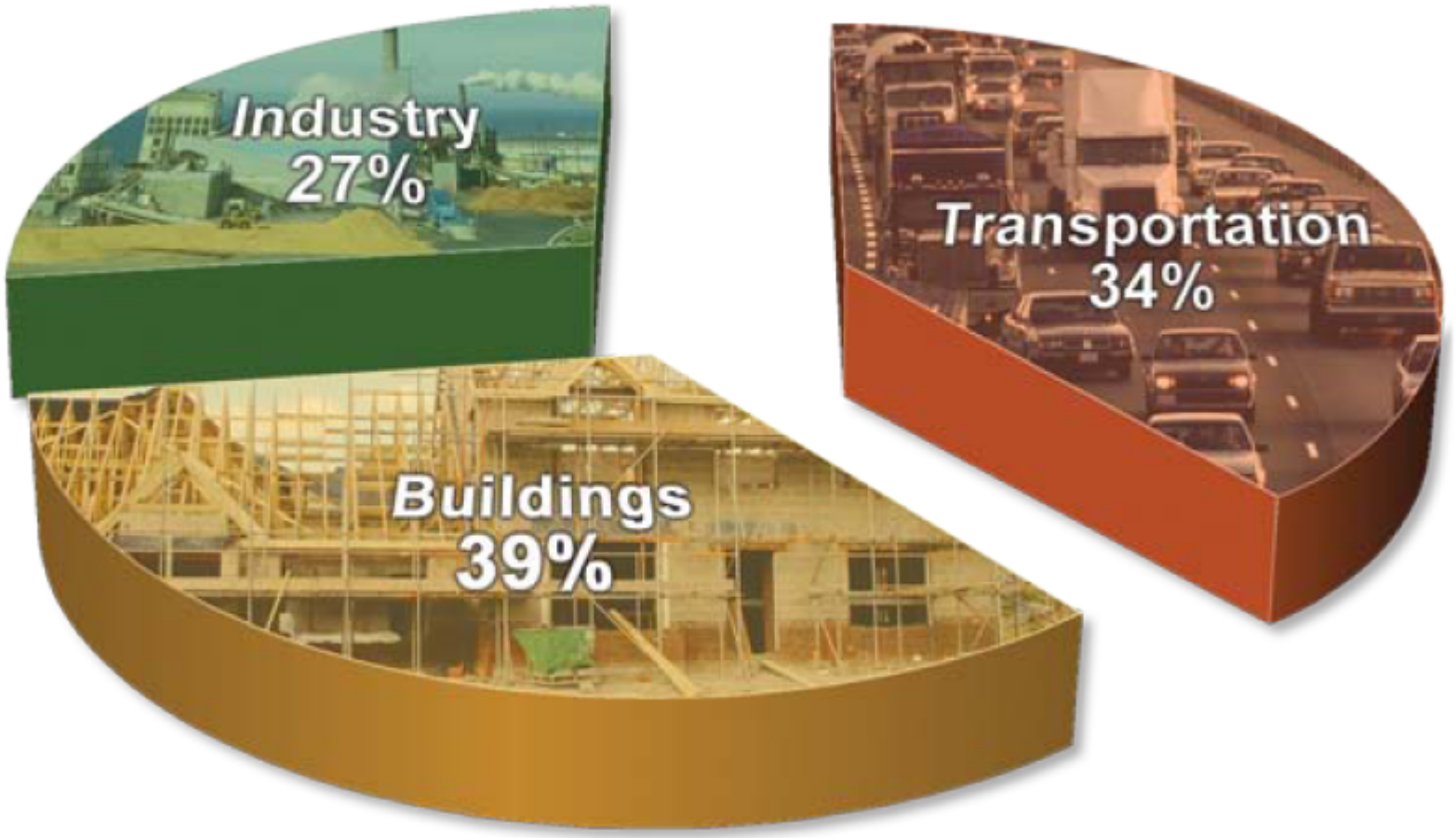
For additional continuing education approvals, please see your credit tracking card.

Today's Agenda

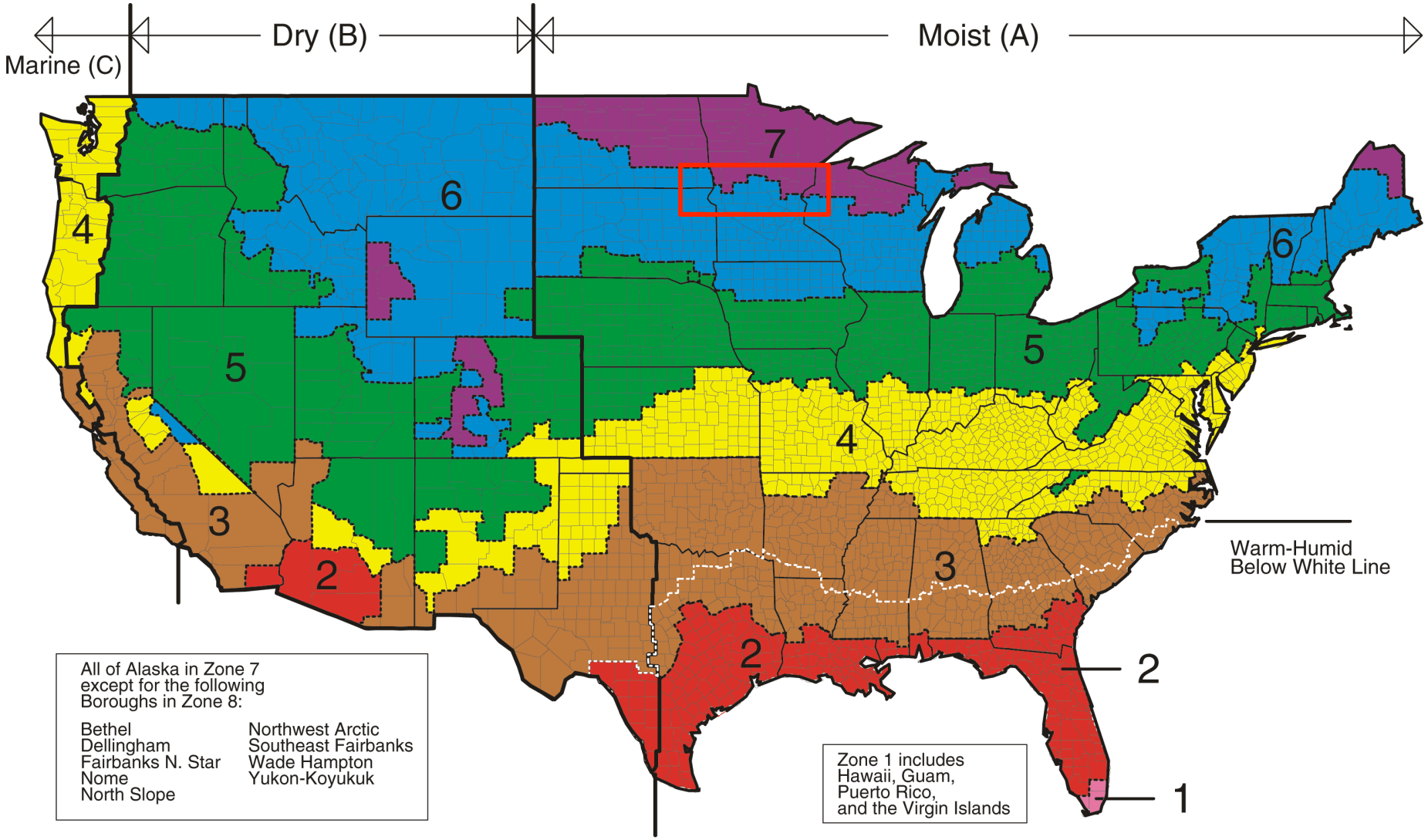
1) Where are we now and where are we going"?
2) 90% Compliance? (Federal requirement)
    1) Is it attainable in Minnesota?
    2) Where is the payback?
    3) What did we learn?
3) 2012 IECC –Residential -
    a) Concepts of the 2012 IECC
    b) Mechanical and misc.
4) REScheck Update

Residential Provisions

U.S. Energy Use

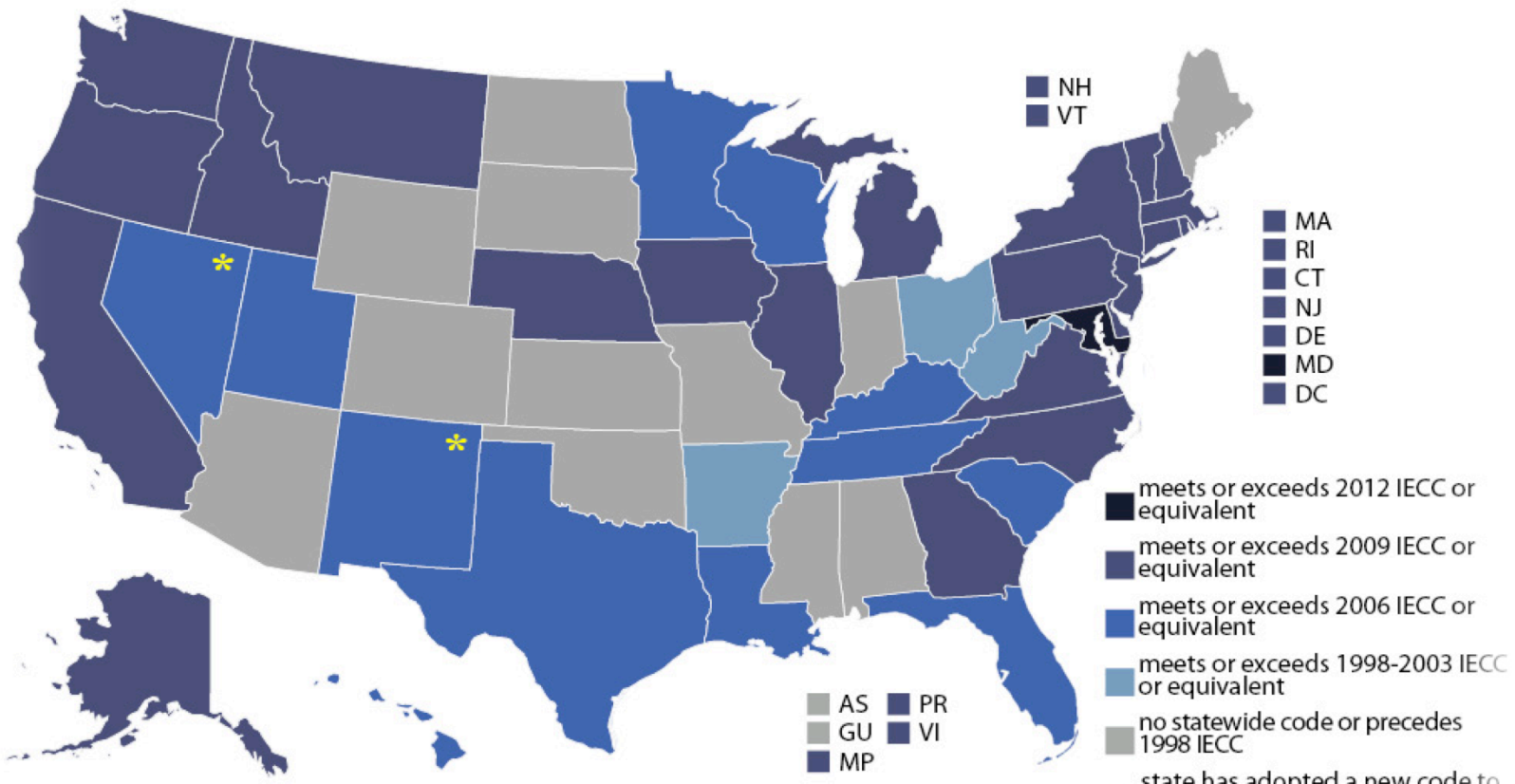


Source: Energy Information Administration Statistics (Architecture 2030)


Marine (C)
Dry (B)
Moist (A)
7
6
4
5
3
2
1
Warm-Humid
Below White Line
All of Alaska in Zone 7
except for the following
Boroughs in Zone 8:
Bethel
Dellingham
Fairbanks N. Star
Nome
North Slope
Northwest Arctic
Southeast Fairbanks
Wade Hampton
Yukon-Koyukuk
Zone 1 includes
Hawaii, Guam,
Puerto Rico,
and the Virgin Islands

Residential State Energy Code Status

AS OF JANUARY 1, 2012



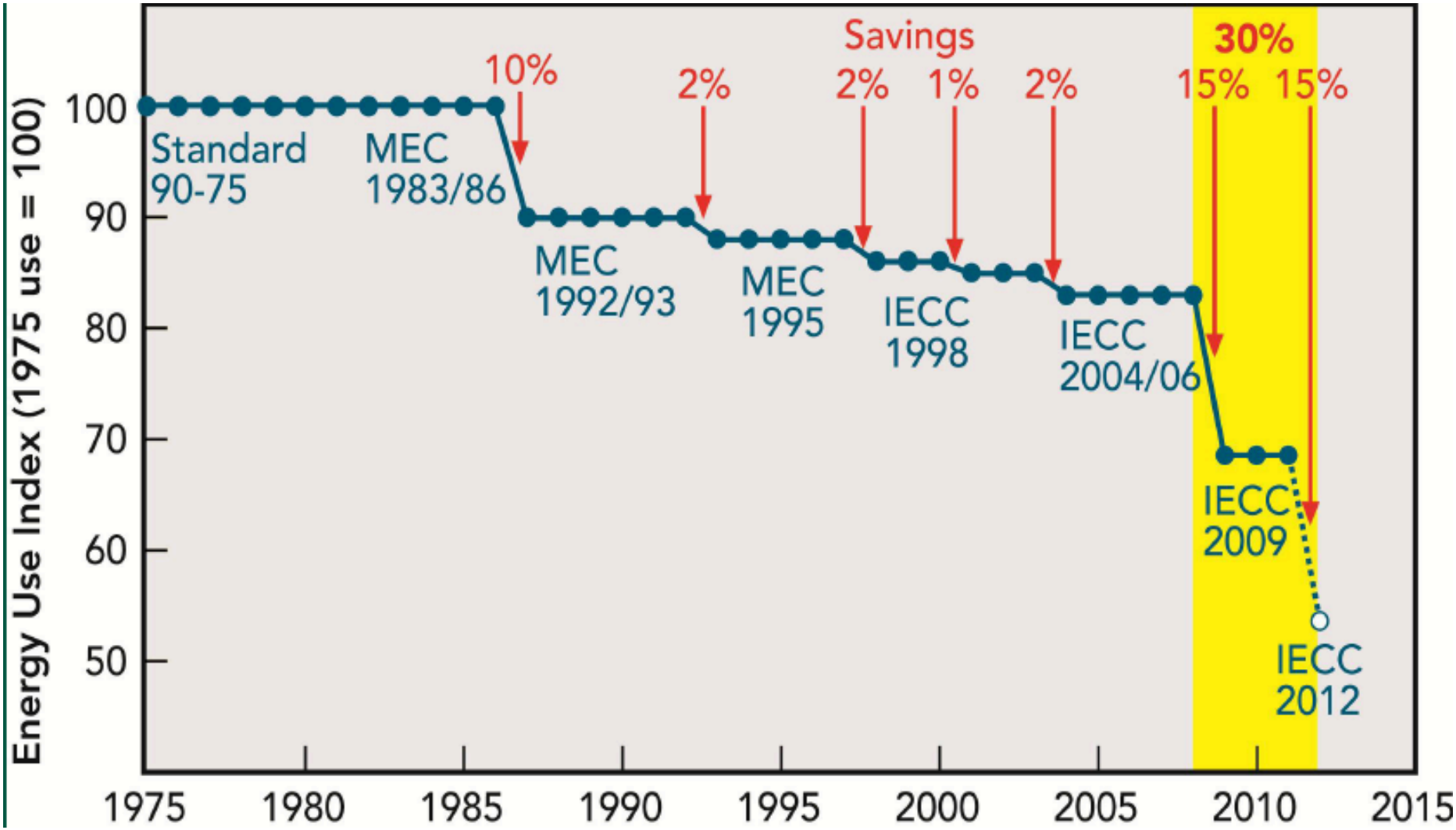
BCAP Dedicated to the adoption, implementation, and advancement of building energy codes

Get all the most up-to-date code status maps and other valuable resources at www.bcap-ocean.org

NOTE: These maps reflect only mandatory statewide codes currently in effect.

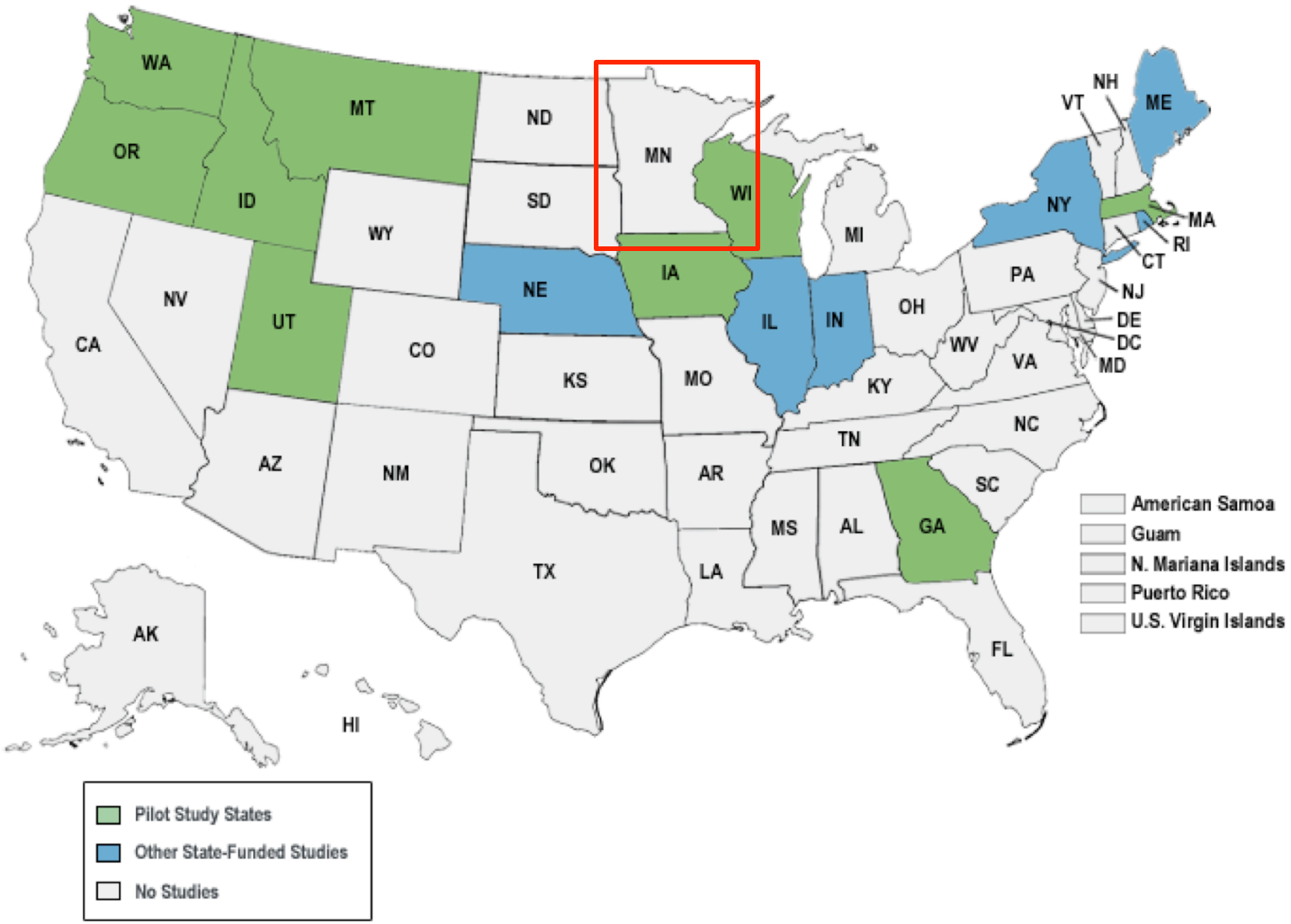
U.S. Residential Energy Code

History of efficiency improvements

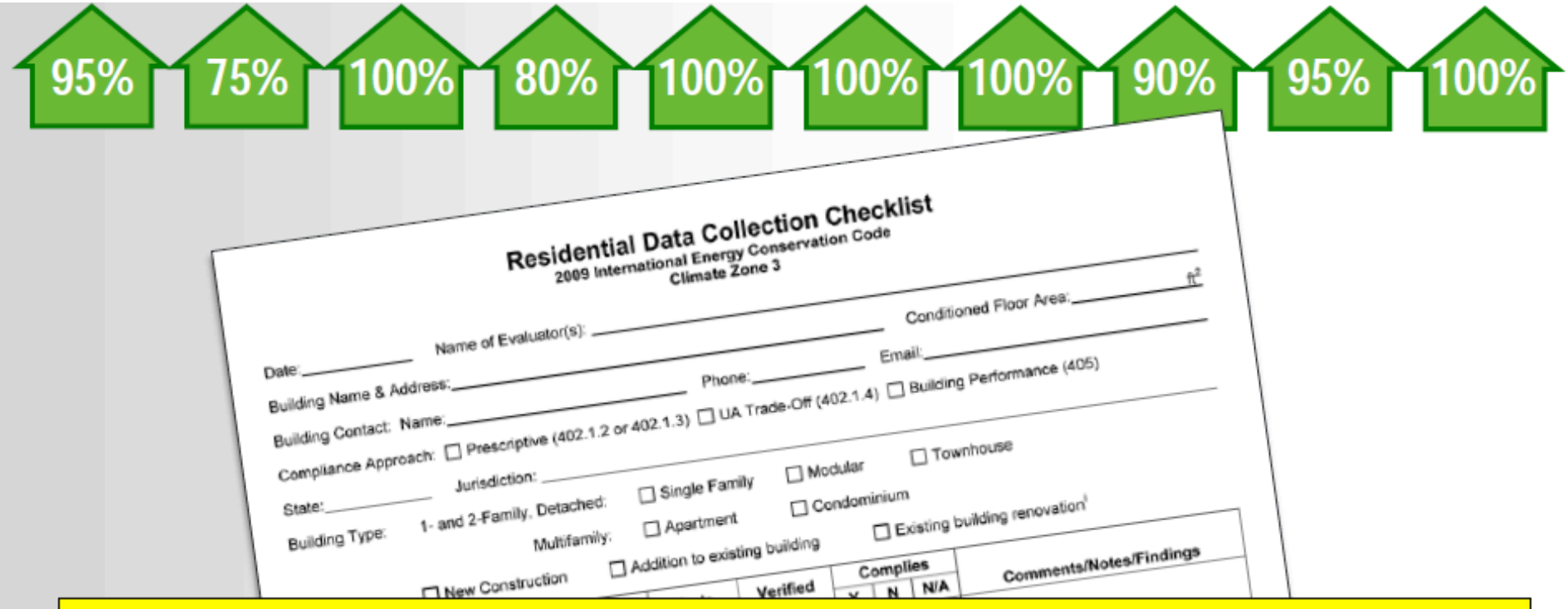


State 90% Compliance Activities

as of October 1, 2011



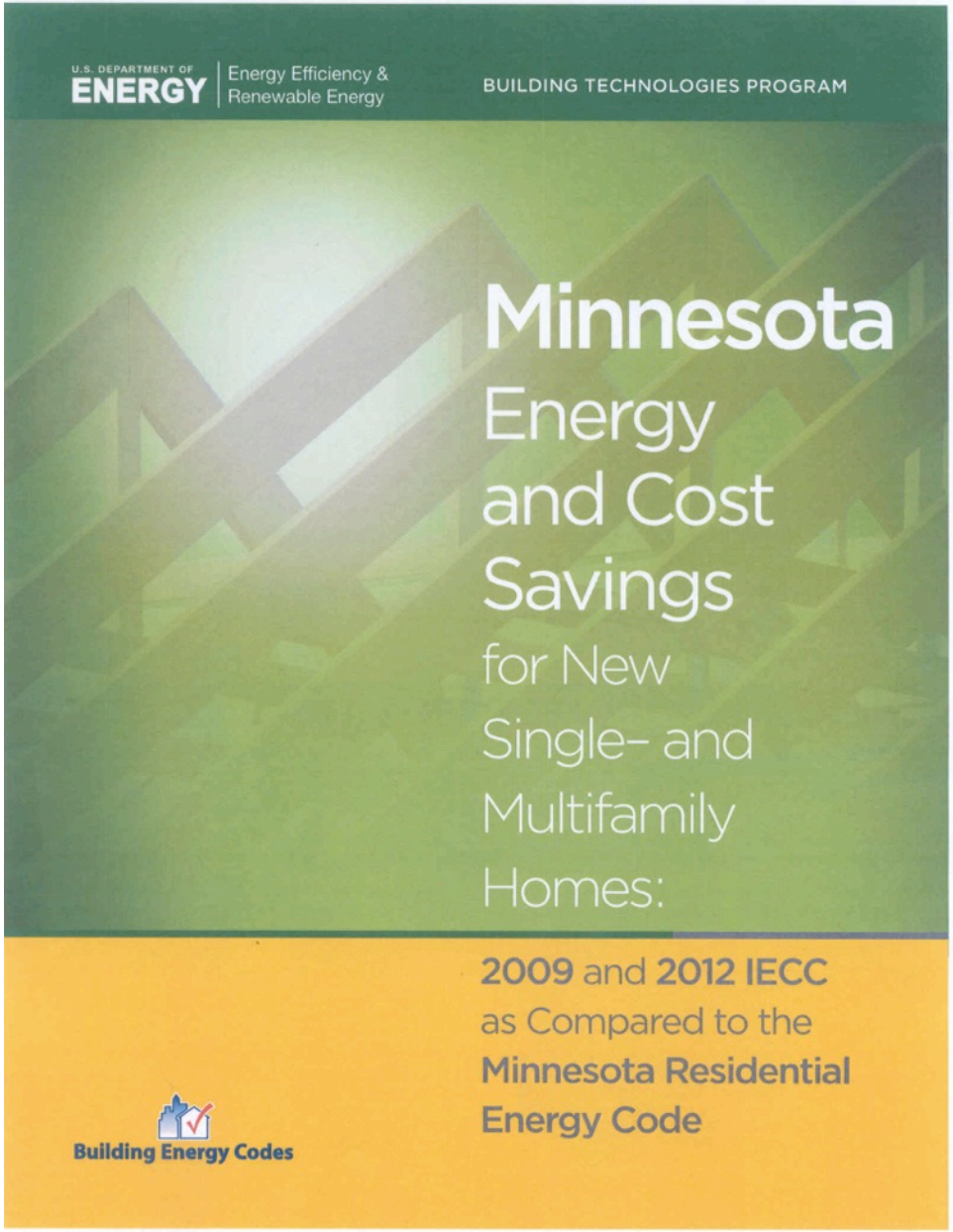
What about code enforcement?



Evaluated buildings are each assigned a compliance rating of 0–100% based on the proportion of code requirements that each has met, and the evaluated buildings' scores within a state are averaged to derive an overall compliance metric with an associated confidence.

Where is the pay back of ROI?

- **“How long will it take to pay for all these energy improvements that are being required under the new federal Laws?”**
- **“What was taken into consideration for calculating this payback?”**
- **“Is it actually worth it?”**


U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy
BUILDING TECHNOLOGIES PROGRAM
Minnesota
Energy and Cost Savings for New Single- and Multifamily Homes:
2009 and 2012 IECC as Compared to the Minnesota Residential Energy Code
Building Energy Codes

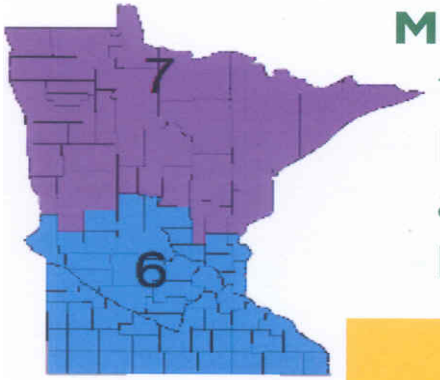


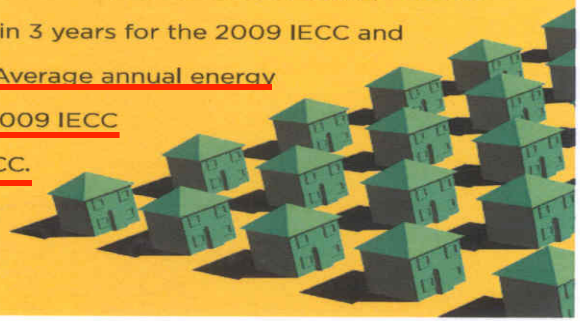
Figure 1. Minnesota Climate Zones

Minnesota Energy and Cost Savings for New Single- and Multifamily Homes: **2009** and **2012 IECC** as Compared to the **Minnesota Residential Energy Code**

The 2009 and 2012 International Energy Conservation Codes (IECC) yield positive benefits for Minnesota homeowners.

Moving to either the 2009 or 2012 IECC from the current Minnesota Residential Energy Code is cost-effective over a 30-year life cycle. On average, Minnesota homeowners will save $1,277 over 30 years under the 2009 IECC, with savings still higher at $9,873 with the 2012 IECC.

Each year, the reduction to energy bills will significantly exceed increased mortgage costs. After accounting for up-front costs and additional costs financed in the mortgage, homeowners should see net positive cash flows (i.e., cumulative savings exceed cumulative cash outlays) in 3 years for the 2009 IECC and 1 year for the 2012 IECC. Average annual energy savings are $122 for the 2009 IECC and $669 for the 2012 IECC.



Highlights

Cost-effectiveness against a Minnesota Residential Energy Code baseline:

Life-cycle cost savings, averaged across climate zones and building types, are $1,277 for the 2009 IECC and $9,873 for the 2012 IECC

Simple payback periods are 9.7 years for the 2009 IECC and 5.7 years for the 2012 IECC

Consumer savings compared to a Minnesota Residential Energy Code baseline:

Households save an average of $122 per year on energy costs with the 2009 IECC

Household energy savings rise significantly to an average of $669 per year with the 2012 IECC

Net annual consumer savings, including energy savings, mortgage cost increases, and other associated costs in the first year of ownership, average $54 for the 2009 IECC and $450 for the 2012 IECC

Energy costs, on average, are 6.2% lower for the 2009 IECC and 34.1% lower for the 2012 IECC

Cost-Effectiveness

The U.S. Department of Energy (DOE) evaluates the energy codes based on three measures of cost-effectiveness:

- **Life-Cycle Cost:** Full accounting over a 30-year period of the cost savings, considering energy savings, the initial investment financed through increased mortgage costs, tax impacts, and residual values of energy efficiency measures
- **Cash Flow:** Net annual cost outlay (i.e., difference between annual energy cost savings and increased annual costs for mortgage payments, etc.)
- **Simple Payback:** Number of years required for energy cost savings to exceed the incremental first costs of a new code

Life-cycle cost is the primary measure by which DOE assesses the cost-effectiveness of the IECC. These savings assume that initial costs are mortgaged, that homeowners take advantage of the mortgage interest deductions, and that long-lived efficiency measures retain a residual value after the 30-year analysis period. As shown in Table 1, life-cycle cost savings, averaged across climate zones are $1,277 for the 2009 IECC and $9,873 for the 2012 IECC.

able 1. Average Life-Cycle Cost Savings from Compliance with 2009 and 2012 IECC, Relative to the Minnesota State Code

	Life-Cycle Cost Savings ($)	Net Positive Cash Flow (Years)	Simple Payback (Years)
2009 IECC	$1,277	3	9.7
2012 IECC	$9,873	1	5.7

Consumer Savings

Annual consumer cash flows impact the affordability of energy-efficient homes. Based on this analysis, Minnesota homeowners, on average, should see annual energy cost savings of $122 and achieve a net cumulative savings that accounts for an increased down payment in addition to energy costs, mortgage costs, and tax-related costs and benefits in 3 years when comparing the 2009 IECC to the Minnesota Residential Energy Code. When moving to the 2012 IECC from the Minnesota Residential Energy Code, the average annual energy cost savings increase substantially to $669, and it is only 1 year before cumulative savings exceed cumulative costs. Table 2 summarizes these results.

Table 2. Impacts to Consumers' Cash Flow from Compliance with the 2009 and 2012 IECC Compared to the Minnesota State Code

	Consumers' Cash Flow (Average)	2009 IECC	2012 IECC
A	Down payment and other up-front costs	$126	$406
B	Annual energy savings (year one)	$122	$669
C	Annual mortgage increase	$68	$220
D	Net annual cost of mortgage interest deductions, mortgage insurance, and property taxes (year one)	$0	-$1
E = [B-(C+D)]	Net annual cash flow savings (year one)	$54	$450
F = [A/E]	Years to positive savings, including up-front cost impacts	3	1

Other Federal mandates that will affect us in Minnesota.

Title 10 CFR Part 430 October 31,2011

Federal Register on June 27, 2011. DOE has determined that the adverse comments received in response to the direct final rule do not provide a reasonable basis for withdrawing the direct final rule. Therefore, DOE provides this notice confirming adoption of the energy conservation standards for residential furnaces and residential central air conditioners and heat pumps established in the direct final rule and announcing the effective date of those standards.

DATES: The direct final rule published on June 27, 2011 (76 FR 37408) became effective on October 25, 2011. Compliance with the standards in the direct final rule will be required on May 1, 2013 for non-weatherized furnaces and on January 1, 2015 for weatherized furnaces and central air conditioners and heat pumps.

ADDRESSES: The docket is available for review at *http://www.regulations.gov*, including **Federal Register** notices,

New Code Requirements

- **Chapter 11 in IRC replaced by IECC-Residential(RE)**

- **Chapter 11 in IRC replaced by IECC-Residential(RE)**

SECTION N1101
GENERAL

N1101.1 Scope. This chapter regulates the energy efficiency for the design and construction of buildings regulated by this code.

Note: *The text of the following Sections N1101.2 through N1105 is extracted from the 2012 edition of the* International Energy Conservation Code—Residential Provisions *and has been editorially revised to conform to the scope and application of this code. The section numbers appearing in parenthesis after each section number are the section numbers of the corresponding text in the* International Energy Conservation Code—Residential Provisions.



- **R101.2 Scope:** Residential Buildings **and** building sites, associated systems and equipment.

- **RESIDENTIAL BUILDING.** For this code, includes detached one- and two-family dwellings and multiple single-family dwellings (townhouses) as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane.

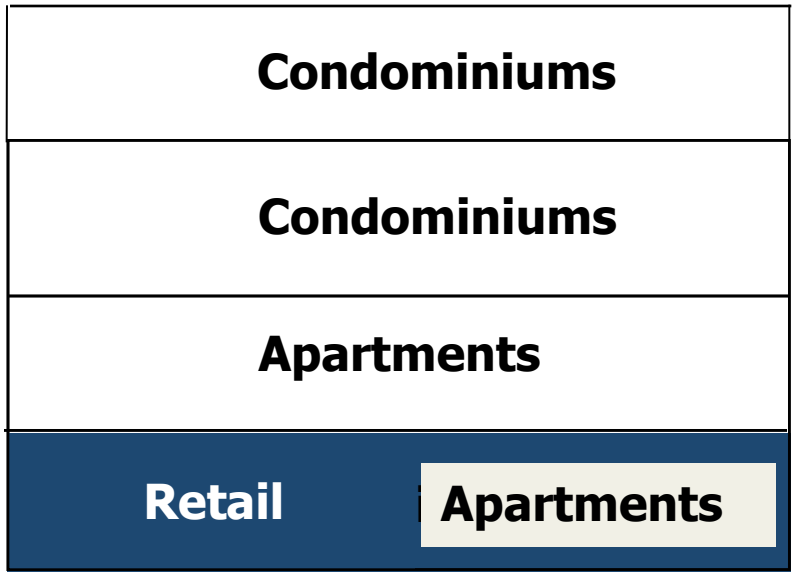
C101.2 Scope.
This code applies to *commercial buildings* and the buildings sites and associated systems and equipment.

- Commercial Buildings and High-Rise Multifamily

- **COMMERCIAL BUILDING. For this code, all buildings that are not included in the definition of "Residential buildings."**

Scope & Mixed Occupancy

- Each occupancy shall be separately considered residential or commercial



Building is now 4 stories. Commercial Provisions throughout

Residential

Residential

Commercial/Residential

The Bottom Line

- Chapter 11 in IRC replaced by IECC-Residential(RE)
- **Cold-climate builders: Will foam sheathing be needed?**

The Bottom Line

- Chapter 11 in IRC replaced by IECC-Residential(RE)
- Cold-climate builders: Will foam sheathing be needed?
- **Not necessarily….**

Insulation Requirements

Insulation	Ceiling R-value		Wood frame R-value		Basement R-value		Crawl Space R-value	
Climate Zone	2009 Ch. 1322	2012 IECC	2009 Ch. 1322	2012 IECC	2009 Ch. 1322	2012 IECC	2009 Ch. 1322	2012 IECC
6	38	49	19 or 13 + 5	21, 20+5, 13+10	5/10	15/19	5/10	15/19
7	44	49	19	21, 20+5, 13+10	10	15/19	10	15/19

5/10 means, insulation levels for the southern zone of Minnesota allowed an R-5 Insulation as a trade-off or, an R-10 insulation if not using the trade-off method.

First value is cavity insulation, second is continuous insulation or insulated siding, so "20+5" or "13+10" means cavity insulation plus 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.

- Chapter 11 in IRC replaced by IECC-Residential(RE)
- Cold-climate builders: Will foam sheathing be needed?
- **More efficient Fenestration products;**

Window Performance

Fenestration	Fenestration U-Factor		Skylight U-factor		Glazed Fenestration SHGC	
Climate Zone	2009 Ch. 1322	2012 IECC	2009 Ch. 1322	2012 IECC	2009 Ch. 1322	2012 IECC
6	0.35	0.32	0.60	0.55	N/A	N/A
7	0.35	0.32	0.60	0.55	N/A	N/A

NFRC
U-Factor, SHGC, VT & Air Leakage

National Fenestration Rating Council
CERTIFIED

World's Best Window Co.

Millennium 2000+
Vinyl-Clad Wood Frame
Double Glazing • Argon Fill • Low E
Product Type: **Vertical Slider**

ENERGY PERFORMANCE RATINGS

U-Factor (U.S./I-P)	Solar Heat Gain Coefficient
0.34	**0.25**

ADDITIONAL PERFORMANCE RATINGS

Visible Transmittance	Air Leakage (U.S./I-P)
0.41	**0.2**

Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. Consult manufacturer's literature for other product performance information.
www.nfrc.org

NFRC Product Certification Program

NFRC Label Certificate for Site-Built Products

World's Best Window Co.
Millennium 2000+
Vinyl-Clad Wood Frame
Double Glazing • Argon Fill • Low E
Product Type: Vertical Slider

ENERGY PERFORMANCE RATINGS

U-Factor (U.S./I-P)	Solar Heat Gain Coefficient
0.35	**0.32**

ADDITIONAL PERFORMANCE RATINGS

Visible Transmittance	Air Leakage (U.S./I-P)
0.51	**0.2**

Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org

Project Location

Street Address: _____

City: _____ State: _____ Zip Code: _____

Project Name (Optional): _____ Designer (Optional): _____

Product Line Information

Operator Type (per Table 4-3 of NFRC 100) _____

Product Line ID No. _____ Individual Product ID No. _____

How many of this individual product _____ Location in building _____

Elevation drawing page _____ Fenestration (window & door) schedule page _____

Frame Material Supplier Company name: _____

City: _____ State: _____ Zip Code: _____

Street Address: _____

Contact: _____ Phone: _____ Fax: _____

Glazing Material Supplier Company name: _____

City: _____ State: _____ Zip Code: _____

Street Address: _____

Contact: _____ Phone: _____ Fax: _____

Glazing Contractor/Installer Comp. name: _____

City: _____ State: _____ Zip Code: _____

Street Address: _____

Contact: _____ Phone: _____ Fax: _____

Certification Authorization

Independent Certification & Inspection Agency (IA): _____

Date Certification Authorization Issued: _____

Materials, Systems, and Equipment

Default Glazed Fenestration *U*-Factor

TABLE 303.1.3(1)
DEFAULT GLAZED FENESTRATION *U*-FACTOR

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT	
			Single	Double
Metal	1.20	0.80	2.00	1.30
Metal with Thermal Break	1.10	0.65	1.90	1.10
Nonmetal or Metal Clad	0.95	0.55	1.75	1.05
Glazed Block	0.60			

Materials, Systems, and Equipment

Default Door *U*-Factors

TABLE 303.1.3(2)
DEFAULT DOOR *U*-FACTORS

DOOR TYPE	*U*-FACTOR
Uninsulated Metal	1.20
Insulated Metal	0.60
Wood	0.50
Insulated, nonmetal edge, max 45% glazing, any glazing double pane	0.35

Materials, Systems, and Equipment

Default Glazed Fenestration SHGC

TABLE 303.1.3(3)
DEFAULT GLAZED FENESTRATION SHGC

SINGLE GLAZED		DOUBLE GLAZED		
Clear	Tinted	Clear	Tinted	GLAZED BLOCK
0.8	0.7	0.7	0.6	0.6

- Chapter 11 in IRC replaced by IECC-Residential(RE)
- Cold-climate builders: will foam sheathing be needed?;
- More efficient Fenestration products;
- **Every new home will need to pass a blower door test to 3ACH$_{50}$; (if adopted)**

Air leakage

New Homes must pass a Blower Door Test. (If adopted)

Installation. Components of the building envelope and air barrier shall be installed in accordance with the thermal- and air-barrier table.

Testing. The building/dwelling unit shall be tested/verified with a blower door as having **an air leakage rate not exceeding 3 ACH_{50}.**

Two Things Needed for Air to Flow

(Building Science 101)

Hole
Pressure differential

Driving forces to cause air to flow:

- Mechanical (a fan)
- Wind

We have no control over wind!

- Stack effect (convection)
- Reverse stack effect

We can control these

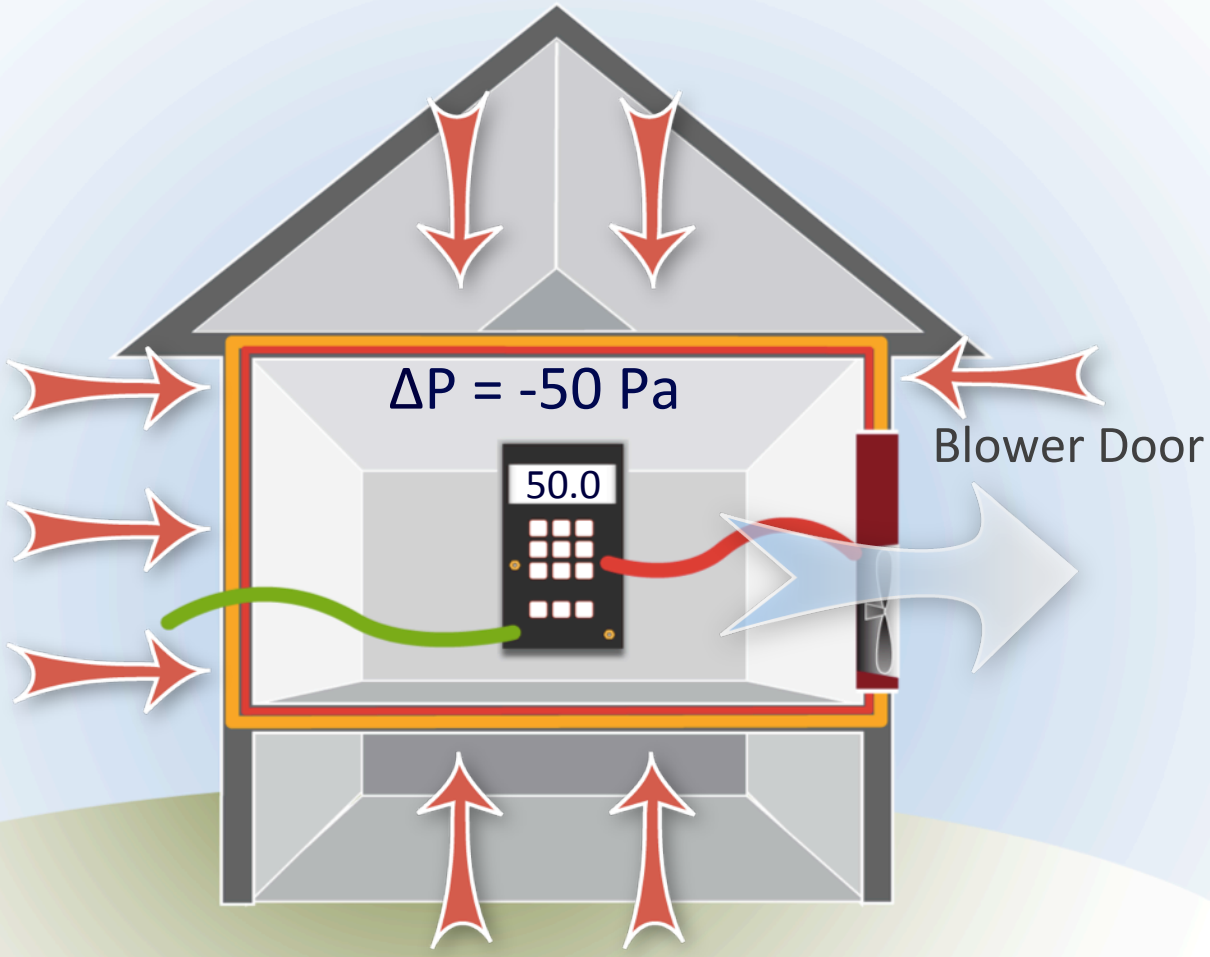
R402.4.1.1 – Blower Door Testing

(*Air Leakage Rate of 3 ACH_{50} Required)*

Use of a calibrated fan to depressurize the house…

1. Quantify air leakage of the building
2. Locate the sources of air leakage
3. Prioritize energy improvement dollars

Blower Door Testing



Calculating ACH_{50}

ACH_{50}=(CFM_{50} X 60 min/hour) ÷ Vol.

- **Blower Door Flow Reading** = 2,550 cfm_{50}
- **House Volume** = 27,000 cu/ft
- **ACH_{50}** = (2,550 x 60) ÷ 27,000 = 5.7 ACH_{50}

(Multiply by 60 to convert from minutes to hours)

Approximate Leakage Area

Divide CFM_{50} by 10

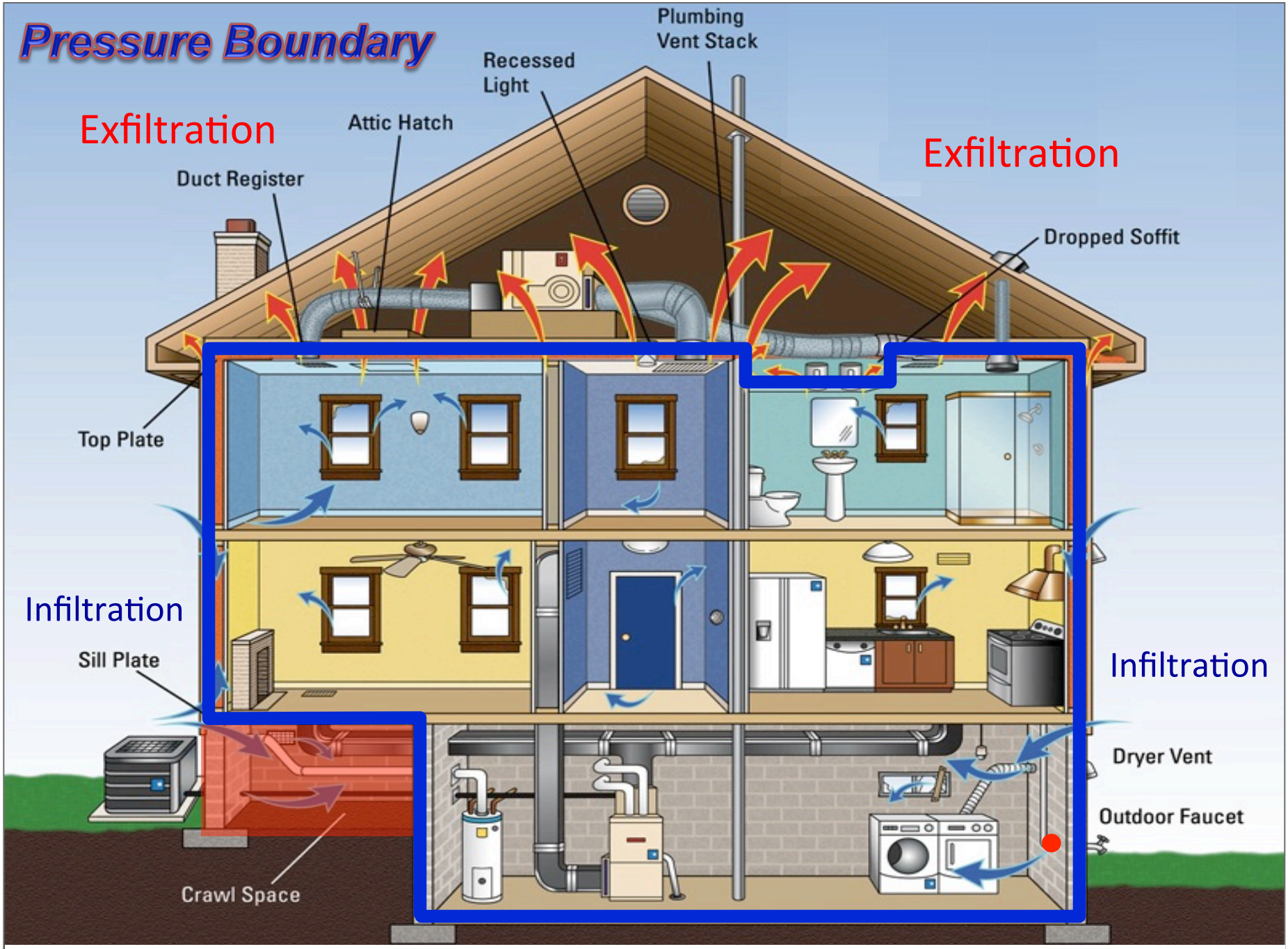
Then take Sq. Root

For example:

2,550 CFM_{50} ÷ 10 = 255 sq”

√ 255 = 16” x 16” hole

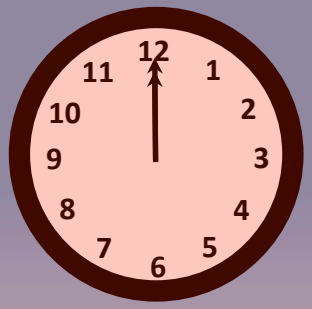
Like having a window open 24 / 7 in every season



One cfm IN = one cfm OUT

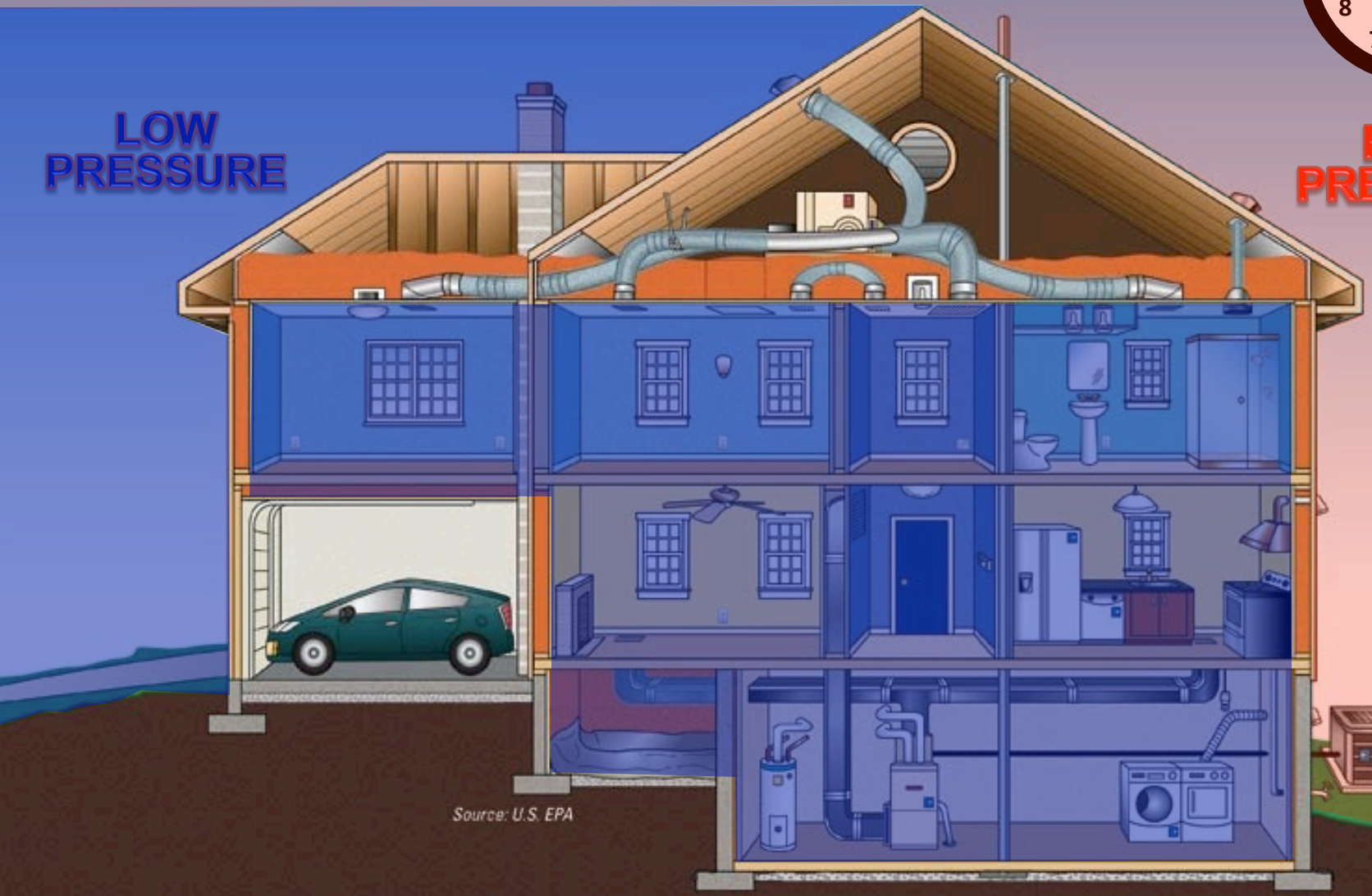
50 Pa = 20 mph wind
1 ACH_{50}

WIND PRESSURE

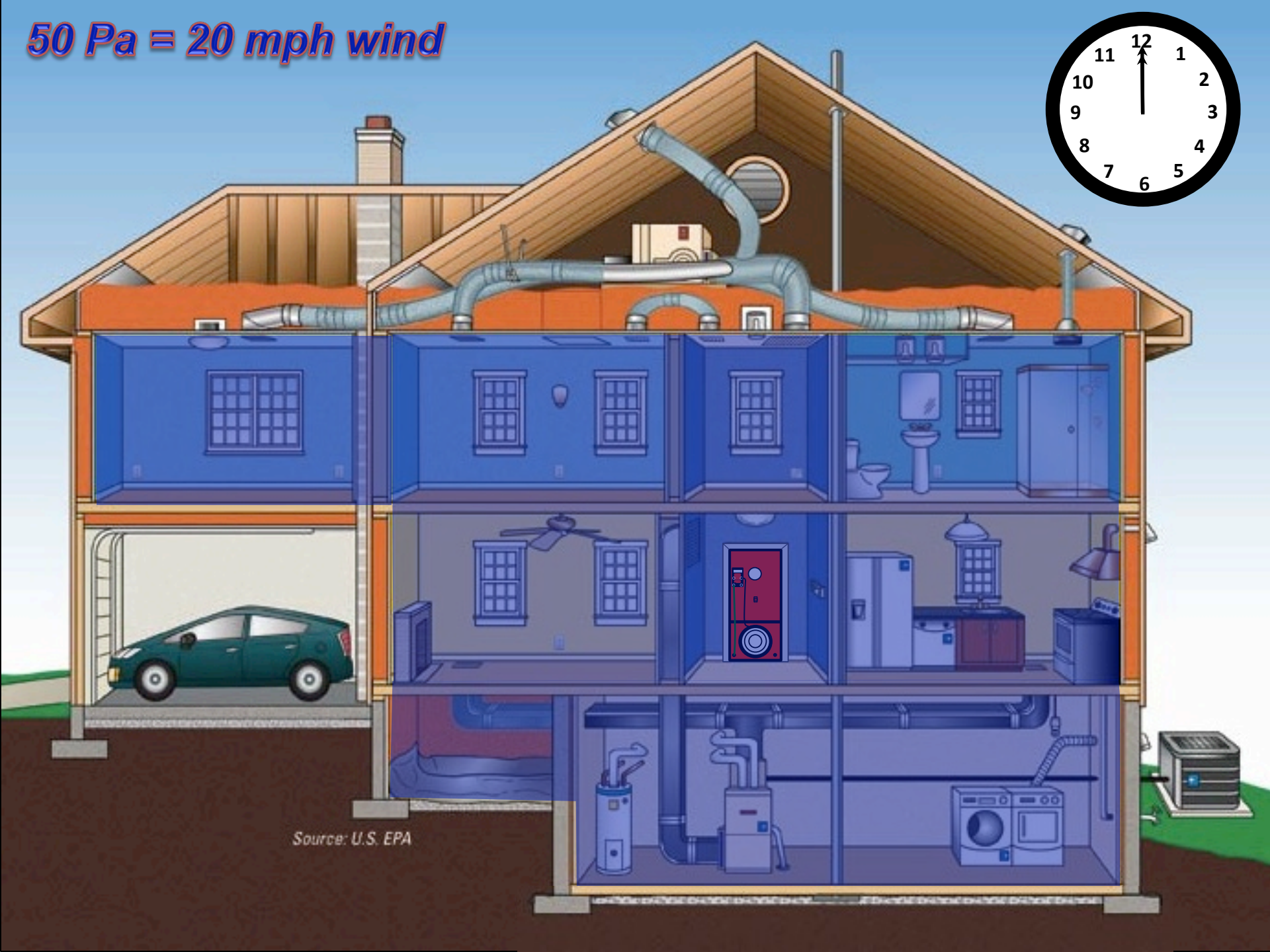


LOW PRESSURE

HIGH PRESSURE



50 Pa = 20 mph wind



Gap in Pressure Boundary

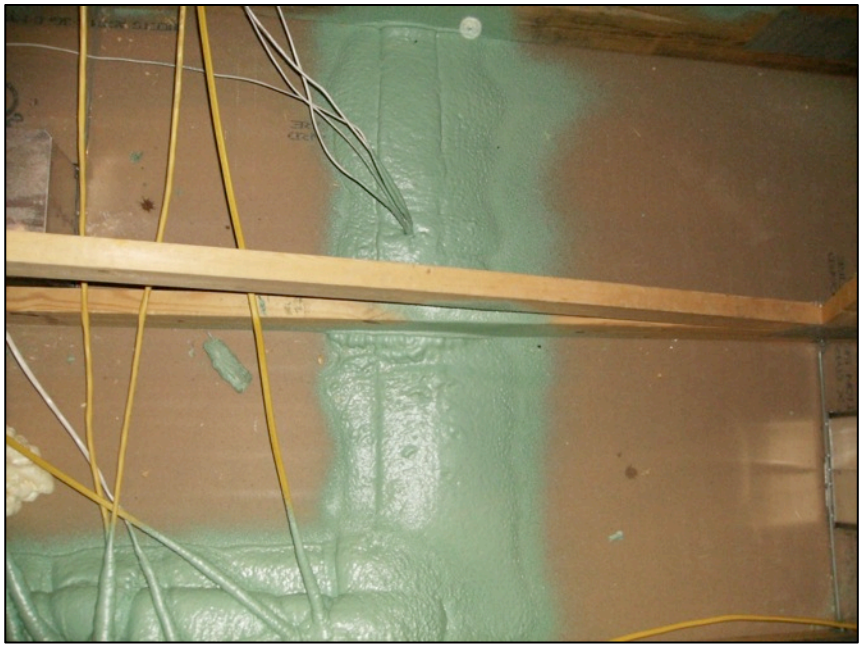
is a Tell Tale
r Leaks

occurs in wall
n air leaks out
ing moisture

Why Do a Blower Door Test?

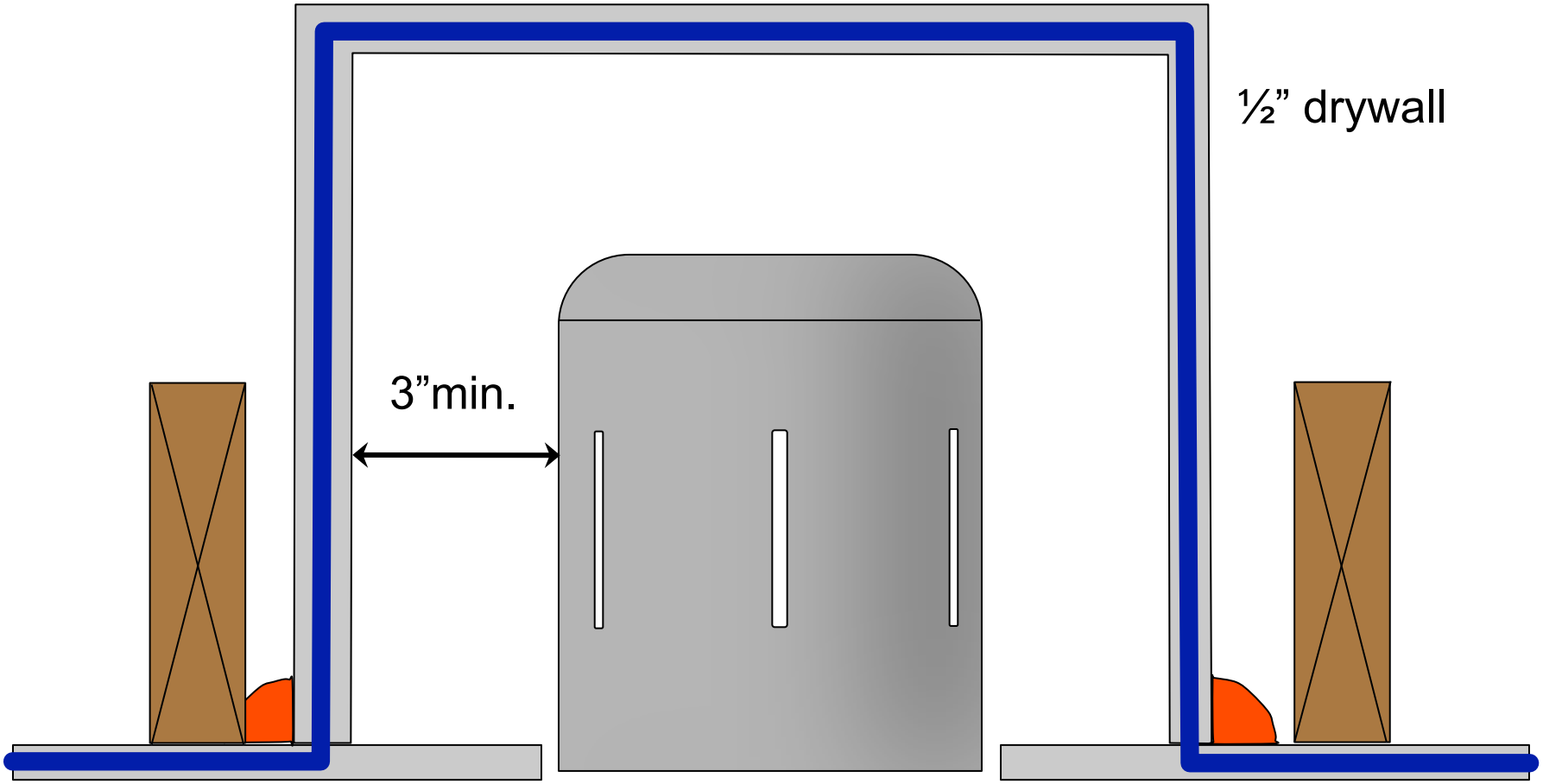
Sealed Top Plates & Short Knee Walls

Sealed and insulated short knee wall and top plates



Perfectly sealed top plates with 2-part spray foam

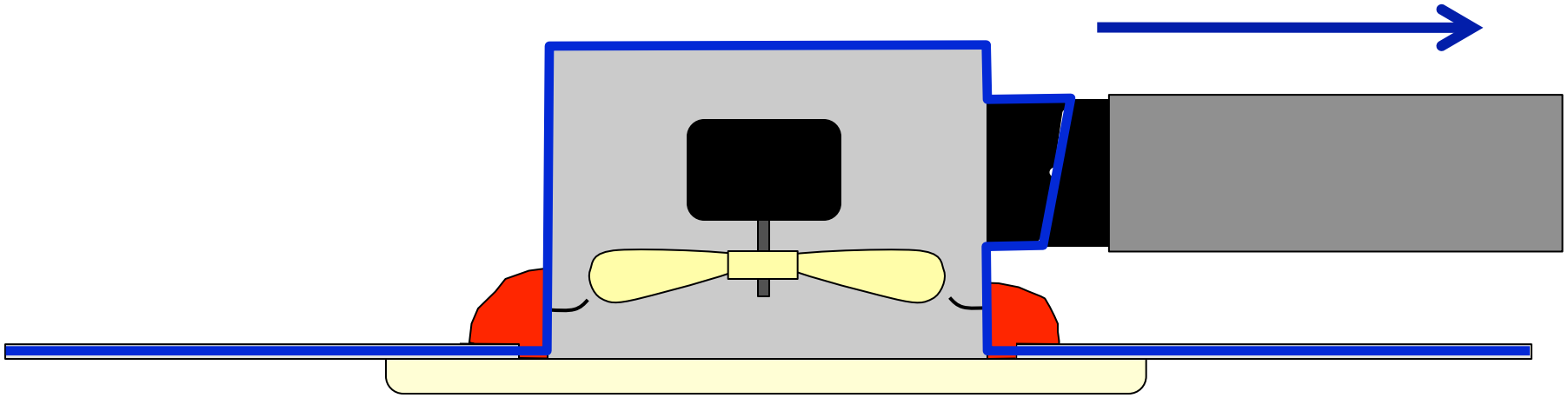
Non-IC Rated Recessed Light Fixture



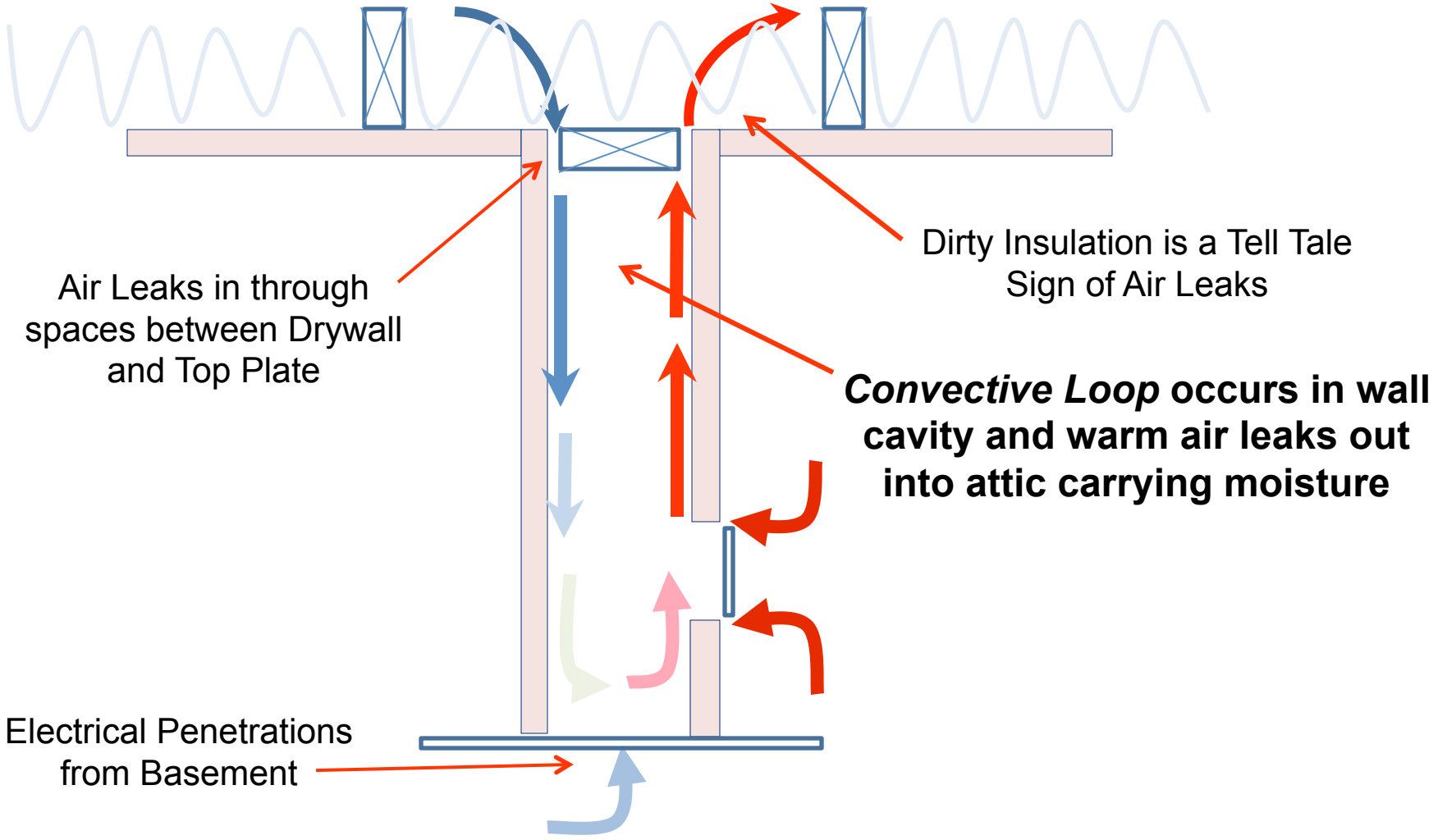
Incomplete pressure boundary

Why Do a Blower Door Test?

Continuity of Pressure Boundary, Exhaust Fans



Gap in Pressure Boundary

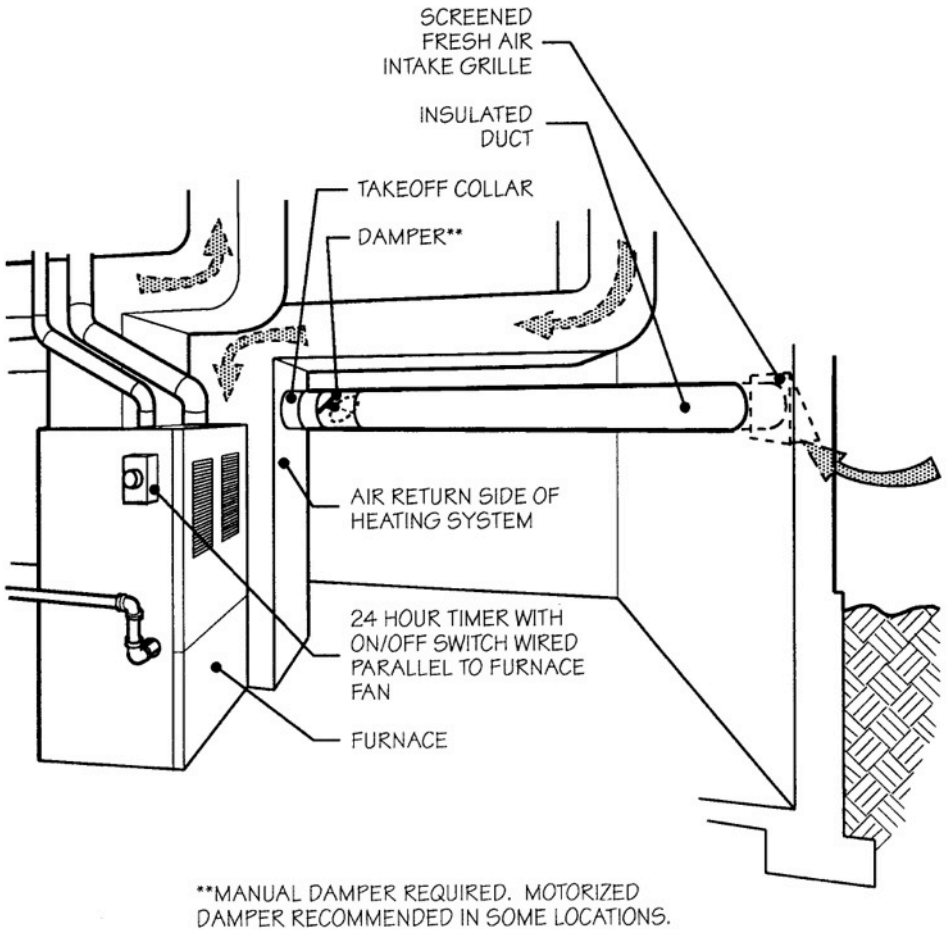


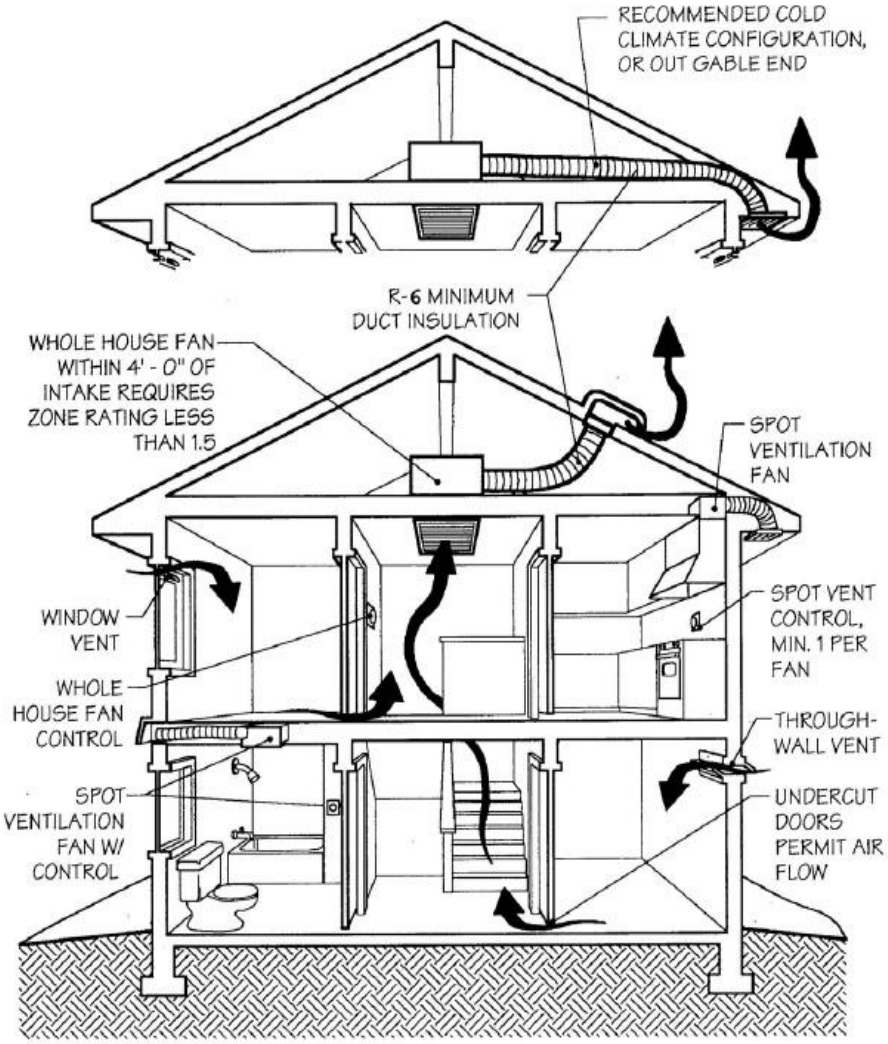
- Chapter 11 in IRC replaced by IECC-Residential(RE)
- Cold-climate builders: Will foam sheathing be needed?;
- More efficient Fenestration products;
- Every new home will need to pass a blower door test to 3ACH$_{50}$; (if adopted)
- **Balanced Mechanical ventilation required for homes**

Def'n - Balanced Mechanical Ventilation required for homes

- **An exhaust only system and a supply only system or some other combination thereof [balanced within 10% for air flow rates] designed to mechanically exchange indoor air with outdoor air…operating continuously or intermittently… as needed to satisfy the whole house ventilation rates.**

BALANCED WHOLE HOUSE MECHANICAL VENTILATION SYSTEMS

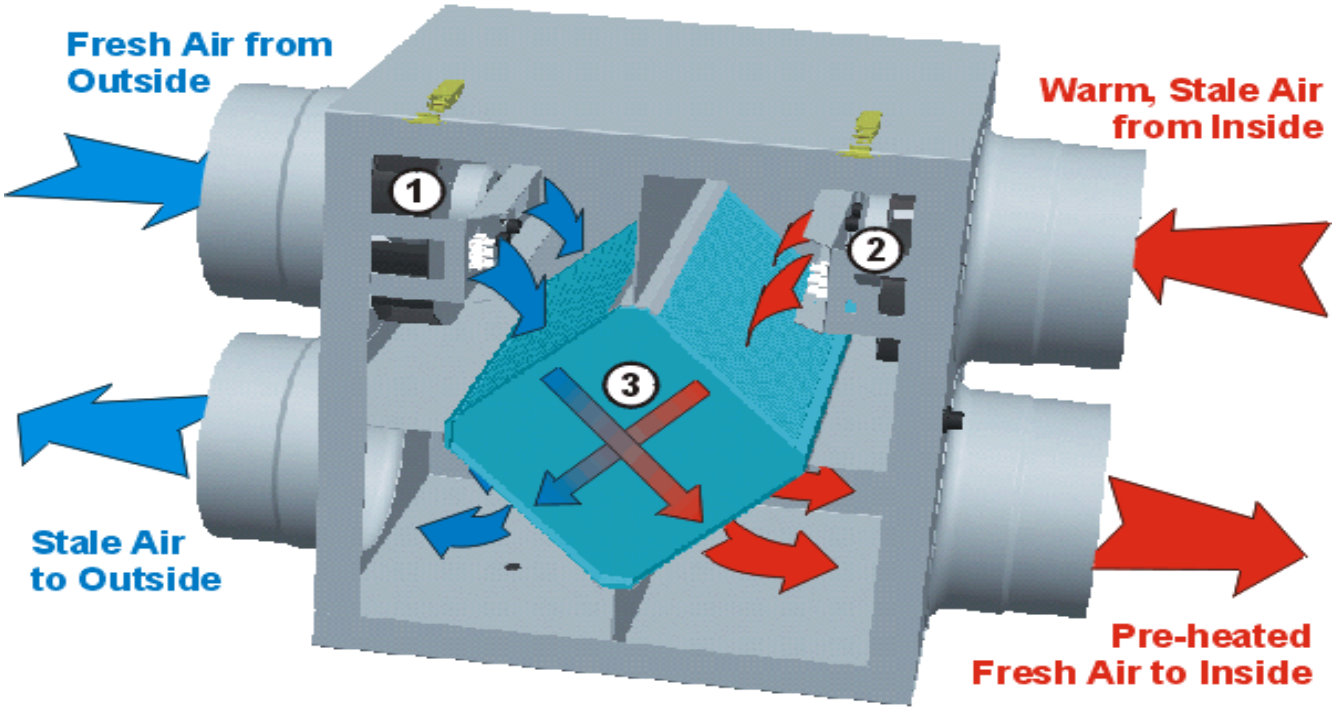




BALANCED WHOLE HOUSE MECHANICAL VENTILATION SYSTEMS

Integrated [Balanced] System

HRV or ERV



- Chapter 11 in IRC replaced by IECC-Residential(RE)
- Cold-climate builders: Will foam sheathing be needed;
- More efficient Fenestration products;
- Every new home will need to pass a blower door test to 3ACH$_{50}$;(if Adopted
- Balanced Mechanical ventilation required for homes (if adopted)
- **New SHW pipe insulation and run-length requirements (R-3);**

Hot Water Pipe Insulation

- **Hot water piping will be insulated to at least R-3 as follows:**
  - Piping is larger than 3/4” in nominal diameter,
  - Piping serves more than one dwelling unit,
  - Piping runs from water heater to kitchen outlets,
  - Piping is located outside of conditioned space,
  - Piping runs from water heater to a distribution manifold,
  - Piping is located under a floor slab,
  - Piping is buried,
  - Supply and return piping is in recirculation systems other than demand recirculation systems,
  - **Piping run exceeds the following maximum run lengths:**

Nominal diameter of largest pipe diameter in run	3/8”	1/2"	3/4”	> 3/4"
Max run length	30 ft	20 ft	10 ft	5 ft

- Chapter 11 in IRC replaced by IECC-Residential(RE)
- Cold-climate builders: Get ready for mandatory foam sheathing;
- Better performing, more efficient windows;
- Every new home will need to pass a blower door test to $3ACH_{50}$;
- Balanced Mechanical ventilation required for homes
- New SHW pipe insulation and run-length requirements (R-3);
- **Increased stringency of duct leakage thresholds;**

Increased duct leakage stringency

Duct Sealing (Mandatory). All ducts are required to be tested for total duct leakage (tightness).

Exception: The test is not required where the air handler and entire duct system are located within conditioned space. New criteria for testing is provided.

	Total Duct Leakage CFM25 per 100 ft^2 CFA	
Construction Phase	~~2009 IECC~~	2012 IECC
Post-Construction	12	4
Rough-in	6	4
Rough-in if air-handler not yet installed	4	3

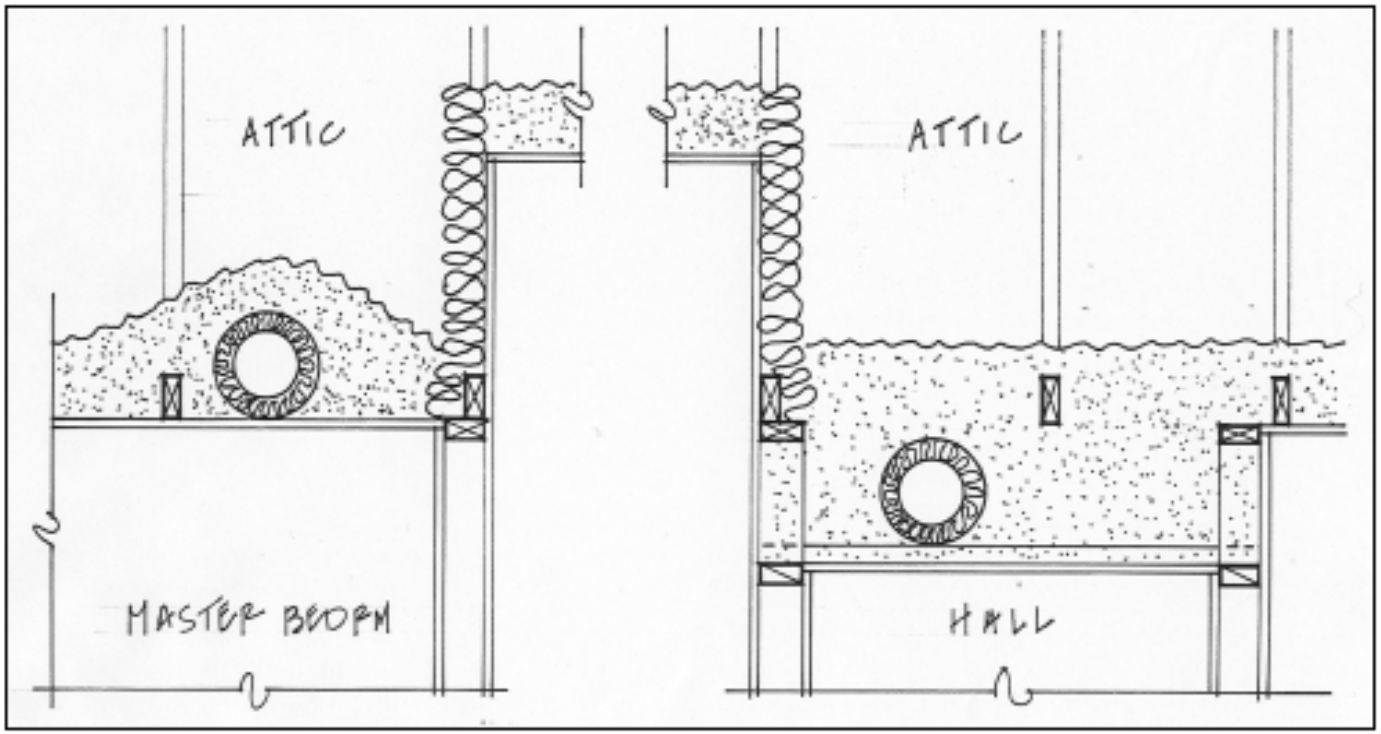
Note: Duct Leakage is measured in cubic feet per minute (CFM) at a pressure of 25 Pascals for every 100 square feet of conditioned floor space (CFA)

- Chapter 11 in IRC replaced by IECC-Residential(RE)
- Cold-climate builders: Get ready for mandatory foam sheathing;
- Better performing, more efficient windows;
- Every new home will need to pass a blower door test to 3ACH$_{50}$;
- Balanced Mechanical ventilation required for homes
- New SHW pipe insulation and run-length requirements (R-3);
- Increased stringency of duct leakage thresholds;
- **Building cavities would no longer allowed for supply or return air;**

Ductwork Buried in Ceiling Insulation

- **Code Compliant Ceiling Insulation (R-Value, Depth, Density)?**

Figure 1. Two Buried Duct Installation Configurations



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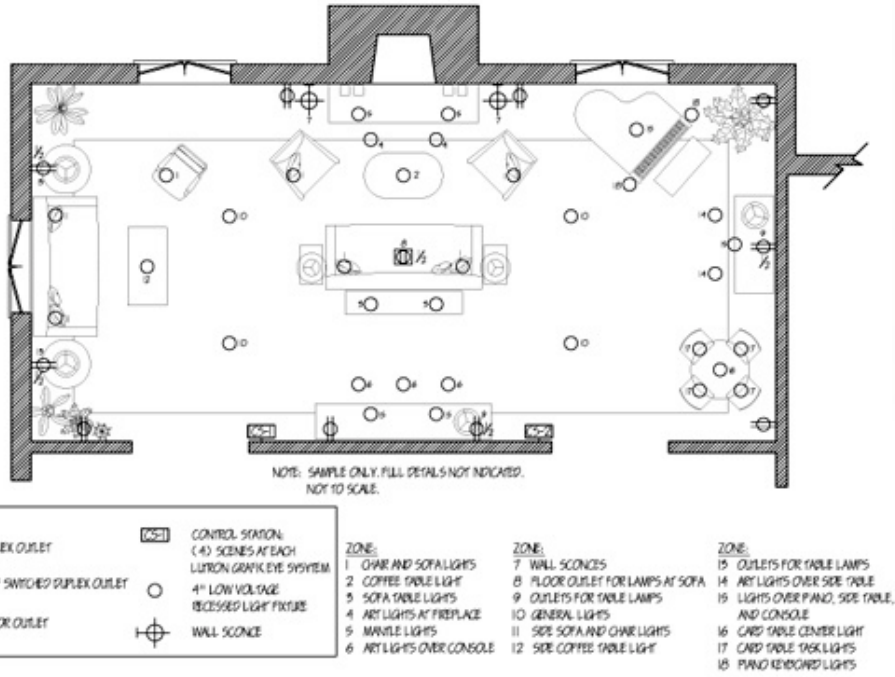
- **Three of every four fixtures will need to be high-efficacy lamps (75%);**

Three of every four fixtures will need to be high-efficacy lamps

A minimum of 75% of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.



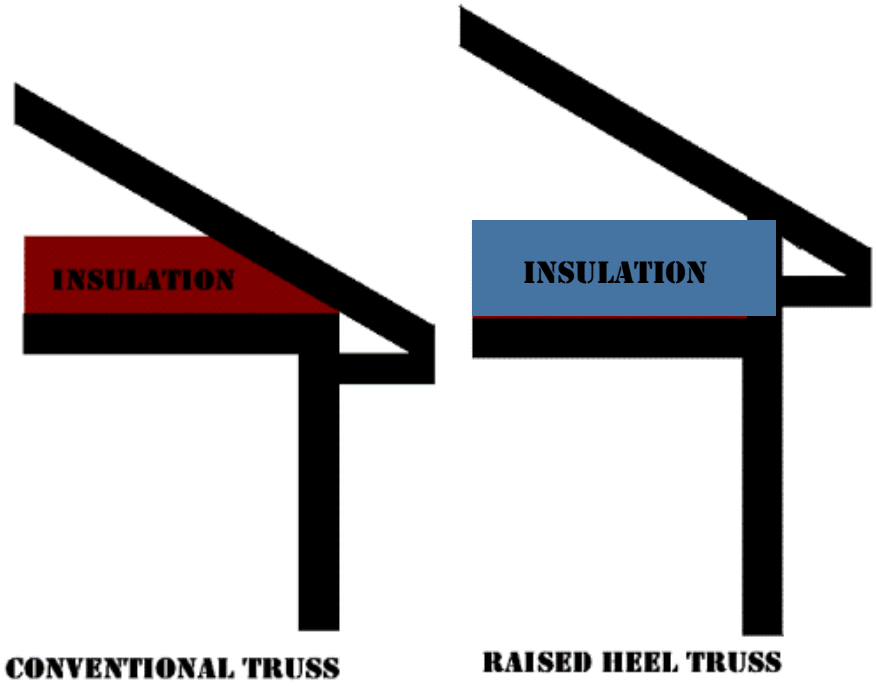
Def'n – THERMAL ISOLATION SUNROOMS

- **Sunrooms – One-story structure >40% glazed wall and roof area. Must meet insulation requirements of code or be *thermally isolated*.**
- **Physical and space conditioning separation from conditioned spaces. The conditioned spaces shall be controlled as separate zones for heating and cooling or conditioned by separate equipment.**

Raised Truss Clarification

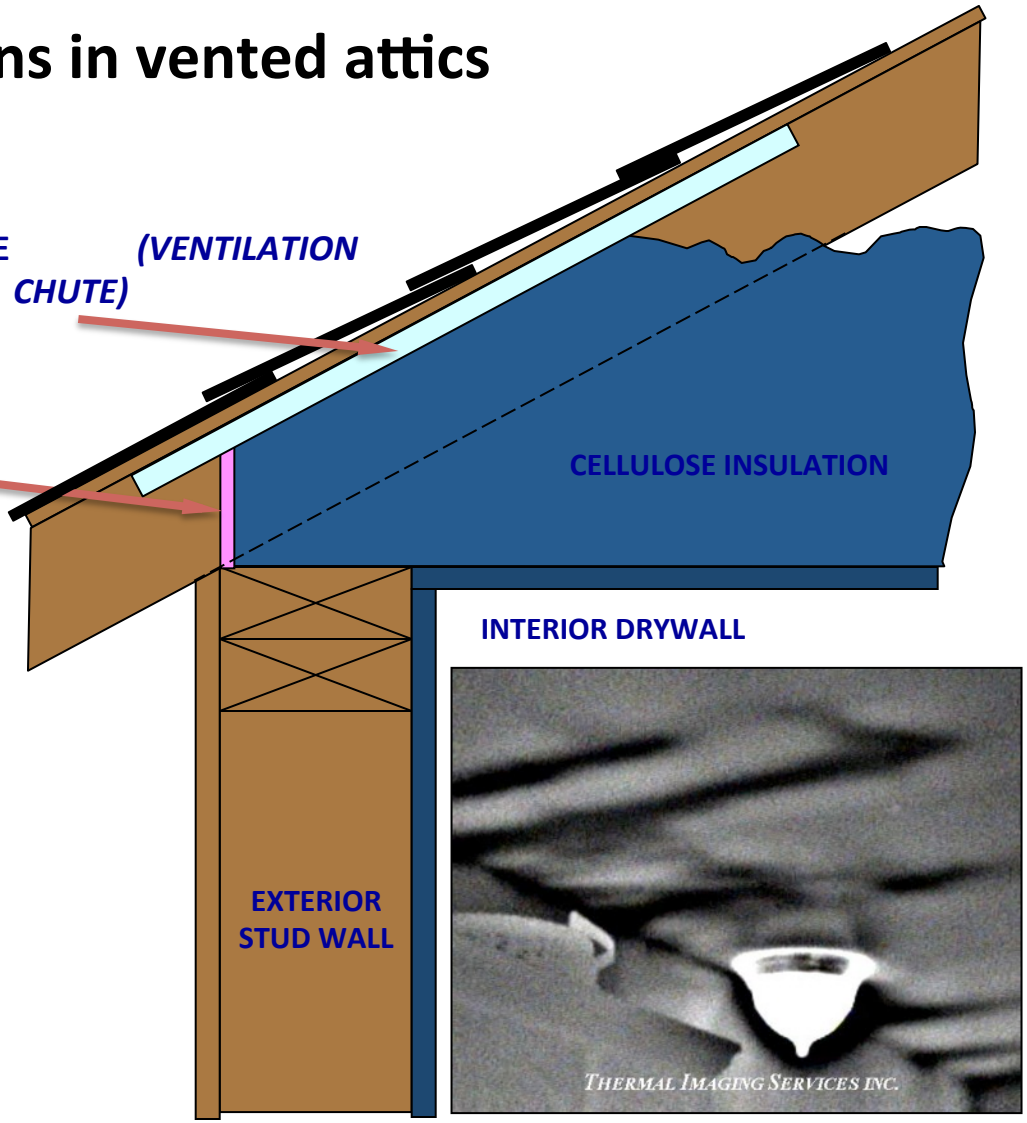
(R-Value Reduction Over Entire Attic Field)

- **The R-30 for R-38 or R-38 for R-49 substitution is applied across the entire attic field (not just at the wall line-to-eave extension).**

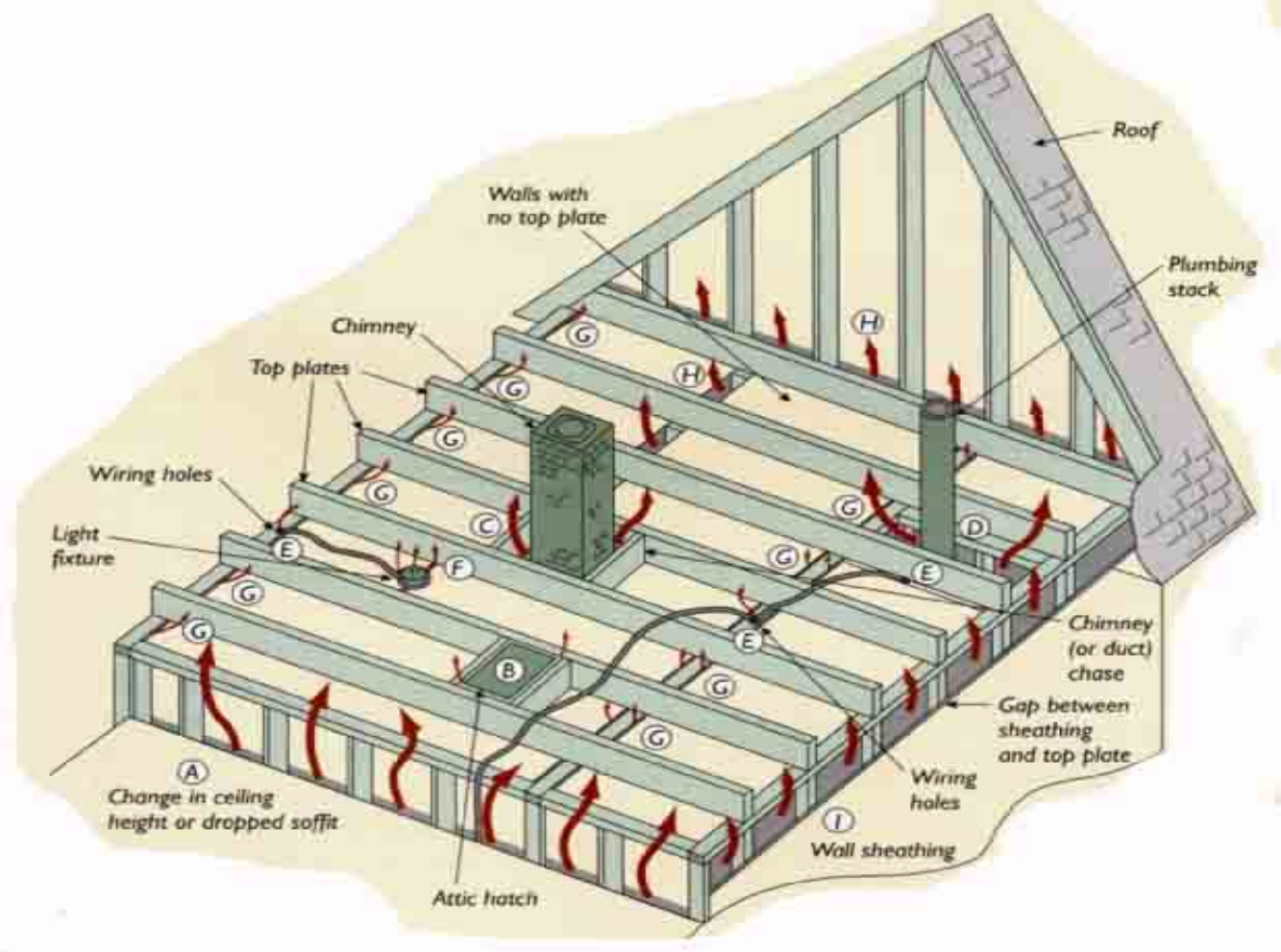


Eave Baffle

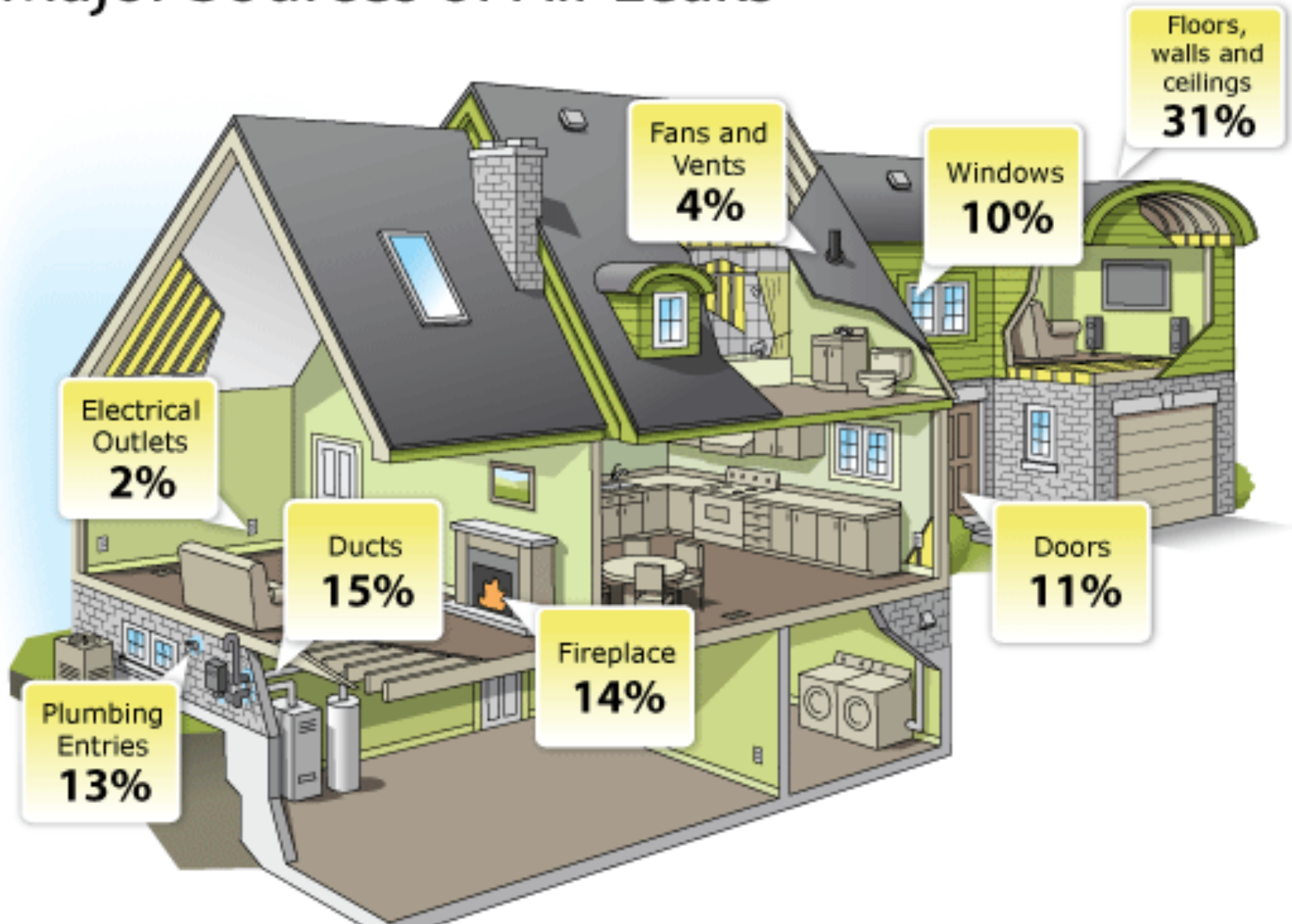
- For air-permeable insulations in vented attics



Air Sealing Priorities

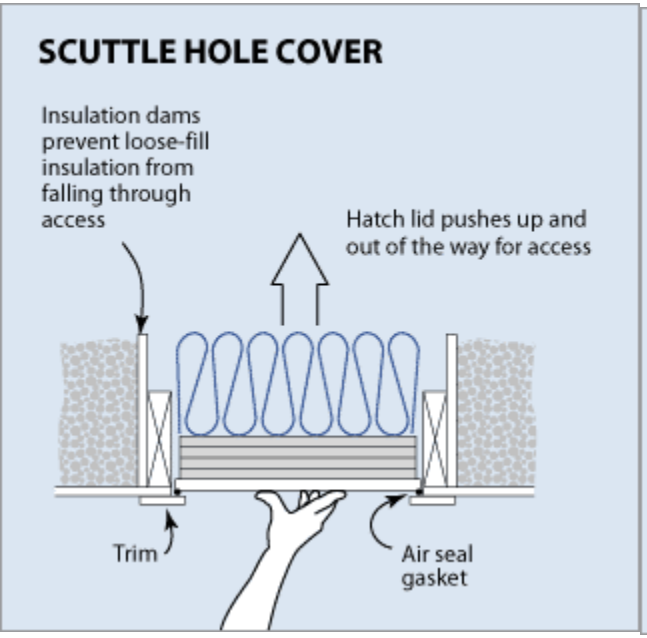


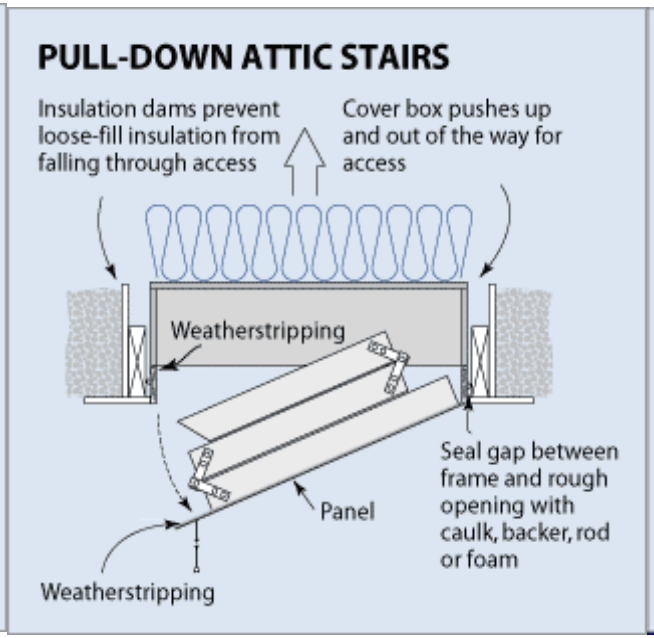
Major Sources of Air Leaks

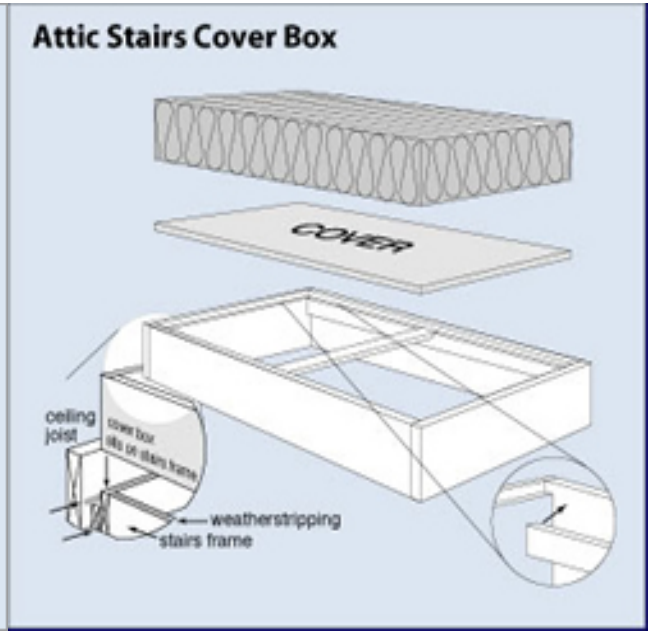


Attic Access Hatches

- **Attic access doors from conditioned to unconditioned spaces shall be weather-stripped and insulated. Insulation dam/baffling required.**







Fireplaces

TABLE R402.4.1.1
AIR BARRIER AND INSULATION INSTALLATION

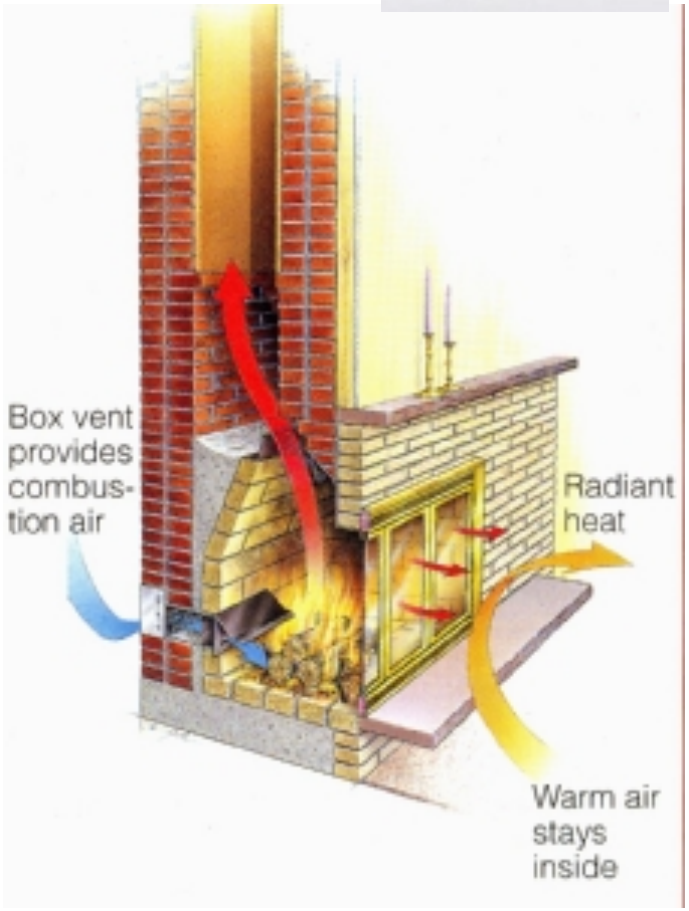
COMPONENT	CRITERIA[a]
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
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 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 the drywall.
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 walls 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 walls	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the sub-floor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.

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

R402.4.2 – Fireplaces
T402.4.1.1 – Fireplace doors

Tight-fitting

(see UL127-08)



Fireplaces.

New wood-burning fireplaces will have tight-fitting flue dampers and outdoor combustion air.

Simulation Software

(Performance Alternative)

- Neither ICC nor DOE or the State of Minnesota reviews or approves specific software.
- Section 405 and tables R405.5.2(1) & R405.5.2(2) set the "Rules to the Game" for how the software must calculate compliance.
- Some more commonly known software are:
  - REM/Rate™, REM/Design™
  - EnergyGauge® USA Residential, EnergyGauge® Commercial
  - MICROPAS® *California Residential Energy Standards (a.k.a., Title-24)*
  - **RES*check*™ and COM*check*™ are *Total UA Trade-Off Tools Not Simulation Software.***
- Some software offer's more flexibility than others: REM/Rate™ and EnergyGauge® can use data from building diagnostic testing to allow for flexibility and an "as installed" approach to meeting code.

Wall Insulation Installation Grading I-III

Grade I

R-Value "as labeled."
Insulation makes full contact w/ all sides of wall framing. No indentations or gaps. Insulation is cut-to-fit around plumbing and wiring.

Grade II

2% R-0, 98% R-Value "as labeled."
Insulation mostly making contact with all sides of framing. Some indentations and compressions of the insulation.

Grade III

5% R-0, 95% R-Value "as labeled."
Insulation has multiple gaps and compressions. Insulation was not cut –to-fit around plumbing or wiring.

So where are we at in the Current Rule Adoption Process?

When will the new provisions of the code come into effect?

When will the new provisions of the code come into effect?

- **The provisions of the new code are targeted for adoption around the first of the year or maybe a little earlier and will be effective in the early part of Spring 2014.**

How to prepare for the new Code?

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  - **2 versions of the book are published**
    - **1 version has just the IECC requirements**
    - **The other also includes ASHREA Standard 90.1-2010**

What did we learn from the 90% Compliance Study for residential Buildings?

90% Compliance Study for Minnesota

Research and study 44 new residential buildings and 44 remodeled residential buildings

Research and study 44 new commercial buildings and 44 remodeled residential buildings

Commercial and Residential Buildings were Studied

44 new buildings of each and 44 remodeled buildings of each

- **Plan review**
- **Insulation Inspection**
- **Final Inspection**
- **Report results**

What is the #1 issue that contractors need to change?

What is the #1 issue that contractors need to change?

- **Submittal Documents.**
  - **They are not complete and are lacking most information that is needed from the Mechanical side of the buildings.**
  - **Permits will not be issued until this is submitted and reviewed by the Code Official**

Construction Documents

(State Building Code Section 1300.0130 and 1322.0401)

- **R401.3 Certificate (Mandatory).** A building certificate shall be completed and posted on or in the electrical distribution panel by the builder or registered design professional. The certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall list the date the certificate is installed, the dwelling address, residential contractor name and contractor license number, or homeowner (if acting as the general contractor), the predominant **installed R-values, their location, and type of insulation** installed in or on ceiling/roof, walls, rim/band joist, foundation (slab, basement wall, crawlspace wall or floor) and **ducts** outside conditioned spaces; U- factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and **the results of any required duct system** and building envelope **air leakage testing** done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall **list the types, input rating, manufacturer, model number and efficiencies of heating, cooling and service water heating equipment.** The certificate shall also **list the structure's calculated heat loss, cooling load and the structure's calculated heat gain.** Where an electric furnace or baseboard electric heater is installed in the residence, the certificate shall list "electric furnace," or "baseboard electric heater," as appropriate. An efficiency shall not be listed for electric furnaces or electric baseboard heaters. The certificate shall **list the mechanical ventilation system type, location, and capacity, and the building's designed continuous and total ventilation rates.** The certificate shall also **list the type, size, and location of any make-up air system installed**. If the radon mitigation system is a passive or active system, the certificate must list the location or future location of the radon fan.

Summary

- There are many changes coming to the code both at submittal time and in the application of the products in the field, but it is not very difficult to comply with these changes

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- There are many changes coming to the code both at submittal time and in the application of the products in the field but it is not very difficult to comply with these changes

- **Bottom line is**
  - **No permit without all documentation submitted at permit application for review by the BO**
  - **Take the time on the front end to design the buildings systems, their ductwork and the locations of everything that you are going to be installing within the building.**

  - **It is as simple as that**

Please Drive Carefully on your way home!