



Nebraska's Energy Code

2018 IECC Compliance Issues and Solutions

Nebraska Energy Code Training Program

Instructor: Matt Belcher

August 13, 2024



Housekeeping



Attendees are muted upon entry



Questions? Enter them in the chat box, or simply unmute yourself and ask



Webinar is being recorded – slides and recording will be sent to attendees



CEU's will be available upon request (ICC and AIA)

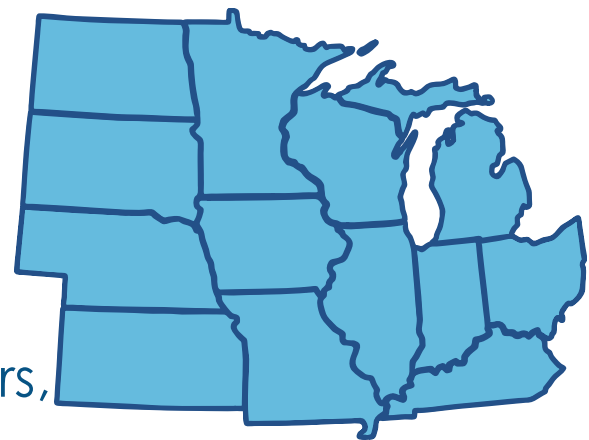


Email: jgossman@mwallian.ce.org with questions



Who We Are

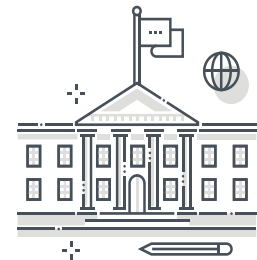
The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network, promoting energy efficiency to optimize energy generation, reduce consumption, create jobs and decrease carbon emissions in all Midwest communities.



MEEA is a non-profit membership organization with 170+ members, including:



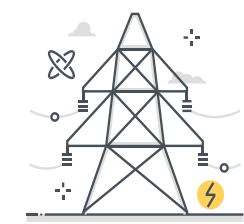
Energy Service Companies & Contractors



State & Local Governments



Academic & Research Institutions



Electric & Gas Utilities



Community-based Organizations

About the Nebraska Training Program



Goal: **prepare** the Nebraska workforce for changes in construction best practices



Focused on **providing training** to builders, code officials, design professionals, public officials and students



For more information, visit:

<https://www.mwalliance.org/nebraska-energy-codes-training-program>

Training Objectives

- What is the 2018 Energy Code?
- Inside the Energy Code:
 - Building Envelope
 - Interior Comfort/Health
 - Remodeling/Rehab
 - Local Application/Amendments
- '21 Code → '24 National Standard
- Marketing Energy Efficient/High Performance Buildings





Nebraska's Energy Code

- Nebraska adopted the full suite of 2018 International Code Council's (ICC) Codes, including the unamended International Energy Conservation Code (IECC)
- The IECC...
 - Applies to new and renovated buildings
 - Sets minimum requirements for energy features and performance
 - Reduces energy use and polluting emissions over the life of complying buildings
 - Benefits commercial building owner, homeowners, and society by improving cost-effectiveness, comfort, productivity, and durability
- The IECC covers both residential and commercial buildings, but we are focused on commercial today

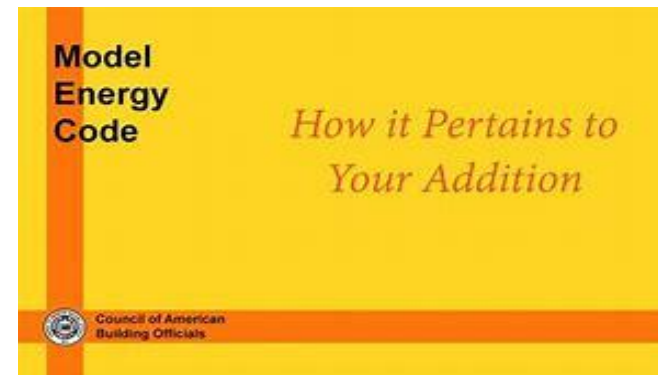


The 2018 IECC

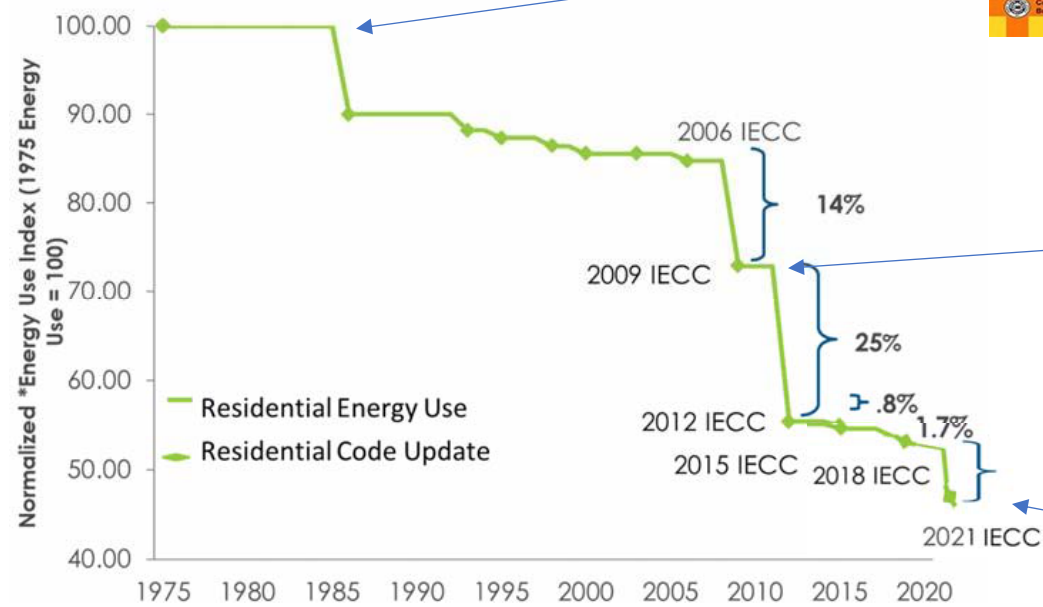
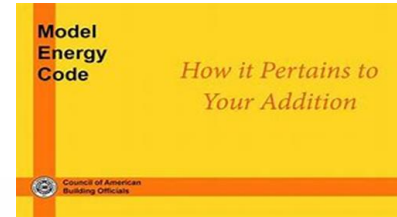


The Energy Code

- Model Energy Code (MEC) developed in 1983 under a U.S. Dept of Energy Contract
- Editions of the MEC released from 1983-1995
- Title changed to International Energy Conservation Code in 1998



Energy Code Background



Nebraska Residential Field Study

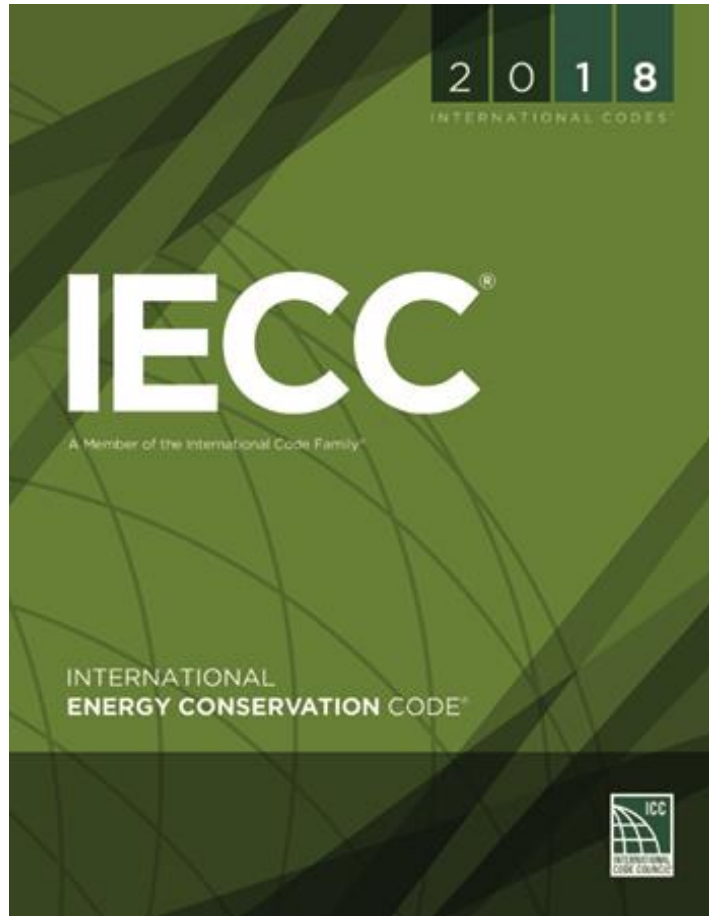
- Conducted in 2017 by **Nebraska Department of Environment and Energy**. 2009 IECC was the baseline.
- Collected and analyzed several data points for new homes, including:
 - Envelope air leakage
 - Efficacy in lighting
 - Duct leakage
 - Ceiling & exterior wall insulation
 - Basement & slab insulation
 - Windows

For More Information and Data:

https://www.energycodes.gov/sites/default/files/documents/Nebraska_Residential_Compliance_Evaluation_final.pdf



So, What's Changed since 2009?



2018 IECC / IRC Section 11

- Creates a Residential Energy Code separate from the Commercial Energy Code
- Adds testing and verification requirements
- Promotes Innovation through Energy Ratings Index (ERI)
 - Uses a HERS-type index as an “equivalent” for residential applications
 - Mandatory requirements still apply

The Energy Code is Everywhere

- Unlike most other codes, the energy code directly impacts the work of many disparate building trades and systems, including:
 - Framing/Envelope
 - Plumbing
 - HVAC
 - Electric
 - Moisture management
 - Concrete
 - Caulking



2018 IECC Mandatory Requirements

Energy Certificate

- Energy Certificate located on circuit breaker box includes key energy efficiency measures and is signed by the builder

Air Sealing

- All holes between floors and through exterior walls/ceilings have been sealed in **accordance with table R402.4.1.1**
- Building or dwelling unit is **tested to verify air leakage rate of ≤ 3 Air Changes per Hour (ACH)**
- Building or dwelling unit must have continuous air barrier installed

2018 IECC Mandatory Requirements

Ducts

- All ducts are sealed with approved materials (e.g. mastic or UL 181 tape) - duct tape is not acceptable
- All ducts outside conditioned space are tested to verify duct leakage with a total duct leakage or leakage to the outside test
- Supply & return ducts in attic insulated to $\geq R-6$ when ducts are outside conditioned space and $\geq R-8$ when ducts are outside the building thermal envelope

Building Cavities

- **Building framing cavities shall not be used as supply ducts or plenums**

2018 IECC Mandatory Requirements

Heating and Cooling

- Controls: Programmable thermostat installed
- Equipment sized per ACCA Manuals S & J

Lighting

- Minimum of **90% high-efficacy lamps** installed
- Recessed lighting in thermal envelope IC-rated and airtight

Mechanical Ventilation

- **Installed according to requirements in the International Mechanical Code**
- **Required for all homes ≤ 5 ACH per Section M303.4 (3 ACH is a 2018 IECC mandatory requirement)**

2018 IECC Mandatory Requirements

Other requirements

- Wood-burning fireplaces have tight flue dampers or doors, and outdoor combustion air
- Mechanical system piping insulated to min R-3 for fluids $>105^{\circ}$ F or $<55^{\circ}$ F
- Circulating hot water systems shall be insulated to at least R-2. Systems shall include an automatic, or readily accessible, off-switch.

Energy Code Compliance Pathways

Prescriptive Method Requirements

- All mandatory and prescriptive requirements must be met

Total UA Method Requirements

- All mandatory and prescriptive requirements (other than Table R402.1.2) must be met
- Include documentation to demonstrate compliance with the UA Trade-off method. Compliance software submittal must include completed compliance form, inspection checklist and certificate demonstrating compliance with 2018 IECC levels

Energy Code Compliance Pathways

Simulated Performance Requirements (Section R405)

- All mandatory requirements must be met
- Submit an energy cost analysis report which demonstrates that the proposed design (as built) home is more efficient than the standard reference design home

Energy Rating Index Requirements (Section R406)

- All Mandatory requirements met. Meet or exceed 2009 IECC prescriptive envelope requirements
- ERI score of 61 or lower. Submit report demonstrating compliance

Structure of Commercial 2018 IECC

- Ch. 1 Scope and Application / Administrative and Enforcement
- Ch. 2 Definitions
- Ch. 3 General Requirements
- Ch. 4 Commercial Energy Efficiency
- Ch. 5 Existing Buildings
- Ch. 6 Referenced Standards
- Index

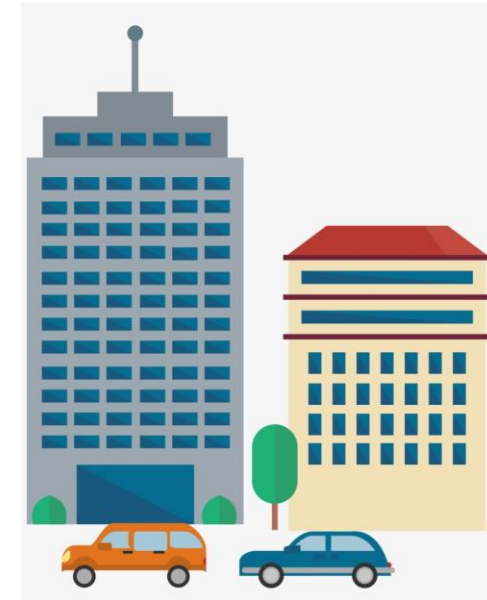
Commercial Buildings in the IECC

Under the Purview of the Commercial Code

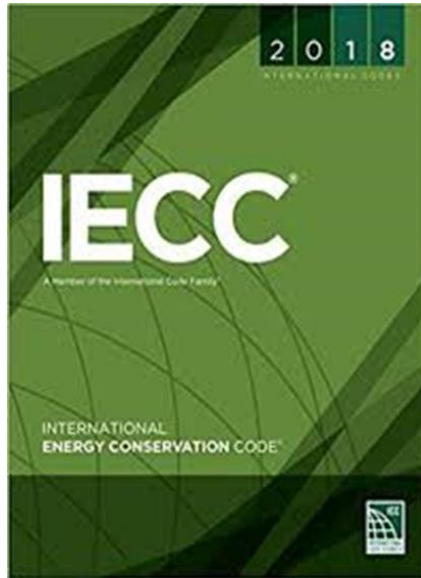
- ✓ Buildings with commercial use
- ✓ Multifamily residential buildings four stories or greater in height

Not Under the Purview of the Commercial Code

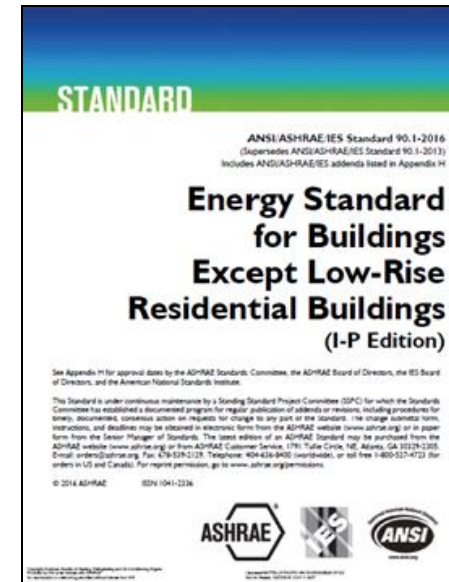
- × One- and two-family residential
- × R-2, R-3, R-4 three stories or less in height



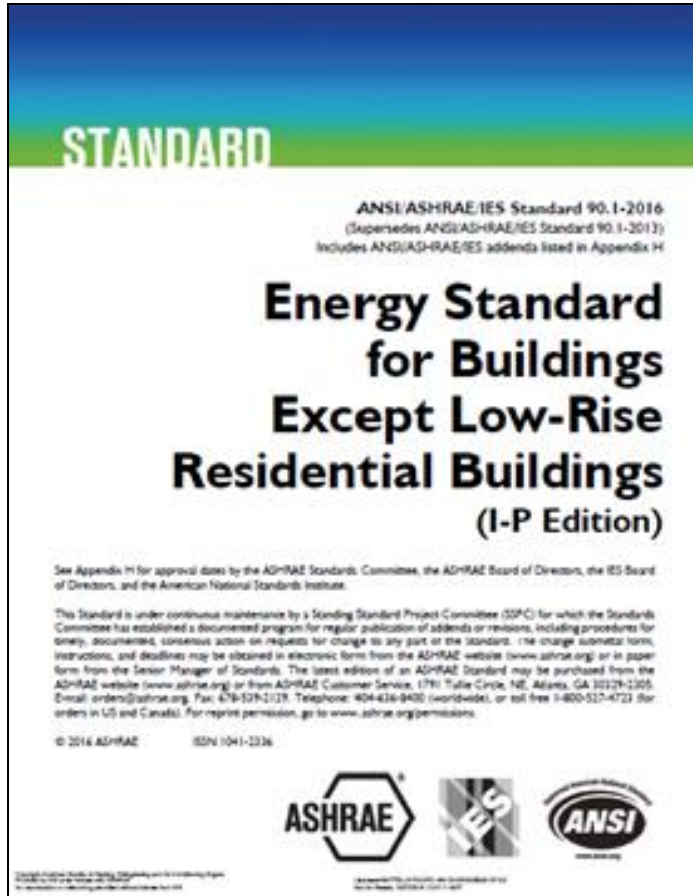
New in 2018: *Two Commercial Compliance Options*



ASHRAE 90.1-2016
Alternative Method to IECC



Structure of Standard 90.1-2016



1. Purpose
2. Scope
3. Definitions, Abbreviations & Acronyms
4. Administration and Enforcement
5. Building Envelope
6. Heating, Ventilating and Air Conditioning
7. Service Water Heating
8. Power
9. Lighting
10. Other Equipment
11. Energy Cost Budget Method
12. Normative References

What About Mixed Use? – C101.4.1

- Treat the residential building portion under the applicable residential code
- Treat the commercial building portion under the commercial code
- Code Official has final authority



Image: agarch.com

Commercial Compliance Options

ASHRAE 90.1-2016

OR

2018 IECC – Prescriptive

- ✓ C402 – Envelope
- ✓ C403 – Mechanical
- ✓ C404 – SWH
- ✓ C405 – Lighting

AND Pick at Least One C406:

- C406.2 – Eff. HVAC Performance
- C406.3 – Reduced Lighting Power
- C406.4 – Enhanced Lighting Controls
- C406.5 – On-site Supply of Renewable Energy
- C406.6 – Dedicated Outdoor Air System
- C406.7 – High Eff. Service Water Heating
- C406.8 – Enhanced Envelope Performance
- C406.9 – Reduced Air Infiltration

OR

2018 IECC – Performance

- C407 – Total Building Performance
- C402.5 – Air Leakage
- C403– Mandatory Mechanical Provisions
- C404 – SWH
- C405 - Lighting
- Building energy cost to be < 85% of standard reference design building



Building Envelope Compliance Options

3 Methods for compliance of building components:

- C402.1.3 – Insulation component R-value based method
- C402.1.4 – Assembly U-factor, C-factor or F-factor based method
- C402.1.5 – Component Performance Alternative

Building Envelope

- All of the elements of the envelope and the assembly methods (and details) determine how well the building envelope performs.
- The building envelope must be an unbroken boundary surrounding the structure.
- All elements must be in close alignment with each other.



Photo courtesy of U.S. Gypsum



Performance Testing

A Great Quality Control Tool



Air Leakage & Continuous Air Barrier Testing

Section C402.5

- Continuous Air Barrier Required
- Two Compliance Options
 - ASTM E 779 (blower door test)
 - Compliant assemblies
 - C402.5.1 through C402.5.8



Image: energyconservatory.com

Ventilation and Air Sealing

- Both natural and mechanical ventilation provide fresh air that can dilute and remove indoor pollutant levels
- Per the IMC/IRC, mechanical ventilation is required when homes are <5 ACH 50
 - Need to do a blower door test to determine leakage rate
 - **Liability concerns when not performed**
- A blower door test measures a building's existing air leakage
- Can not design a code compliant system without knowing air leakage



Courtesy of AC Tool Supply, Inc.

Air Leakage Report

- Blower door test documents a home's air leakage performance
- Required by code
- Third party verification (some areas; performed by Inspectors)
- Provides solid data for final equipment adjustment and energy use/cost forecast
- Great liability protection for all involved

AIR LEAKAGE REPORT

Date: May 02, 2012 Rating No.: 8016891 - 097

Building Name: 802EastMcCartyStreet Rating Org.: ASERusa
 Owner's Name: River City Habitat for Humanit Phone No.: 314-894-2300
 Property: 802 East McCarty Street Rater's Name: Gary Fries
 Address: Jefferson City, MO 65101 Rater's No.: 8016891
 Builder's Name: River City Habitat for Humanit Rating Type: Confirmed
 Weather Site: Columbia, MO Rating Date: 12/01/11
 File Name: 8016891 - 097 - eSTAR 2.0, TC, NR - 802 East M

Whole House Infiltration	Blower door test	
	Heating	Cooling
NaturalACH:	0.23	0.16
ACH @ 50 Pascals:	3.78	3.78
CFM @ 25 Pascals:	427	427
CFM @ 50 Pascals:	670	670
Eff. Leakage Area: [sq.in]	36.8	36.8
Specific Leakage Area:	0.00018	0.00018
ELA/100 sf shell: [sq.in]	0.96	0.96

Duct Leakage	Leakage to Outside Units	Ductwork
CFM @ 25 Pascals:		25
CFM25 / CFMfan:		0.0214
CFM25/CFA:		0.0181
CFM per Std 152:		N/A
CFM per Std 152 / CFA:		N/A
CFM @ 50 Pascals:		39
Eff. Leakage Area: [sq.in]		2.15
Thermal Efficiency:		N/A
Total Duct Leakage Units		CFM25/CFA
Total Duct Leakage:		0.0181

Ventilation	Air Cyclor
Mechanical:	
Sensible Recovery Eff. (%):	0.0
Total Recovery Eff. (%):	0.0
Rate (cfm):	50
Hours/Day:	24.0
Fan Watts:	150.0
Cooling Ventilation:	Natural Ventilation

ASHRAE 62.2 - 2010 Ventilation Requirements

For this home to comply with ASHRAE Standard 62.2 - 2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, a minimum of 44 cfm of mechanical ventilation must be provided continuously, 24 hours per day. Alternatively, an intermittently operating mechanical ventilation system may be used if the ventilation rate is adjusted accordingly. For example, a 88 cfm mechanical ventilation system would need to operate 12 hours per day, as long as the system operates to provide required average ventilation once each hour.

REM/Rate - Residential Energy Analysis and Rating Software v12.98

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Air Leakage Report

Date:	May 02, 2012	Rating No.:	81158891-901
Building Name:	123 Main Street	Rating Org.:	Raters USA
Owners Name:	Jane Smith	Phone:	555-555-5555
Property Address:	123 Main Street Omaha, NE 68007	Rater's Name:	John Williams
Builder's Name:	ABC Construction	Rater's No.:	1234567
Weather Site:	Omaha, NE	Rating Type:	Confirmed
File Name:	101682391-097 eSTAR	Rating Date:	12/01/20

AIR LEAKAGE REPORT			
Date:	May 02, 2012	Rating No.:	8016891 - 097
Building Name:	802EastMcCartyStreet	Rating Org.:	ASERusa
Owner's Name:	River City Habitat for Humanit	Phone No.:	314-894-2300
Property:	802 East McCarty Street	Rater's Name:	Gary Fries
Address:	Jefferson City, MO 65101	Rater's No.:	8016891
Builder's Name:	River City Habitat for Humanit	Rating Type:	Confirmed
Weather Site:	Columbia, MO	Rating Date:	12/01/11
File Name:	8016891 - 097 - eSTAR 2.0, TC, NR - 802 East M		

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Air Leakage Report

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Duct Leakage

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Mechanical:	
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Air Leakage Report

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Systems Commissioning and Completion Requirements

Section C408

- Commissioning is critical to ensure that buildings are **working as designed**
- Preliminary and final reports required
- Mechanical and lighting commissioning detailed in section C408

Benefits of Commissioning



Ventilation and I.A.Q.



Building Envelope +
Air Sealing Package +
HVAC Design, Equipment & Installation +
ERV/HRV +
Water Heating Design

= Occupant Comfort



Moisture Management

It Connects EVERYTHING!

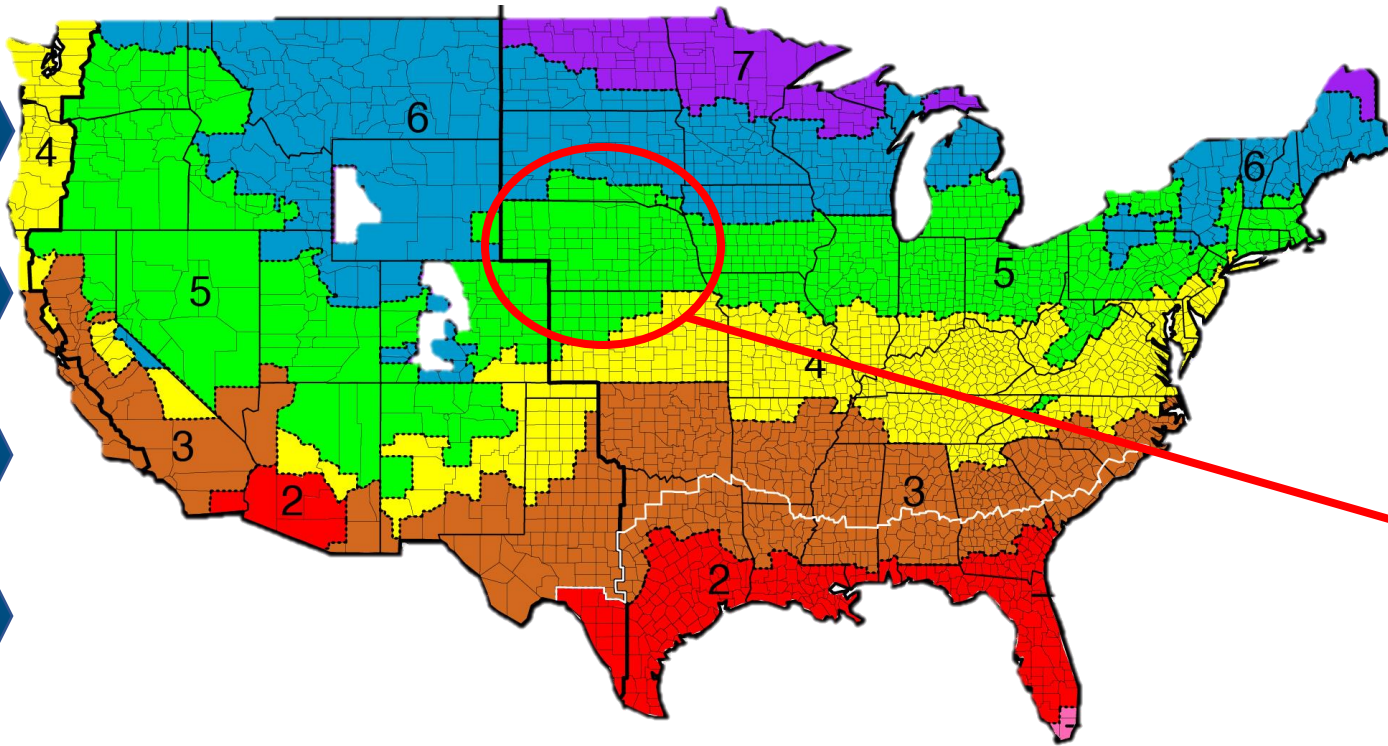




The Major “Damage Functions”

- Liquid water (bulk and capillary)
- Air-borne water
- Vapor
- Radiation (UV degradation)
- Pests
- People

Climate Zones

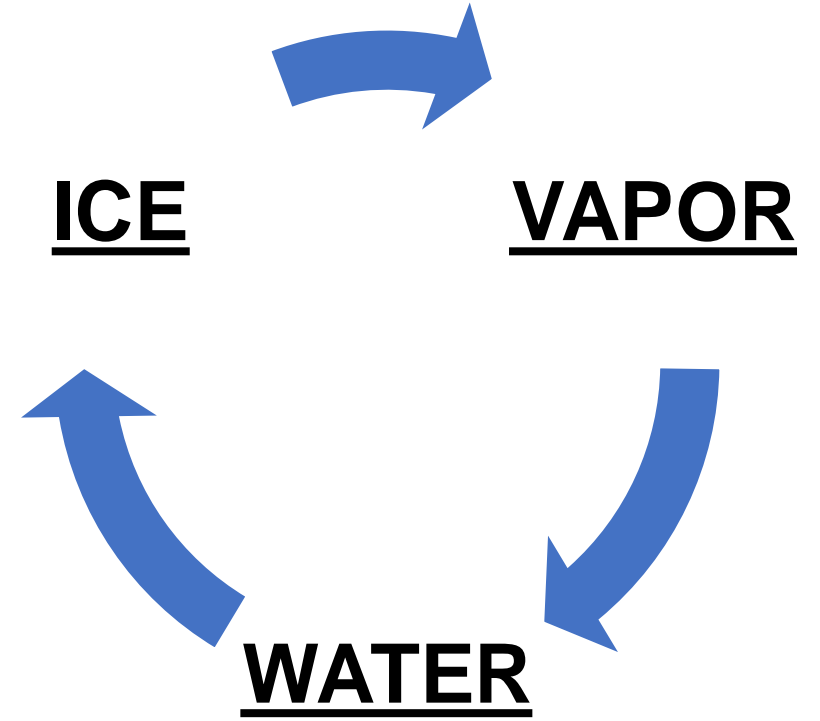


- Nebraska has only one climate zone – 5A
- Cold & Moist climate



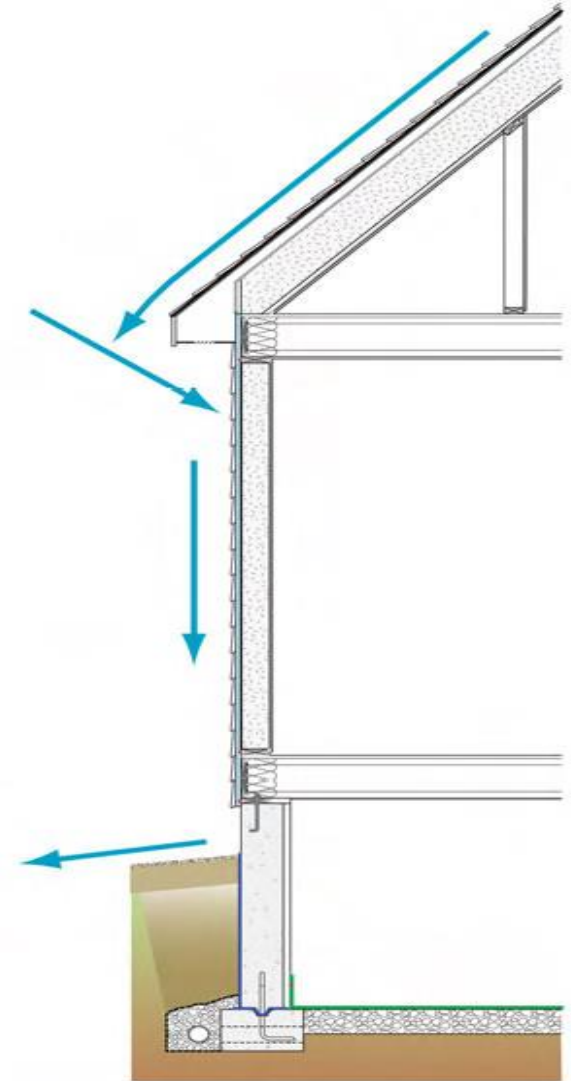
Prioritizing Moisture Movement

- #1 – Bulk Water
- #2 – Capillary Water
- #3 – Air-Transported Moisture
- #4 – Diffusive Moisture Movement



Bulk Water Management – Priority #1

The key is proper
drainage!



Always Allow For Drying

Exterior Conditions

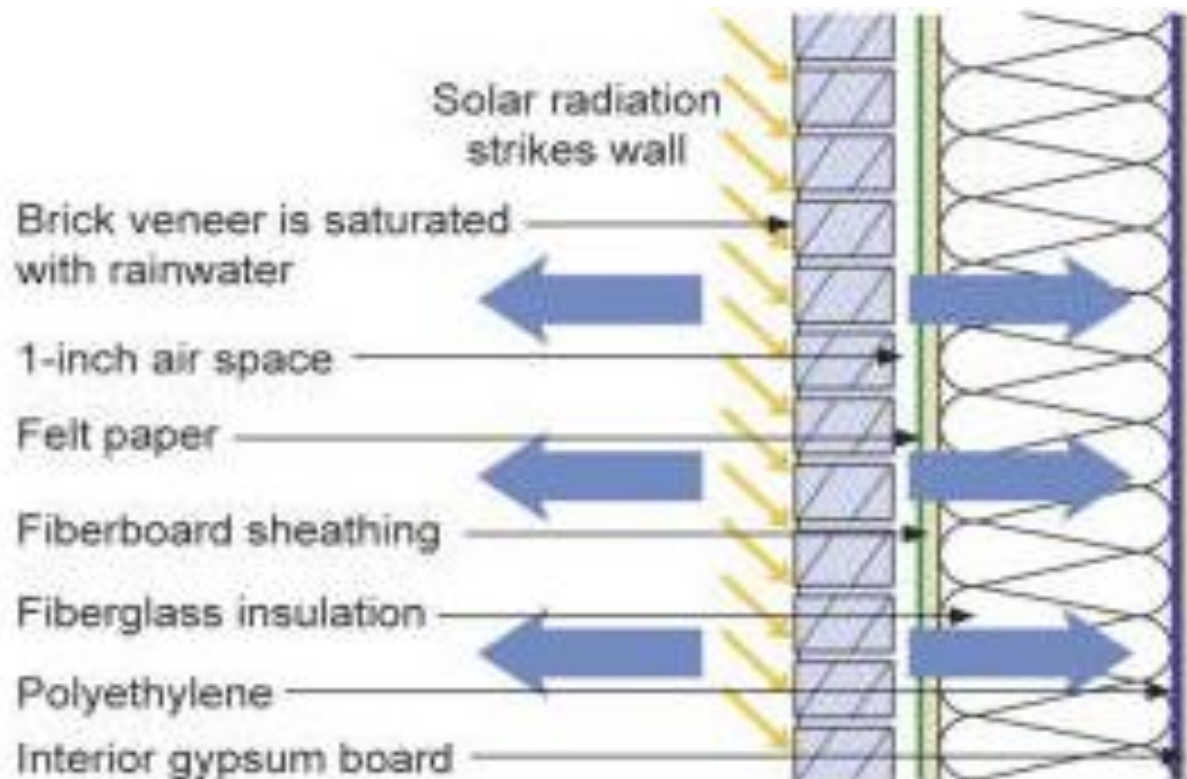
Temperature: 80° F
Relative Humidity: 75%
Vapor Pressure: 2.49 kPa

Conditions Within Cavity

Temperature: 120° F
Relative Humidity: 100%
Vapor Pressure: 11.74 kPa

Interior Conditions

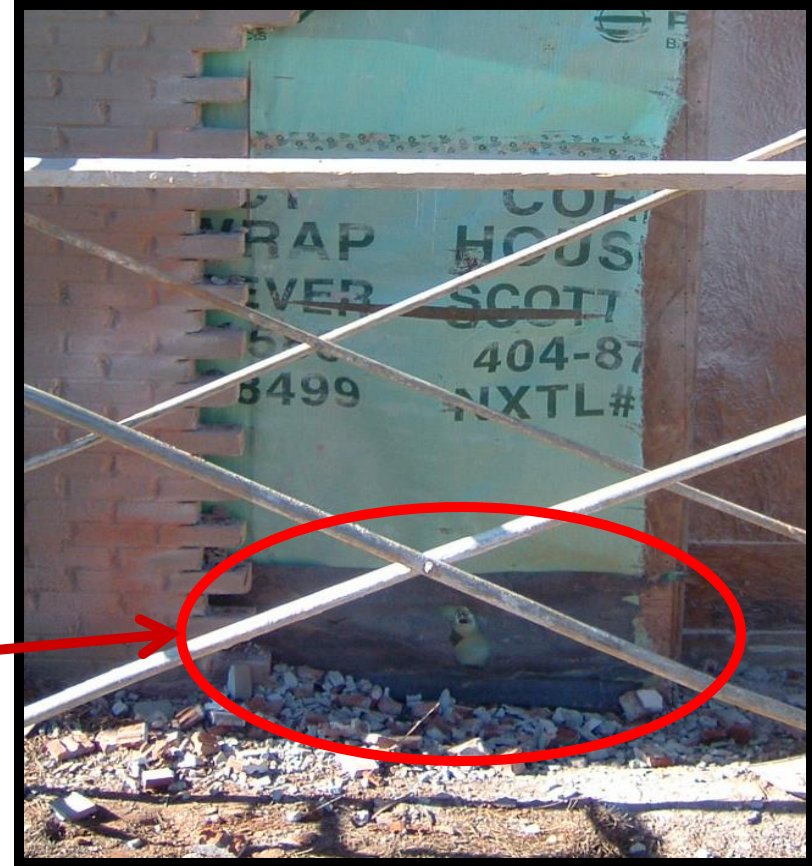
Temperature: 75° F
Relative Humidity: 60%
Vapor Pressure: 1.82 kPa



Vapor is driven both inward and outward by a high vapor pressure differential between the brick and interior and the brick and exterior

Properly Lap Flashing

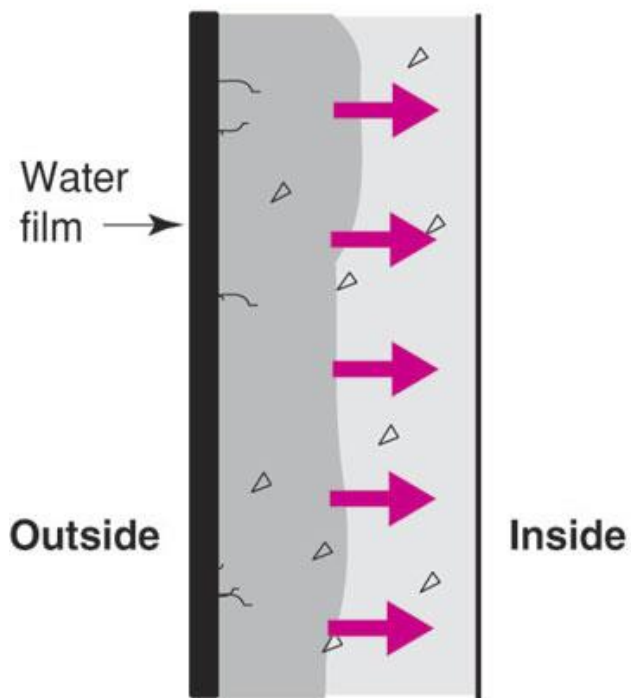
- The mason's flashing (black) was installed after and in front of the house wrap (green). This is reverse flashing that will trap any drain water that gets past the brick veneer.



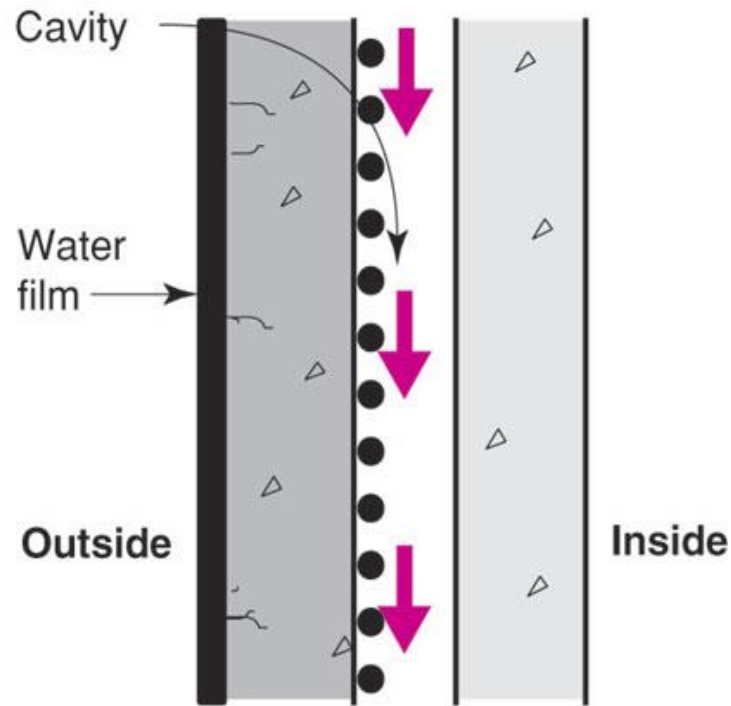
Direct Water Away From Corners



Capillary Moisture Flows - Priority #2



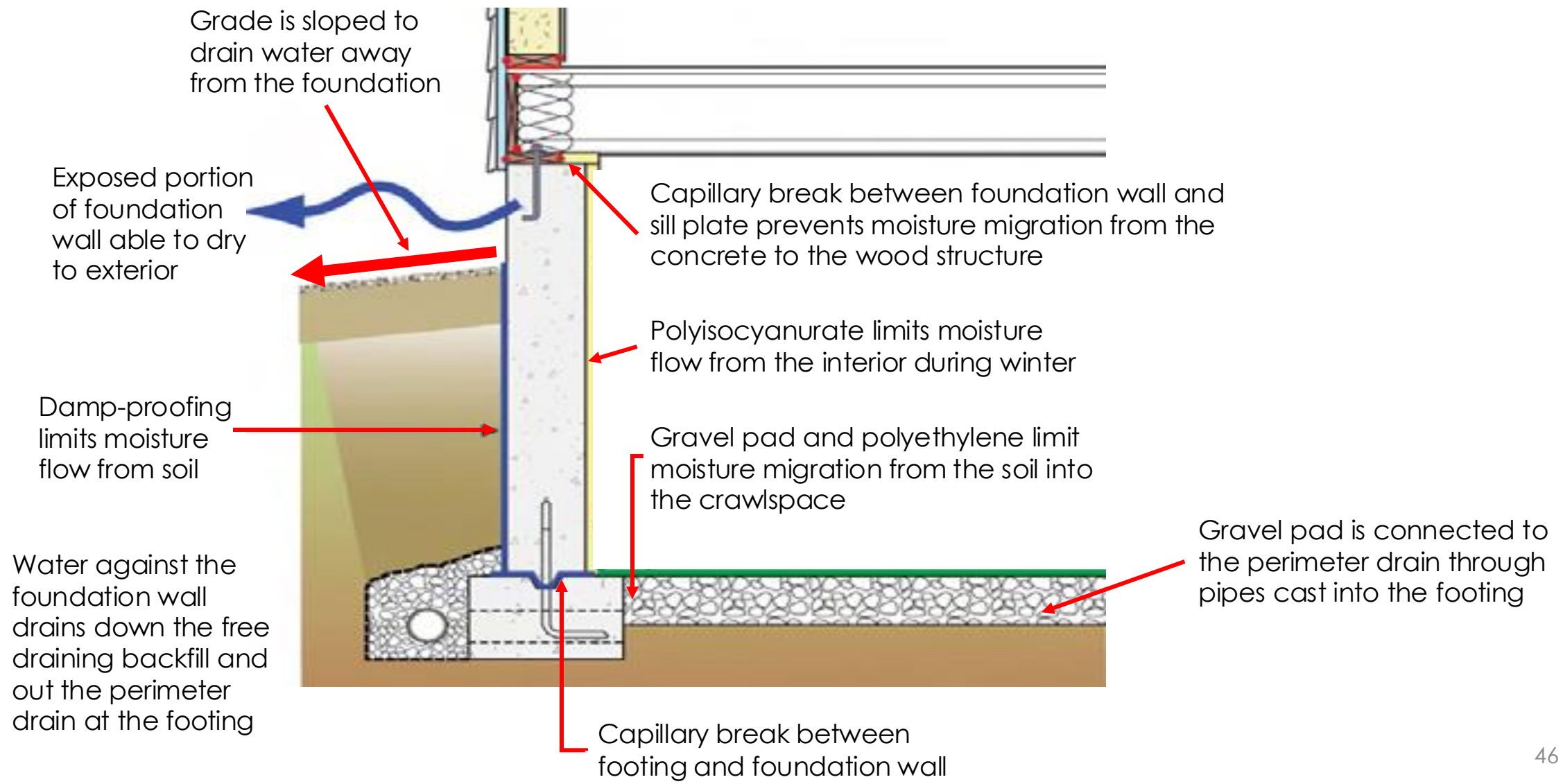
Capillary suction draws water into porous material and tiny cracks



Cavity acts as capillary break and receptor for capillary water interrupting flow

Image courtesy of Building Science Corp.

Foundation Moisture Management



Sill Plates Need Capillary Breaks



Air Transport of Moisture – Priority #3

- Air carries a **lot** of water
- Air leakage
 - Moisture flow
 - 4X8 Drywall
 - 70 F
 - 40% RH
 - 1 square inch hole
- Flow quantity
 - 30 Quarts of water!!

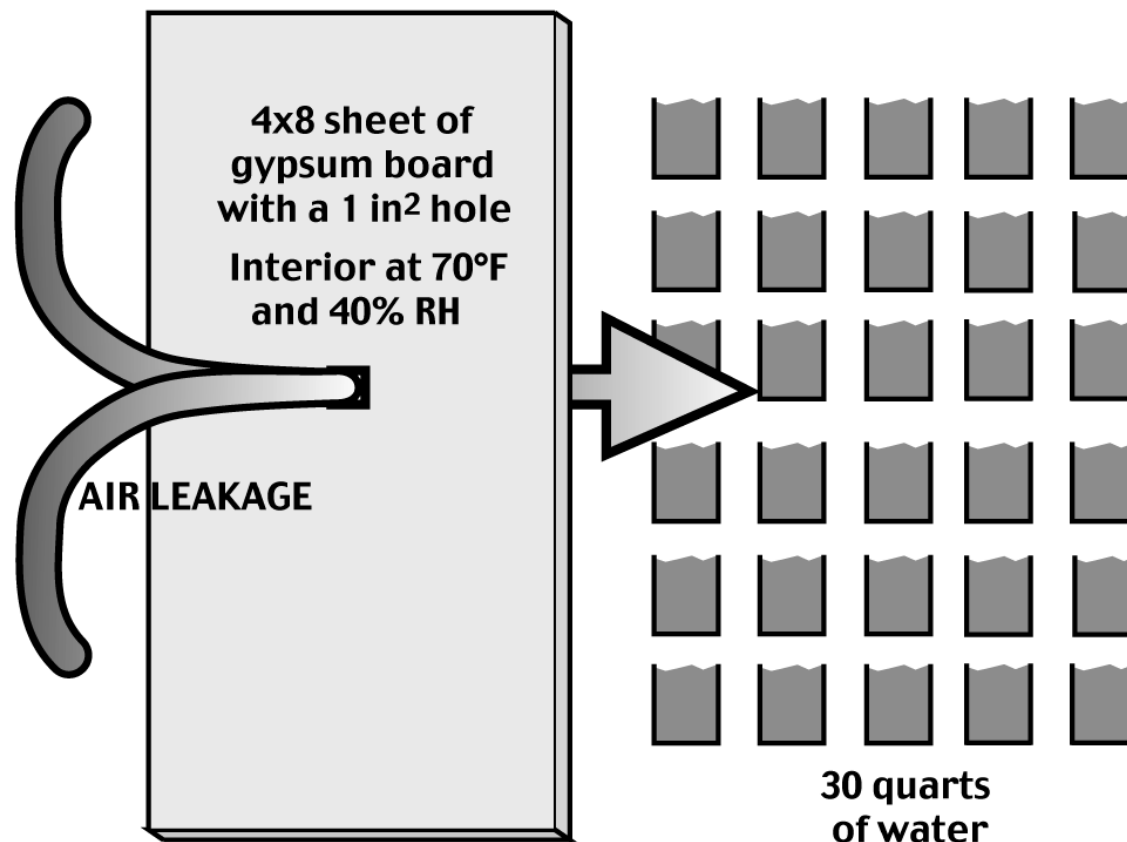
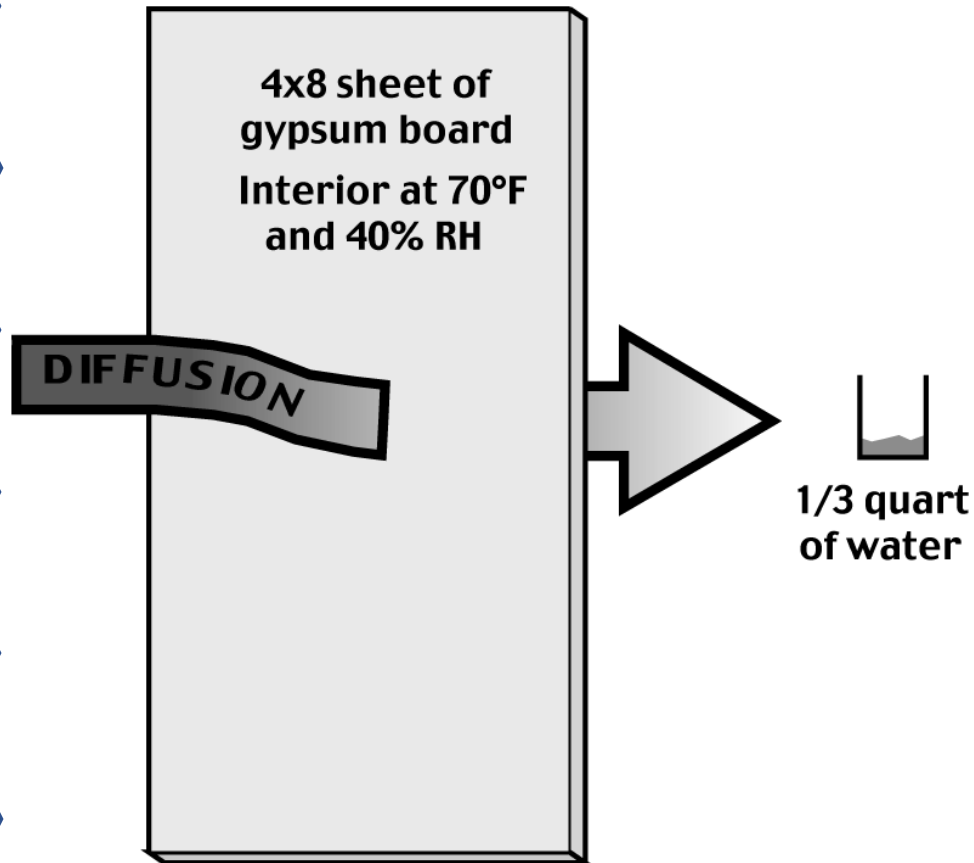


Image courtesy of Building Science Corp.

Diffusion – Priority #4



- Migration of moisture by means of vapor pressure differential
- Occurs in either direction based on climate conditions and exterior/interior levels of humidity
- Different building materials have different permeability

Image courtesy of Building Science Corp.



Air Movement

Air Movement Seeks Balance

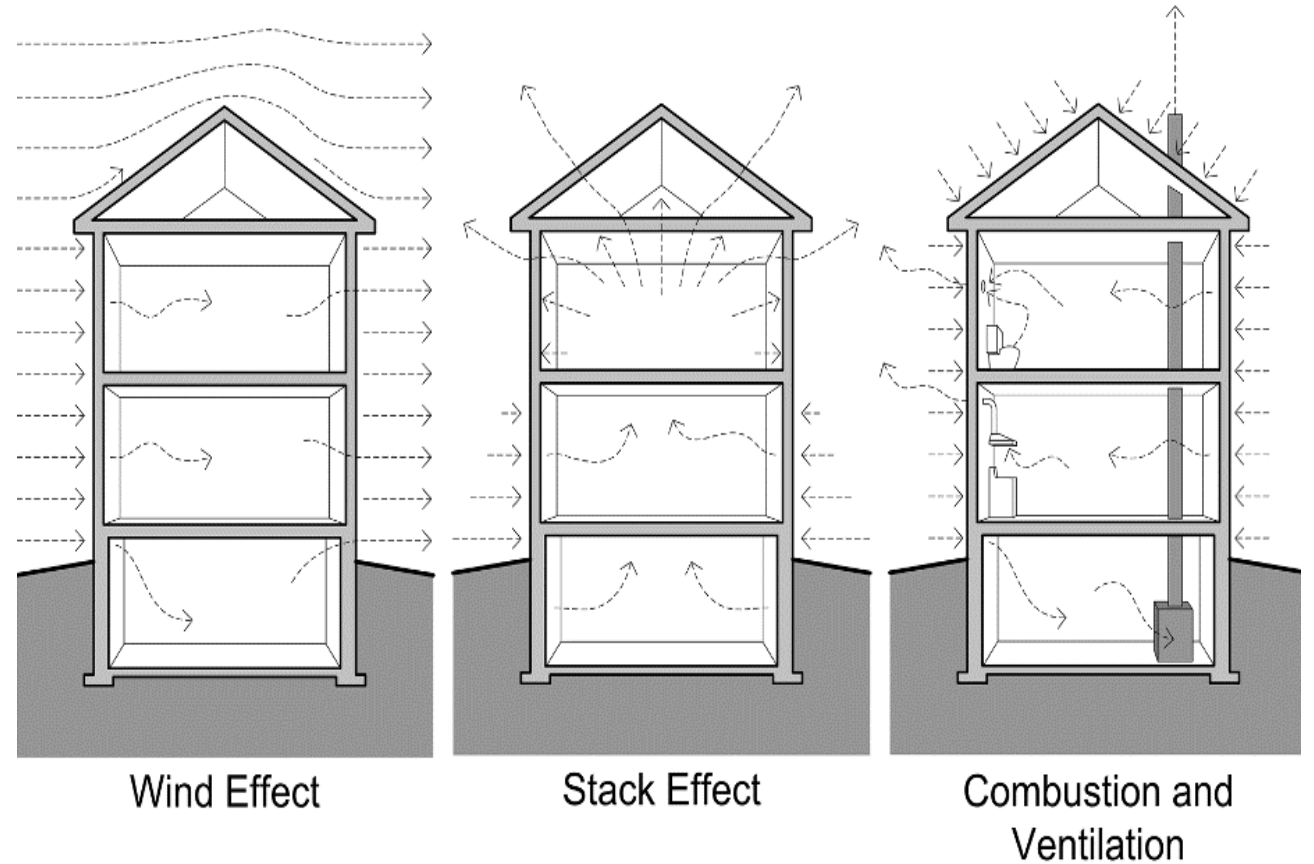


How Does Air Get Around?

Air In = Air Out

For air movement you need:

- A hole
- A driving force
- Another hole



Internally Generated Air Pressure

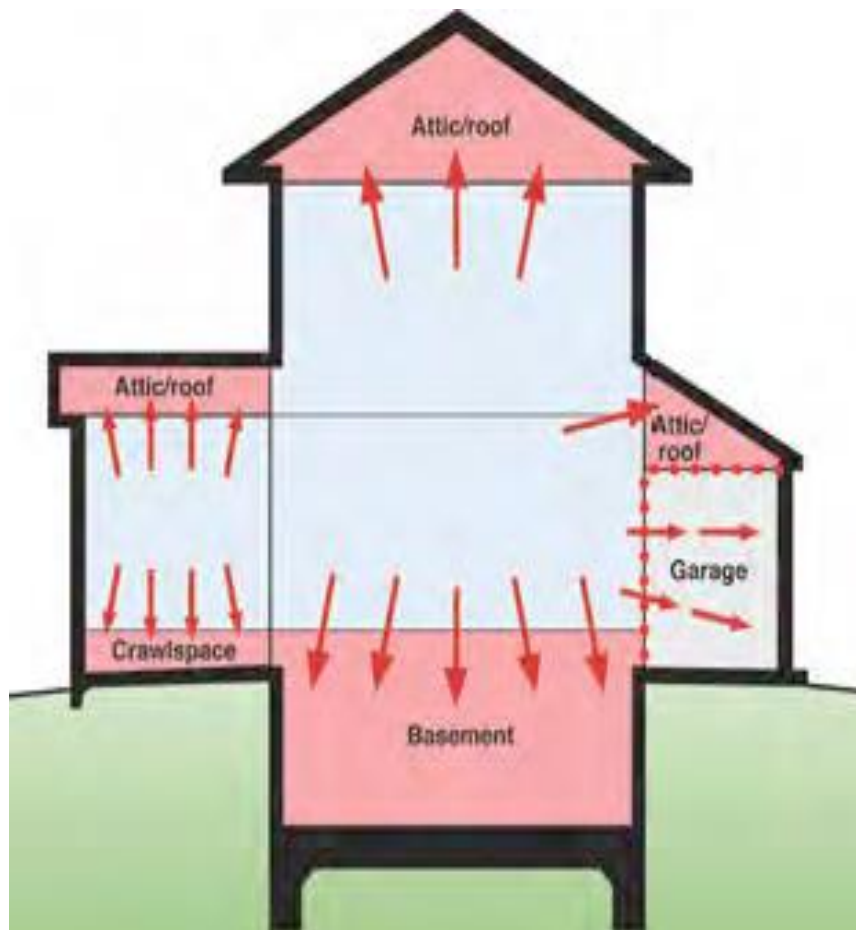


Image by Belcher Homes

Expansion of Conditioned Space

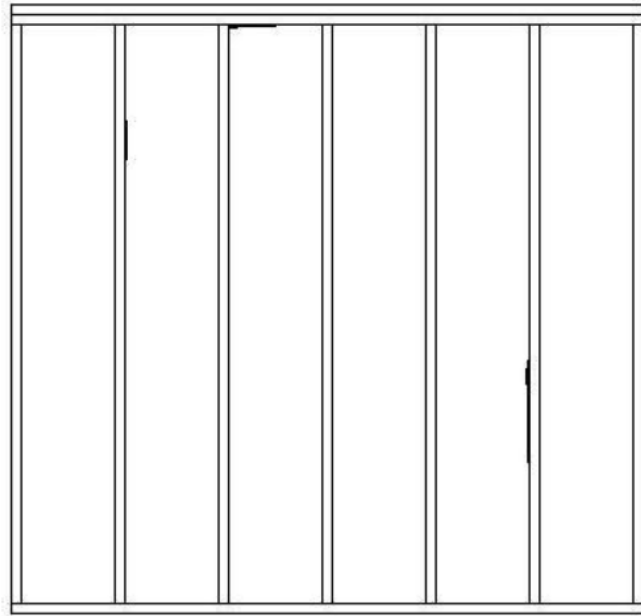
- Conditioned space boundaries moving towards exterior surfaces of building
- Garage isolated from house by air barrier/pressure boundary
- Garage ventilated and conditioned independently of rest of conditioned spaces



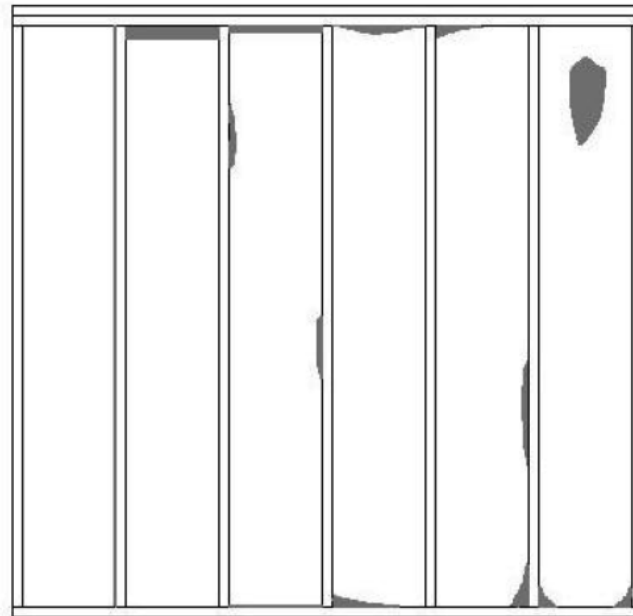
Batt Insulation Grading

Code Compliant

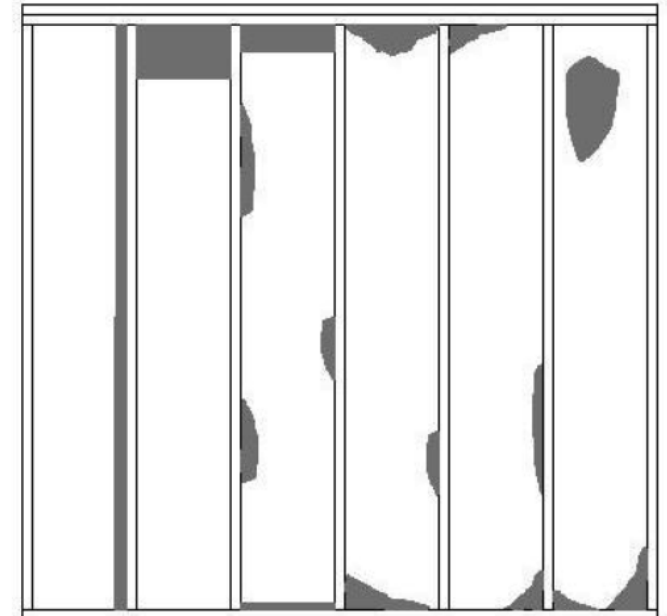
Not Acceptable



Grade I: Almost no gaps



Grade II: Up to 2%



Grade III: 2% - 5%

RESNET protocol for the effect of missing insulation on installation grade

Diagrams from the HERS Standards



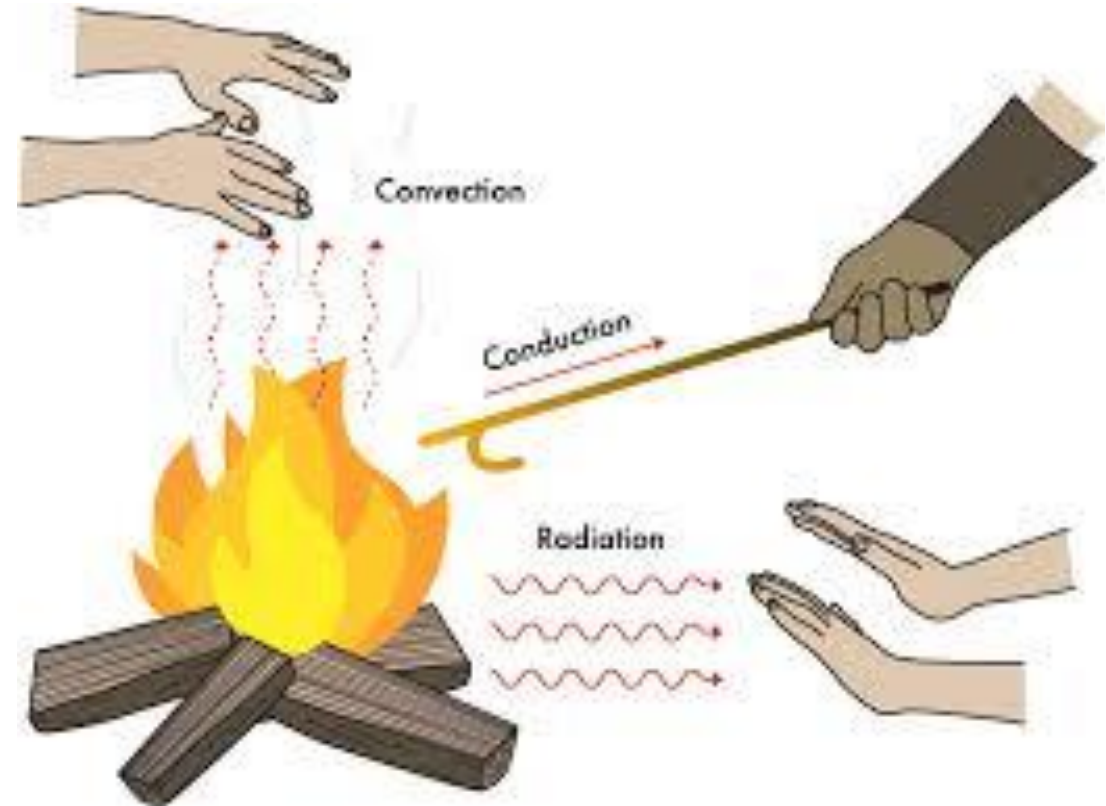
Heat Transfer

A Triple Threat



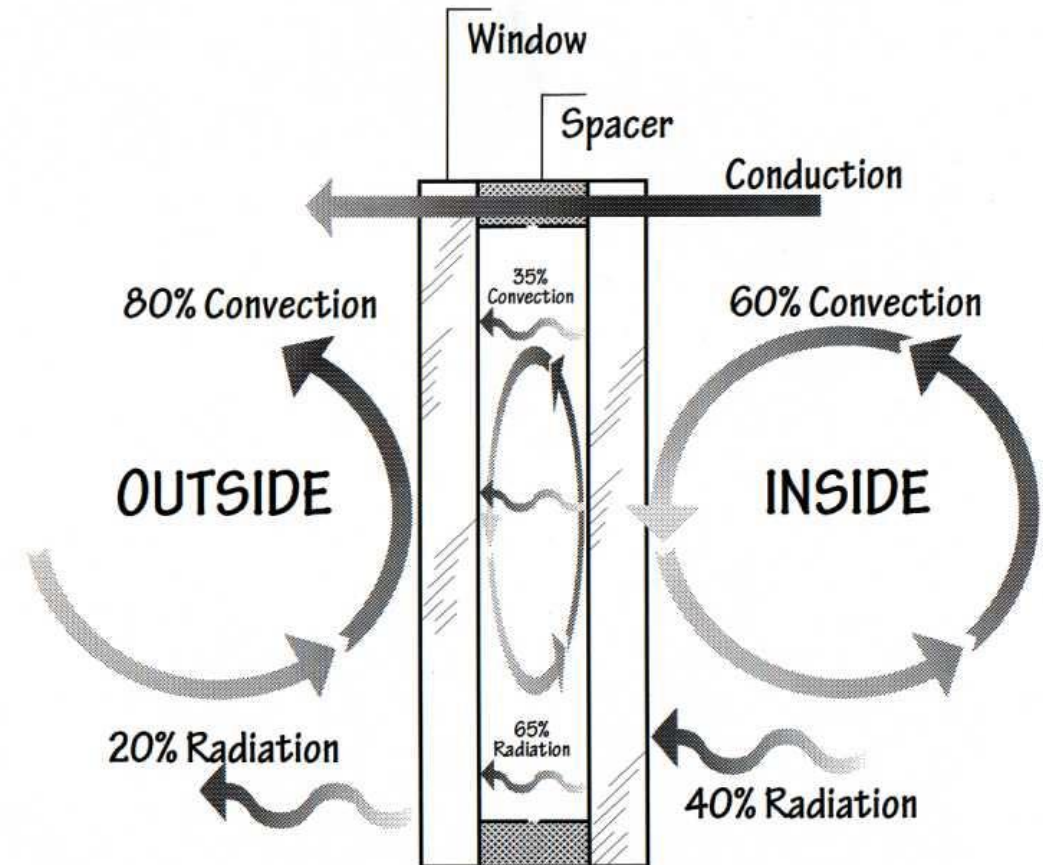
Heat Transfers in 3 Ways

- **Convection** - Through fluids (liquid or gas)
- **Conduction** - Through solids
- **Radiation** - Mostly windows



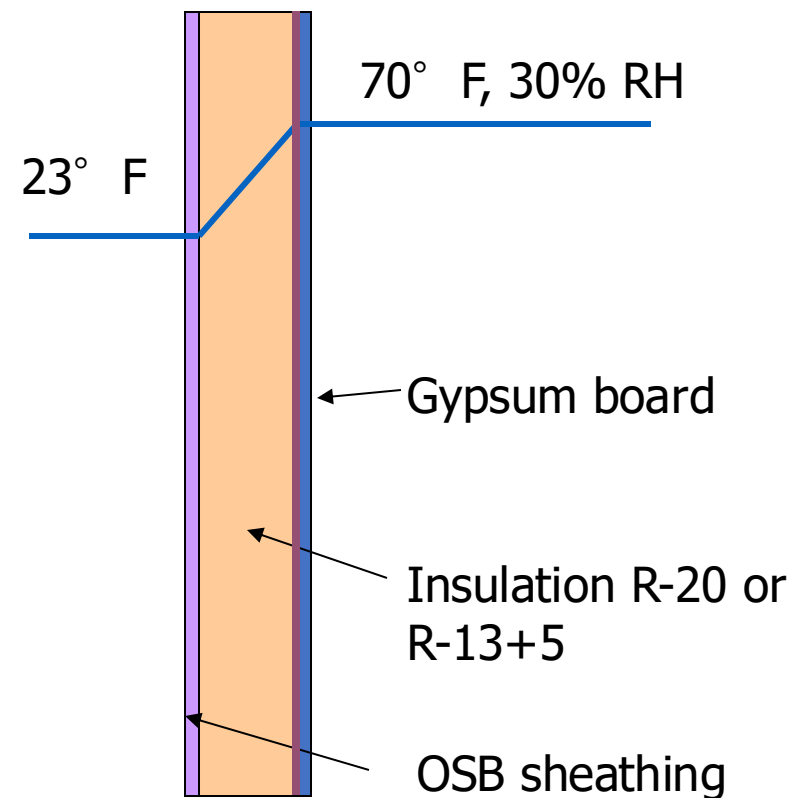
Practical Application - Windows

- Heat always moves from hot to cold
- Always a mix of transfers
- Different rates of transfer can be important



Condensing Surface Temperatures

- Dewpoint of interior air = 37°F
- Where will condensation occur?
Inside surface of exterior sheathing
- One Solution?
Interior vapor retarder, but what type and at what “cost?”





Major Building Envelope Protection Systems

- Water Barrier
- Air Barrier
- Thermal Barrier
- Vapor Profile (not just the designated vapor retarder)
- Maintenance documents

“You don’t get what you expect, you get what you inspect!”





HVAC System

Don't Forget the "V"



HVAC Design and Loads

Oversized systems:

- Less comfort
- Less efficient
- Poorly handles moisture
- Premature equipment failure

Right-sized systems:

- Better operating efficiencies
- Greater comfort
- Healthier indoor environments
- Better moisture control

HVAC Design and Loads

- Properly designed HVAC systems rely on scientific criteria and a systematic method to match the loads required for health and comfort:
 - *ACCA Manual J – Residential Load Calculation*
 - *ACCA Manual S – Residential Equipment Selection*
 - *ACCA Manual D – Residential Duct Systems*
- Reports should be submitted with permit application



HVAC Load Calculations - Commercial

Section C403.1.1 (Mandatory)

Heating and cooling load sizing calculations required:

- ASHRAE/ACCA Standard 183
 - OR -
- Other approved computation procedures – defined in Chapter 3
 - Interior design conditions specified by Section C302
 - $\leq 72^{\circ}\text{F}$ for heating load
 - $\geq 75^{\circ}\text{F}$ for cooling load
- Loads reduced from energy recovery systems utilized in the HVAC system shall be accounted for in accordance with the ASHRAE HVAC Systems and Equipment Handbook



HVAC Design and Loads

Today's homes risk health problems for occupants because:

- They are not properly ventilated:
 - < 3 ACH
- More chemicals and products are used in and around a house:
 - Concentration levels are often 2 to 100 times higher than outside.



Balanced Ventilation

- Blows air into and out of the house
- Is cost effective by reclaiming energy from exhaust and supply airflows (60%-80%!)
- Balances exhaust and supply flows (minimizes pressure differential)
- Maintains the Minimum Ventilation Guideline automatically with proper set-up

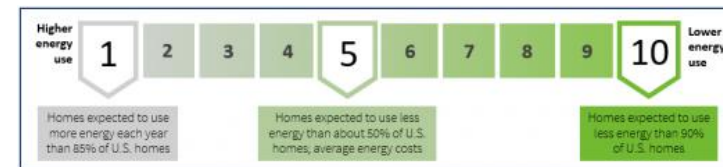
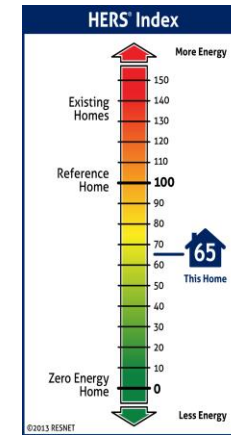


Appraisals and Resale Value



Appraisers

- Unlike granite countertops, energy efficiency investments are not always visible at a glance
- Utilize certifications, labels, ratings, and scores
- Make sure appraisers are accurately valuing sustainable properties
 - *Residential Green and Energy Efficient Addendum* - Assists appraisers in analyzing residential “Green” features and properties.



Residential Green and Energy Efficient Addendum!

- Resources for realtors and appraisers on properly valuing energy efficiency/green features
 - Educational materials
 - List of designated appraisers
 - Trainings
- For more information: http://www.appraisalinstitute.org/education/green_energy_addendum.aspx

Client File #:		Appraisal File #:	
Residential Green and Energy Efficient Addendum			
Client:			
Subject Property:			
City:	State:	Zip:	
Additional resources to aid in the valuation of green properties and the completion of this form can be found at http://www.appraisalinstitute.org/education/green_energy_addendum.aspx			
<p>The appraiser hereby certifies that the information provided within this addendum:</p> <ul style="list-style-type: none"> has been considered in the appraiser's development of the appraisal of the subject property only for the client and intended user(s) identified in the appraisal report and only for the intended use stated in the report. is not provided by the appraiser for any other purpose and should not be relied upon by parties other than those identified by the appraiser as the client or intended user(s) in the report. is the result of the appraiser's routine inspection of and inquiries about the subject property's green and energy efficient features. Extraordinary assumption: Data provided herein is assumed to be accurate and if found to be in error could alter the appraiser's opinions or conclusions. is not made as a representation or as a warranty as to the efficiency, quality, function, operability, reliability or cost savings of the reported items or of the subject property in general, and this addendum should not be relied upon for such assessments. <p>Green Building: The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's lifecycle from design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classic building design concerns of economy, utility, durability, and comfort (US EPA). High Performance building and green building are often used interchangeably.</p> <p>Six Elements of Green Building: A green building has attributes that fall into the six elements of green building known as (1) site, (2) water, (3) energy, (4) materials, (5) indoor environmental quality, and (6) maintenance and operation. The energy and water elements are the most measurable elements of green or high performance housing. Appraisers need savings amounts to develop an income approach to support energy efficient contributory value.</p>			
THIRD-PARTY VERIFICATIONS (See types defined in glossary)			
The following verified items are developed within the appraisal analysis of the subject property:			
Green Certification	Environmental Protection Agency (EPA): <input type="checkbox"/> Indoor AirPLUS <input type="checkbox"/> WaterSense <input type="checkbox"/> ENERGY STAR	Energy Department (DOE): <input type="checkbox"/> Zero Energy Ready Home (ZERH)	
Certifications attest that the home meets certain minimum thresholds:	Home Innovation Research Labs (HIRL) Green Building Certification: <input type="checkbox"/> Bronze <input type="checkbox"/> Silver <input type="checkbox"/> Gold <input type="checkbox"/> Emerald	Home Innovation Research Labs (HIRL) Green Building Certification: <input type="checkbox"/> Bronze <input type="checkbox"/> Silver <input type="checkbox"/> Gold <input type="checkbox"/> Emerald	
	LEED for Homes: <input type="checkbox"/> Certified <input type="checkbox"/> Silver <input type="checkbox"/> Gold <input type="checkbox"/> Platinum		
	Other: _____		
Date Verified: ____/____/____	Green Certification Version: _____	Organization URL: _____	ABOVE VALID ONLY IF CHECKED: <input type="checkbox"/> Verification reviewed on site <input type="checkbox"/> Verification attached to this report
Energy Label Labels disclose the state the home's energy assets.	RESNET's HERG Rating (0 to 150): _____ <input type="checkbox"/> Sampling Rating <input type="checkbox"/> Projected Rating <input type="checkbox"/> Confirmed Rating	Estimated energy savings for this home: \$ ____/year ____ kWh rate dated ____/____/____ Energy Savings includes electricity, heating & Cooling. Score below 100 indicates energy costs are expected to be lower than average local code home per square foot. HERG Index Report estimates energy cost based on number of bedrooms plus one. Only a "confirmed rating" is a diagnostic test.	
	DOE's Home Energy Score _____ Score 1 to 10: _____ <input type="checkbox"/> Official Score <input type="checkbox"/> Unofficial Score	Estimated energy savings for this home: \$ ____/year ____ kWh rate dated ____/____/____ Energy Savings includes electricity, heating & Cooling. Score above 100 indicates energy costs are expected to be lower than average local code home. Home Energy Score estimates energy cost based on state average energy rates and the home's energy features.	
	Other Energy Score: _____ Range 1 ____ to ____: _____	Estimated energy savings: \$ ____/year ____ kWh rate dated ____/____/____ Describe energy label system: _____	
	Date Verified: ____/____/____ Organization URL: <input type="checkbox"/> www.resnet.org <input type="checkbox"/> www.homeenergyscore.gov Other: _____		ABOVE VALID ONLY IF CHECKED: <input type="checkbox"/> Verification reviewed on site <input type="checkbox"/> Verification attached to this report
Verified Energy Improvements Explain energy-related improvements: Cost of improvements: \$ _____	Date Verified: ____/____/____ Certificate of Efficiency Improvements Version: _____ Organization URL: <input type="checkbox"/> www.resnet.org <input type="checkbox"/> www.greenstar.gov/homeperformance Other: _____		ABOVE VALID ONLY IF CHECKED: <input type="checkbox"/> Verification reviewed on site <input type="checkbox"/> Verification attached to this report
Completed by: _____ Title: _____ Date: _____			

*NOTICE: The Appraisal Institute publishes this form for use by appraisers where the appraiser deems use of the form appropriate. Depending on the assignment, the appraiser may need to provide additional data, analysis and work product not called for in this form. The Appraisal Institute makes no representations, warranties or guarantees as to, and reserves no responsibility for, the data, analysis or work product provided by the individual appraiser(s) in the specific contents of the Appraisal Report. AI Reports® AI 820.04 Residential Green and Energy Efficient Addendum Appraisal Institute 2017. All Rights Reserved. November 2016



Form 820.04





Lender Specification

“This Home/Building is being built/renovated/updated to nationally recognized standards above prevailing code. It is designed and constructed with unique features and materials and with high efficient equipment and in accordance with high efficiency standards. The Lender shall choose an Appraiser educated and knowledgeable in this type of valuation of these specialized Homes, preferably an appraiser who holds a professional appraisal designation that requires advanced education on such issues as the valuation of sustainable buildings (e.g. MAI or SRA designations from the Appraisal Institute). The appraiser shall provide verification of green valuation education of 14 hours or more from a qualified educational provider and knowledge to be permitted to conduct the appraisal for this project.”



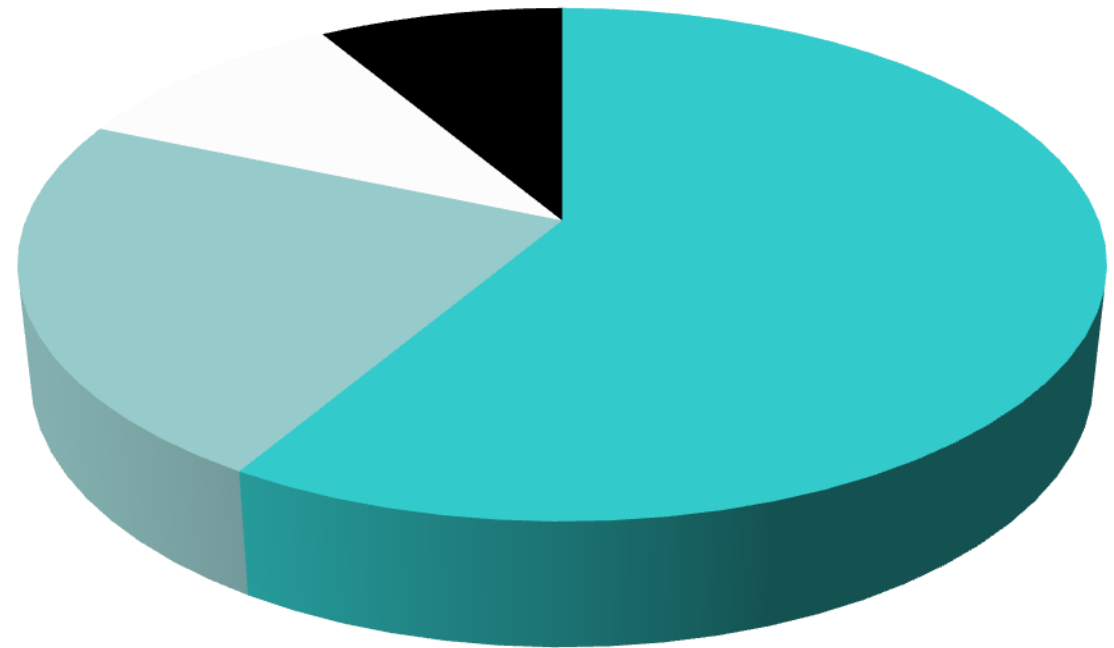
Marketing High Performance





Equity!

Cost



- Int/Tax, etc.
- Energy
- O&M
- Other



Existing Buildings

Section C503 - Alterations

- Code applies to any new construction
 - Additions or new work in existing structures
- Unaltered portion(s) may not need to comply
- When complying via ASHRAE 90.1-2016, alterations do not need to comply with C402-C405
- Where existing building exceeds fenestration area limitations of Section C402.4.1 prior to alteration, building is exempt from C402.4.1 provided there is no increase in fenestration area



Image: montgomerycountymd.gov

Key Takeaways

- 2018 IECC has new requirements for:
 - Air sealing
 - Duct sealing
 - U-Factor
 - R-Values
 - Performance Testing
- Controlling moisture is *critical*
 - Proper air sealing is key
 - Right-sizing HVAC is required
 - Mechanical ventilation must be installed and takes on new importance

Looking Ahead:



- IECC changes to The National Energy Standard as of 2024.
- Uses 2021 IECC as a baseline.
- Introduces Carbon Impact into the conversation.
- On a trajectory for Net Zero Energy as of 2030.



Upcoming Trainings

September

- In-person training in the Grand Island area, stay tuned - (Exact date TBD)
- Nebraska Energy Codes Collaborative – VIRTUAL – (Exact date TBD)

Would you like an in-person training in your area? Let us know!



Thank You! Questions?

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