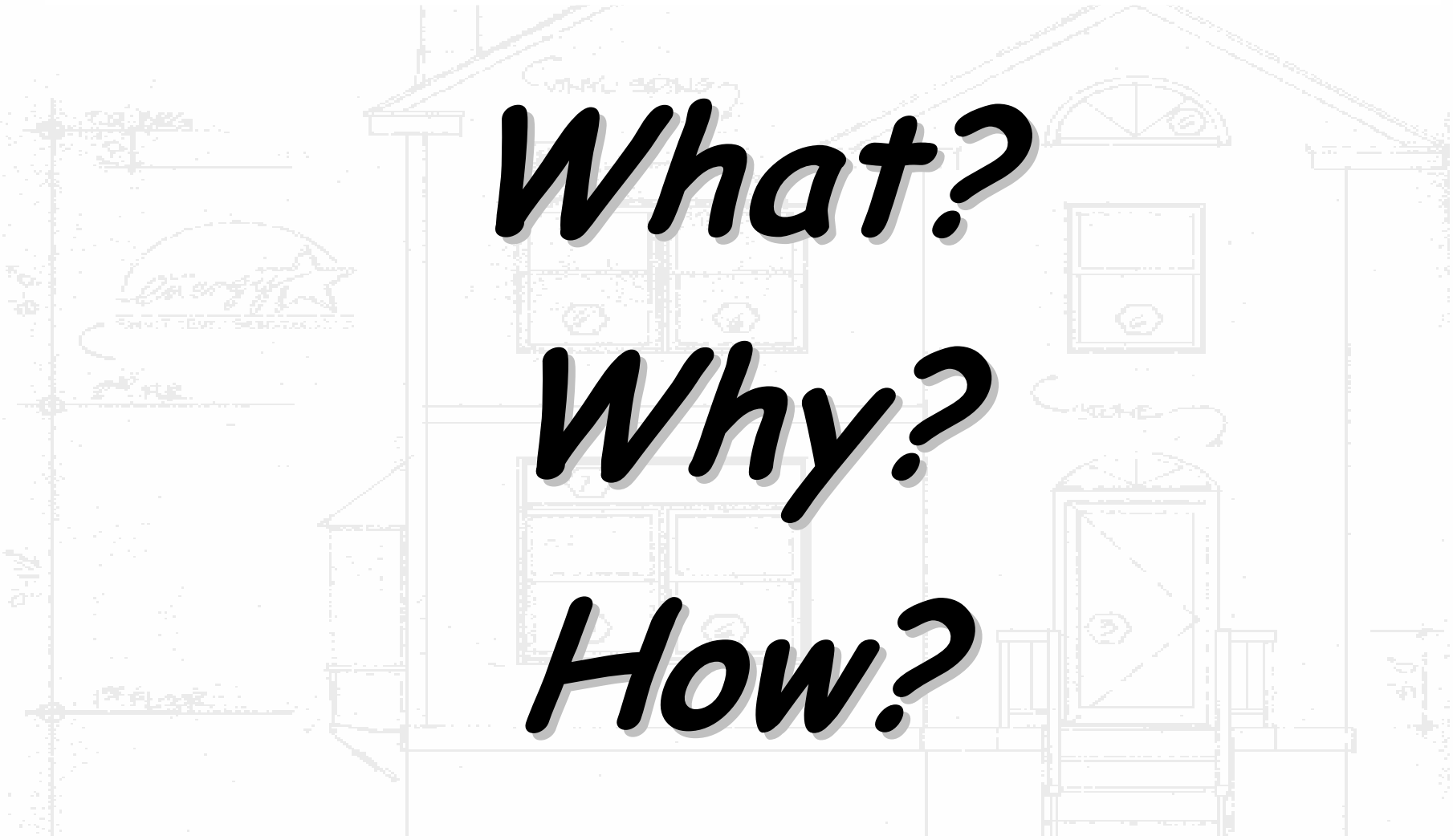


What?
Why?
How?

What…

…is ENERGY STAR?
…is ENERGY STAR for Homes?
…are we Selling?

WHAT IS ENERGY STAR?

The national, US government-backed

symbol for

cost-effective

energy efficiency

while assuring same or better performance

ENERGY STAR BACKGROUND

- **1992** launched
- **50+** products categories
- **1+ Billion** products sold
- **$14 Billion** annual savings
- **25 Million** vehicles equivalent GHG

GROWING BRAND

ENERGY STAR:

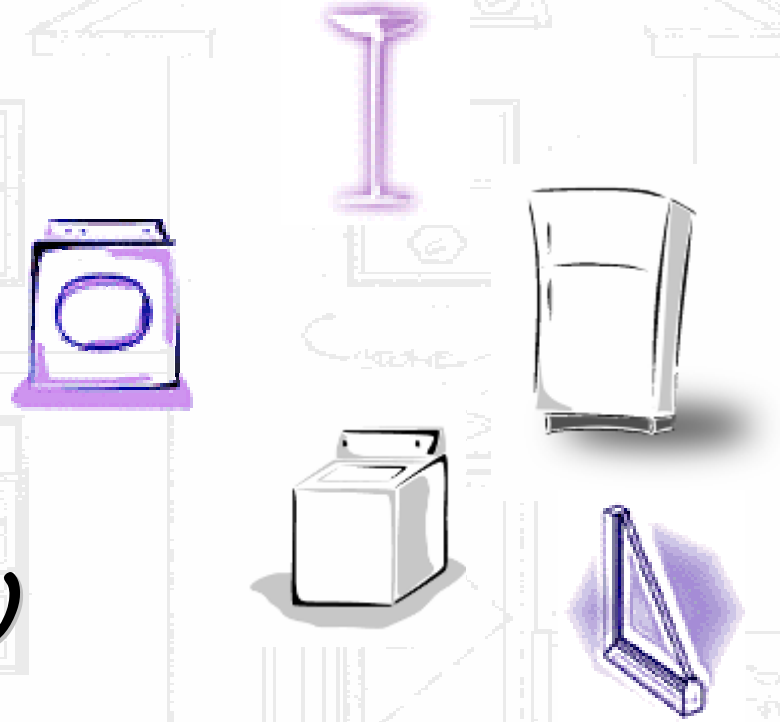
~70% awareness in 2004

70%+ households would recommend

95% likely to buy again in future

ENERGY STAR PRODUCTS FOR HOMES

- *Heating/Cooling Equipment*
- *Lighting*
- *Appliances*
  - *Clothes Washer*
  - *Refrigerator*
  - *Dishwasher*
  - *Dehumidifiers*
- *Windows (by Climate)*
- *Thermostats*
- *Ventilation Fans*

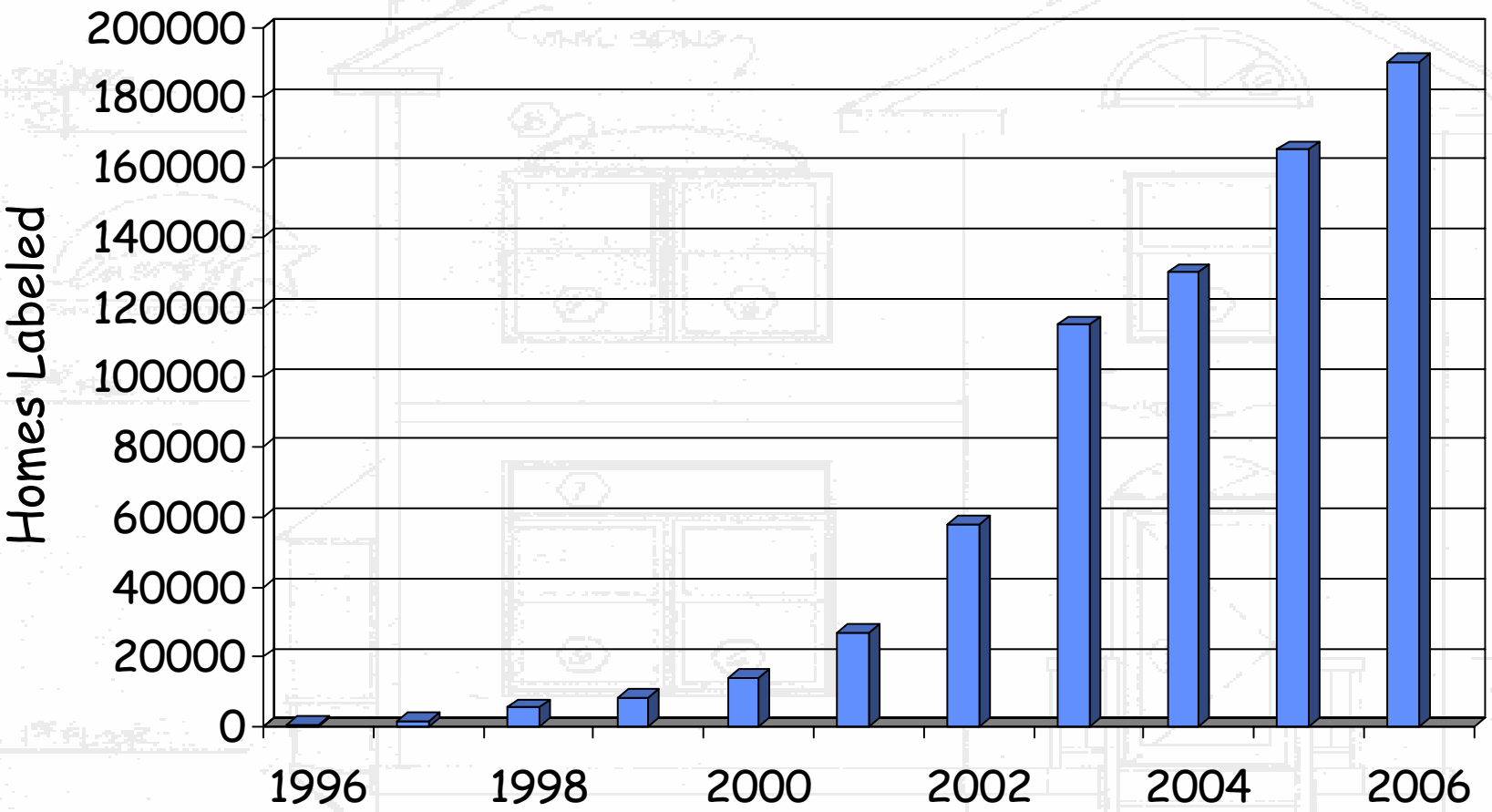


WHAT IS ENERGY STAR FOR HOMES?

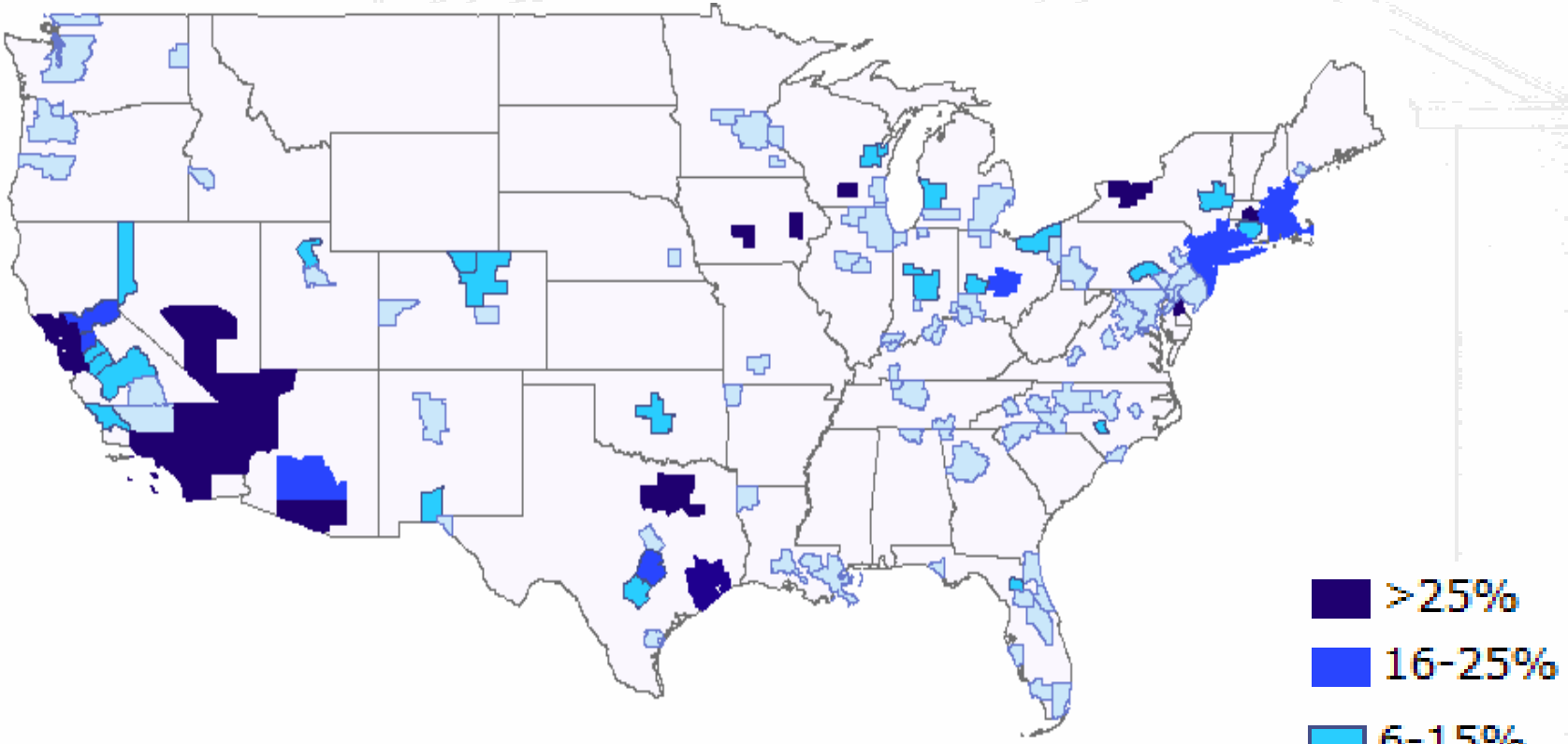
- ***Voluntary***
- ***Truly Energy Efficient***
- ***Builder Recognition***

  Government-Backed Label
  Third-Party Verified
  Awards

RESULTS: EXPONENTIAL GROWTH



RESULTS: MARKET PENETRATION

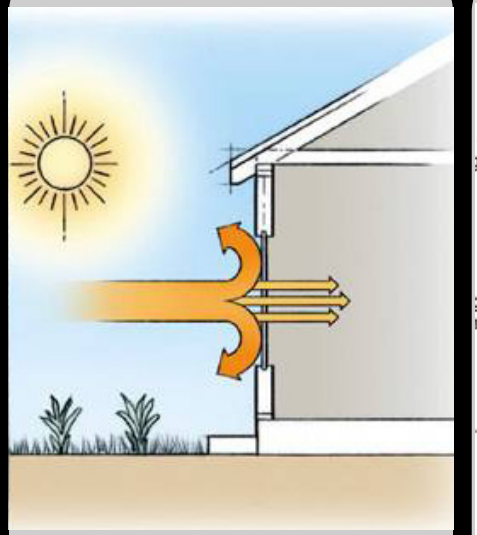


ENERGY STAR FOR HOMES METRICS

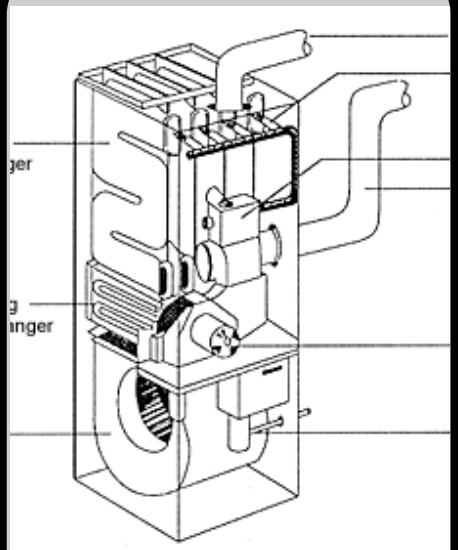
- **5,000+** Active Builder Partners
- **750,000+** Labeled Homes
- **20%+** Penetration in **25** Markets

ENERGY STAR FOR HOMES OLD SPEC

Tight Ducts



Adv. Windows

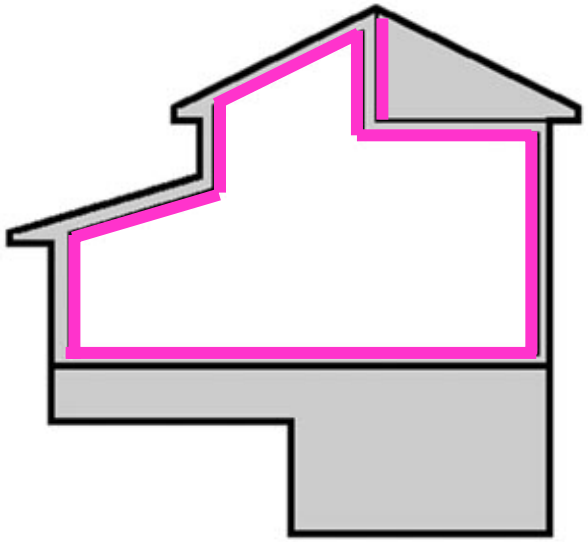


Eff. Equip.

Verification

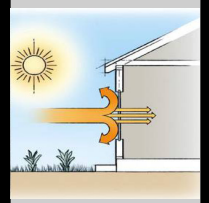
ENERGY STAR FOR HOMES NEW SPEC

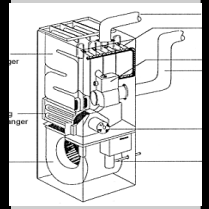
Insulation Installation



Thermal Bypass

Right Sizing

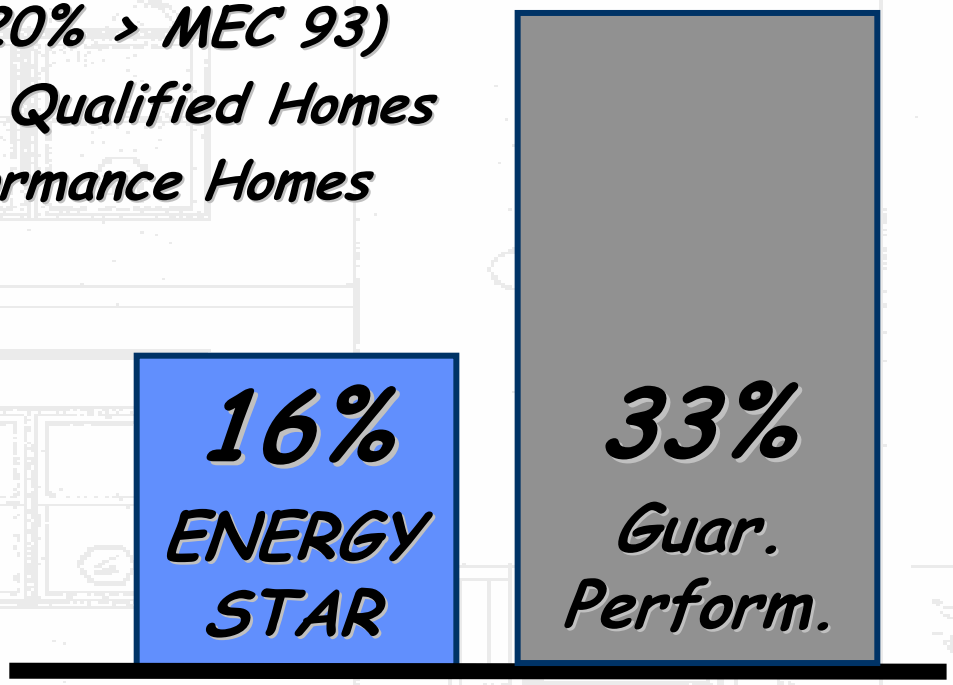




NEW SPEC: TRULY ENERGY EFFICIENT

AEC Study:

- ~7,000 homes (1998 and 2004)
- ~3,300 baseline (est. 20% > MEC 93)
- ~3,000 ENERGY STAR Qualified Homes
- ~800 Guaranteed Performance Homes



Energy Savings Compared to Baseline

Source: Measuring Public Benefit from Energy Efficient Homes [2005], Advanced Energy Corp.

NEW SPEC: COST-EFFECTIVE

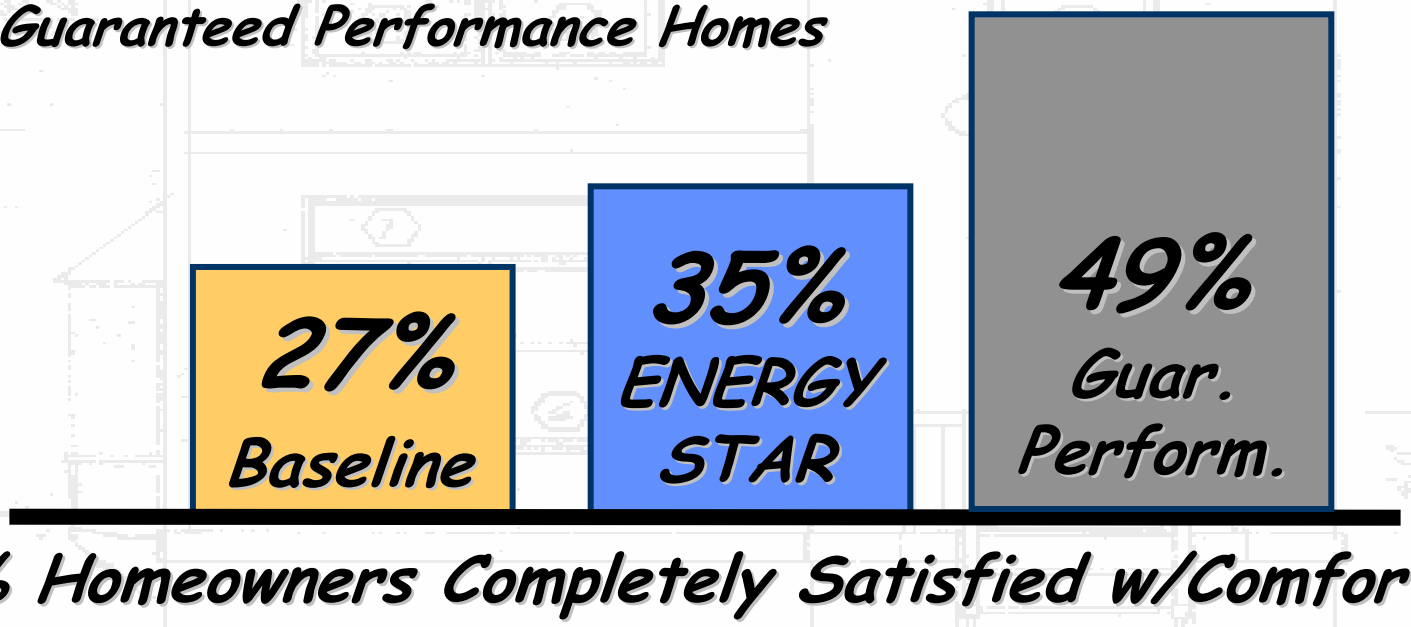
	Monthly	Annual
Utility Savings	$40	$480
Added Mortgage	$15	$180
Cost Savings	**$25**	**$300**

= $1,000's *for typical ownership period*

NEW SPEC: BETTER PERFORMANCE

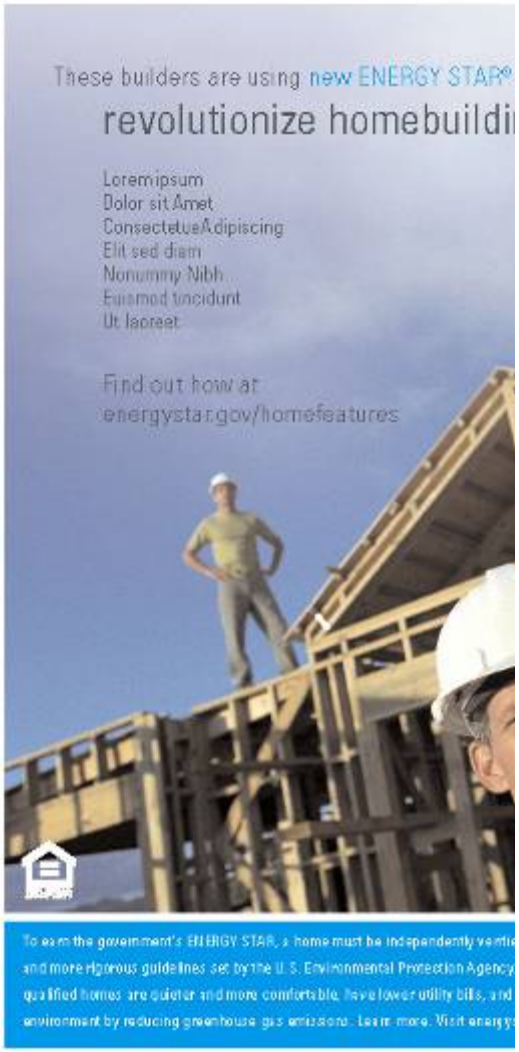
AEC Study:

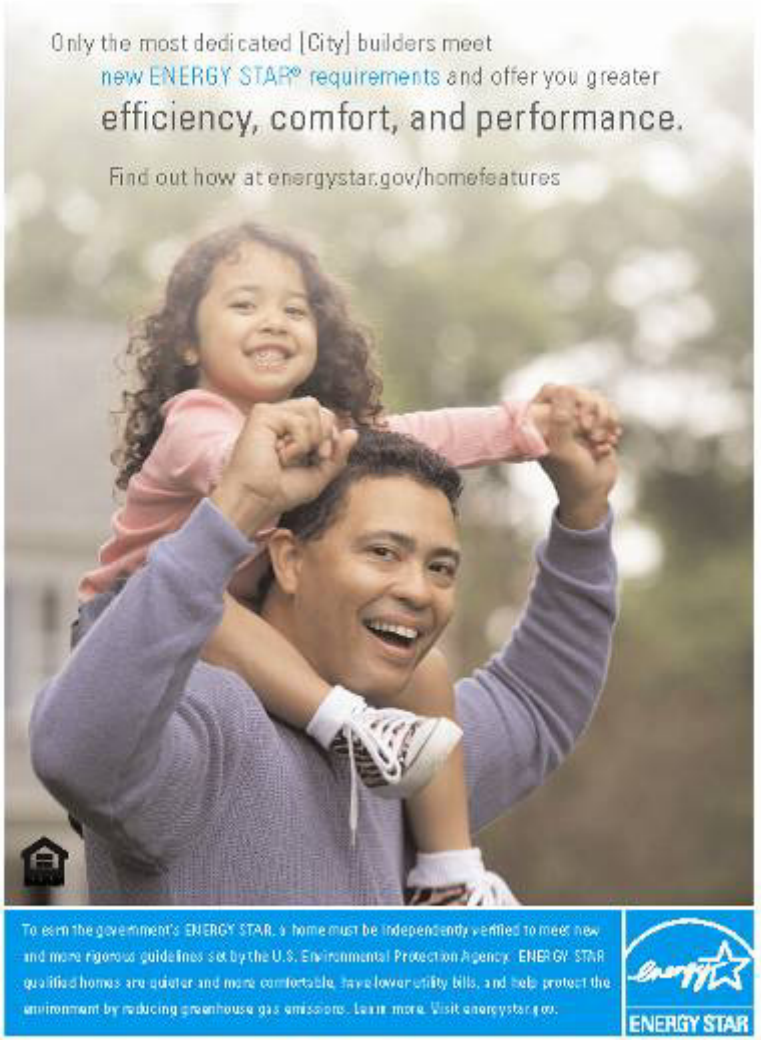
- ~700 new home owners direct-mail survey
- ~200 baseline homes (est. 20% > MEC 93)
- ~250 ENERGY STAR Qualified Homes
- ~235 Guaranteed Performance Homes



Source: Measuring Public Benefit from Energy Efficient Homes [2005], Advanced Energy Corp.

BUILDER RECOGNITION

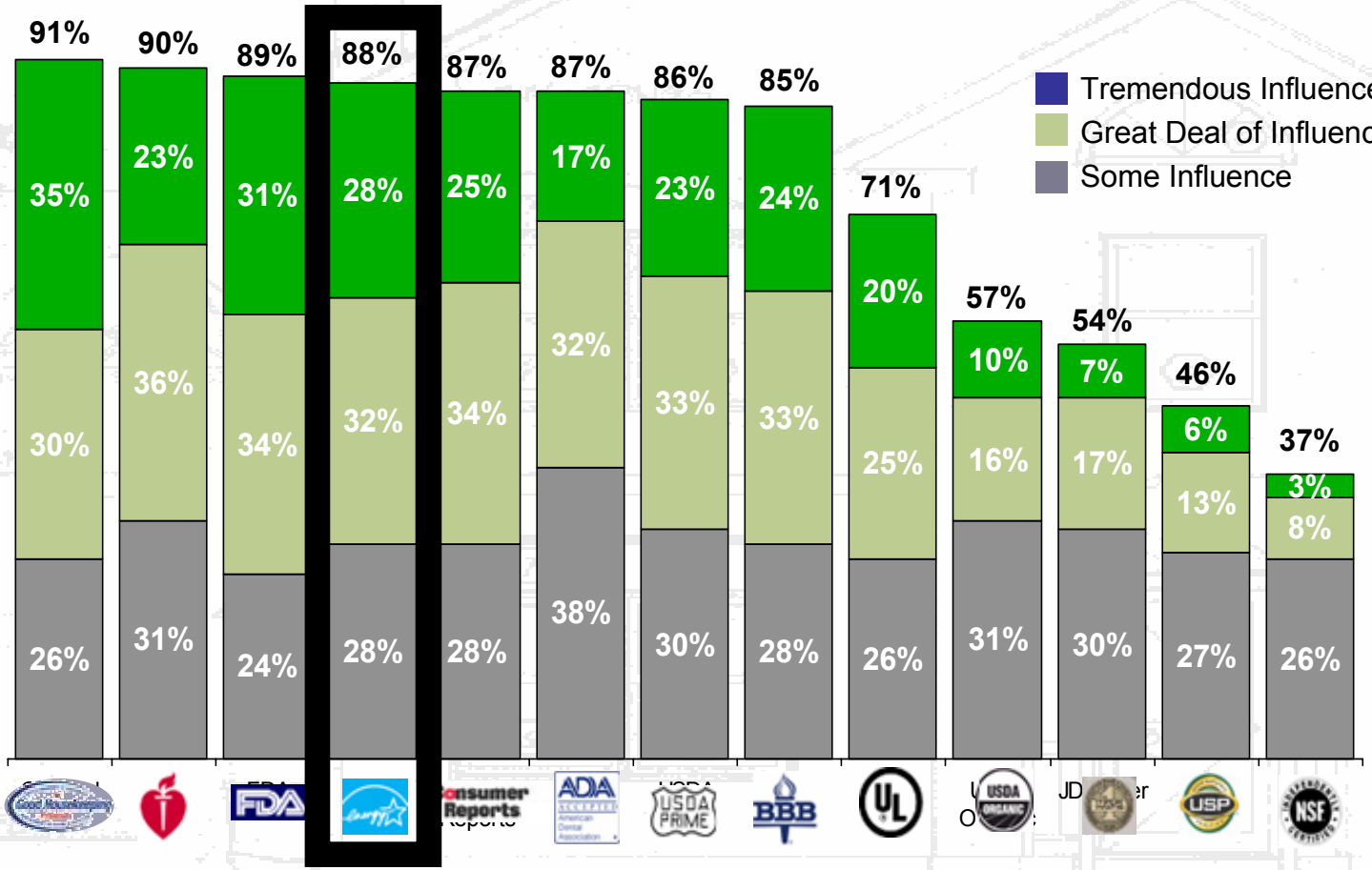




WHAT WE ARE SELLING

- **Brand** Advantage
- **Quality** Advantage
- **Cost** Advantage
- **Peace-of-Mind** Advantage
- **Environmental** Advantage

BRAND ADVANTAGE



Source: Fairfield Research, May 2003

BRAND ADVANTAGE

=

Brand Shorthand:

- Truly Energy Efficient
- Credible
- Environmental Leadership

QUALITY ADVANTAGE

Quality Advantage requires

Translating features into

"What's in it for me?"

benefits.

QUALITY ADVANTAGE

Properly Installed Insulation System =

- *Lower utility bills*
- *Improved comfort*
- *Quieter indoors*

Consumer Message:

It's virtually cost prohibitive to upgrade a minimum code home to include the advanced insulation system included in our new homes.

QUALITY ADVANTAGE

Tight construction =

- *Lower utility bills*
- *Improved comfort*
- *Quieter indoors*
- *Less dust, pollen, bugs*
- *Added durability*

Consumer Message:

Tight construction is like closing a hole in your wall the size of an open window.

QUALITY ADVANTAGE

Tighter ducts =

- *Lower utility bills*
- *Improved comfort*
- *Quieter and cleaner*
- *Less dust, pollen, bugs*
- *Added durability*

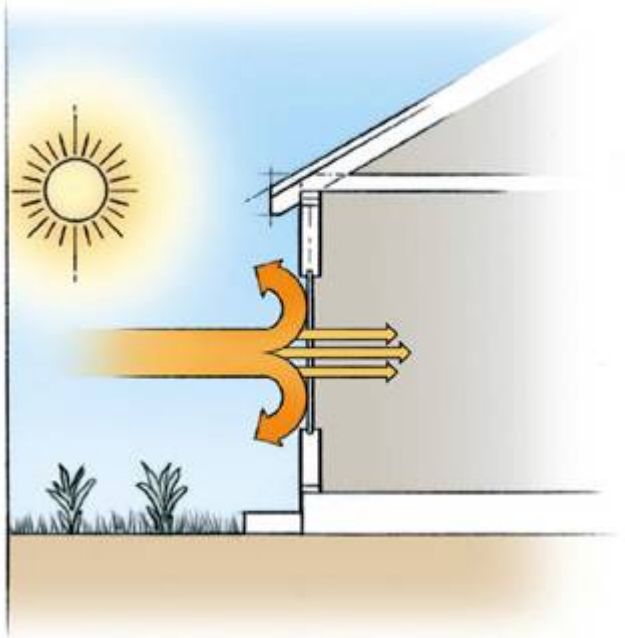
Consumer Message:

Think of heating and cooling ducts as the lungs of your home; we seal ducts so dust, bugs and pollen can't compromise the air you breathe.

QUALITY ADVANTAGE

Advanced windows =

- *Lower utility bills*
- *Improved comfort*
- *Quieter indoors*
- *UV Protection*



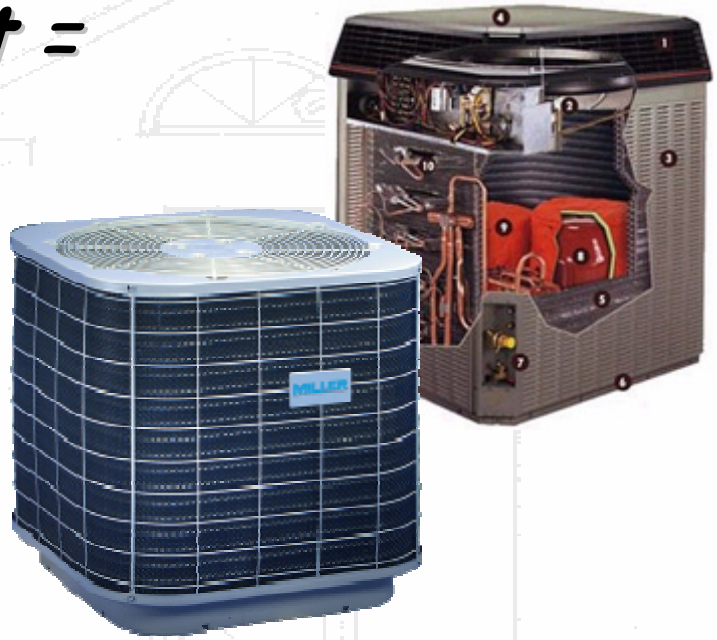
Consumer Message:

You wouldn't let your children spend hours outdoors in the sun without protection; the same goes for your home.

QUALITY ADVANTAGE

High efficiency equipment =

- *Lower utility bills*
- *Quieter and cleaner*
- *Added durability*
- *Long warranties*



What to Tell Customers:

You expect a state-of-the-art operating system with a new computer; you should expect the same with a new home.

QUALITY ADVANTAGE

Right-sized equipment =

- *Lower utility bills*
- *Longer life*
- *Quieter operation*
- *More comfort*

What to Tell Customers:

Bigger is not better;
we make less mistakes so our homes need less energy for better comfort.

QUALITY ADVANTAGE

Third-party inspection =

- *Independent quality control*
- *Better subcontractor work*
- *Documented performance*

What to Tell Customers:

"Our subcontractors send their best crews because they know their work will be inspected."

ENERGY STAR Partner Astoria Homes, Nevada

QUALITY ADVANTAGE

Features	WIIFM Benefits
• Properly Installed Insulation System	• More Quiet
• Tight Construction	• More Comfort
• Tight Ducts	• No Drafts
• Advanced Windows	• Less Bugs/Pests
• High Eff./ Right-Sized Equip.	• Better IAQ
• Inspections/Testing	• Higher Quality
	• Less Maintenance
	• Better Workmanship
	• Better Investment

COST ADVANTAGE

	Monthly	Annual
Utility Savings	$45	$540
Added Mortgage	$20	$240
Cost Savings	**$25**	**$300**

What to Tell Customers:

By applying advanced technologies and building practices, we have been able to substantially improved the quality of our new homes, while reducing your ownership cost.

PEACE-OF-MIND ADVANTAGE

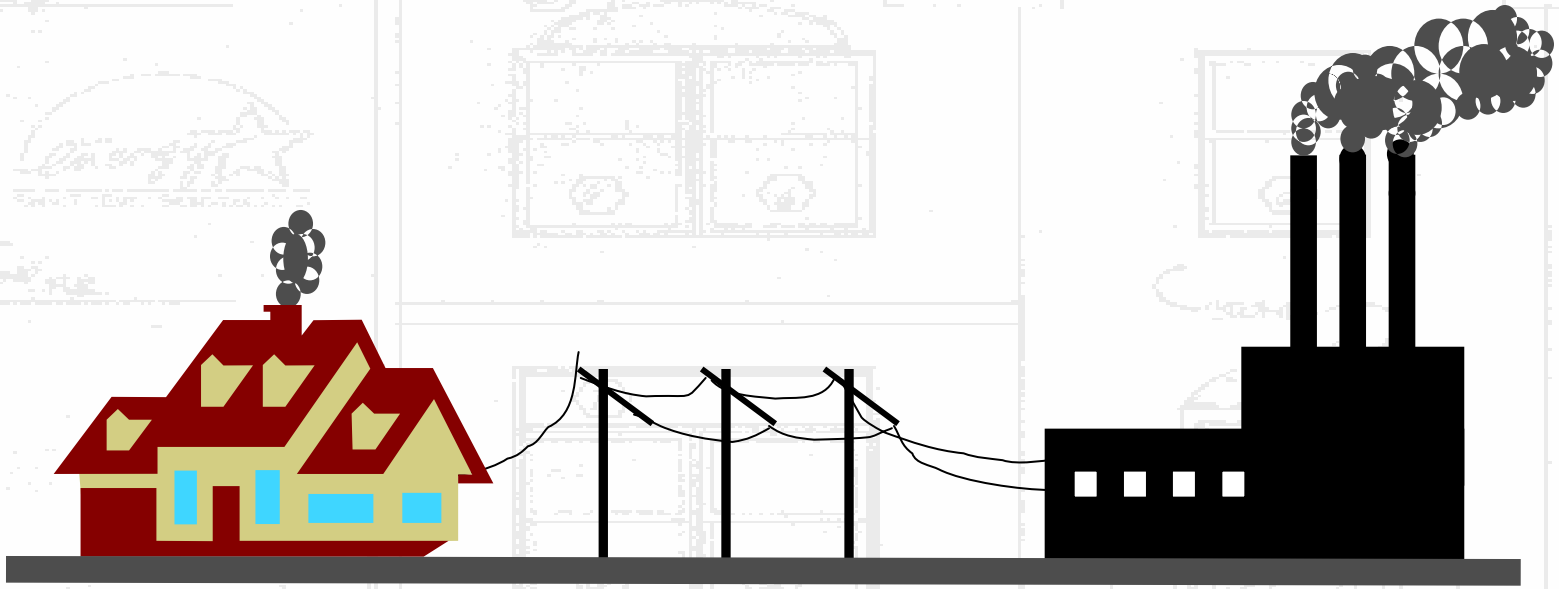
- ***Select Group of Excellence***
  < 12% of all homes in U.S. earn ENERGY STAR

- ***Less Obsolescence***
  Upgraded insulation system
  Advanced comfort delivery system
  Advanced technology windows and equipment
  Home designed for future energy cost increases

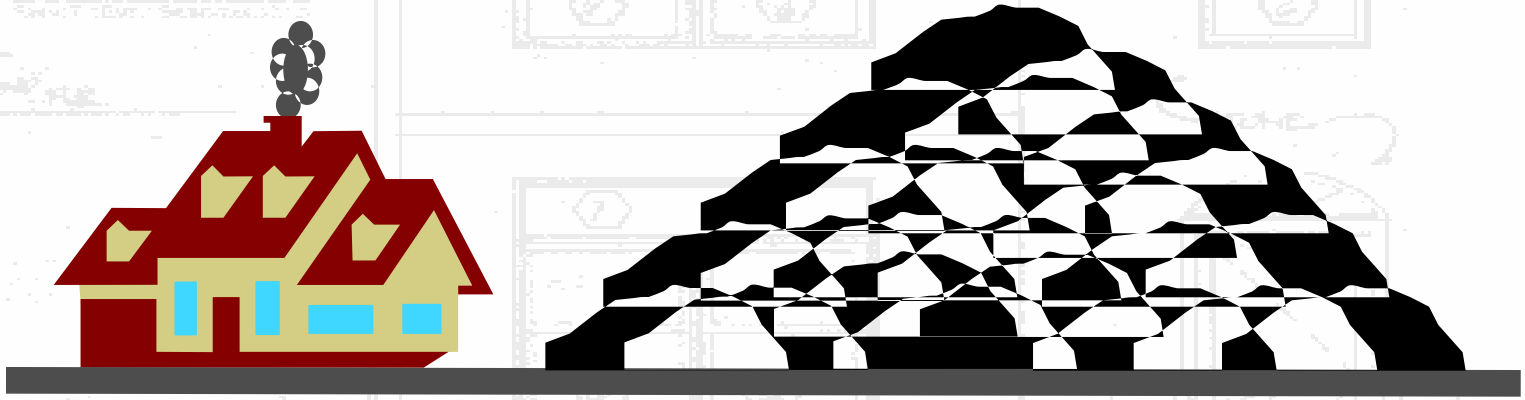
- ***Quality Assurance***
  Rigorous inspection and testing
  Strict guidelines from EPA and DOE

ENVIRONMENTAL ADVANTAGE

Less Energy Used = Less Pollution



ENVIRONMENTAL ADVANTAGE



"Each home that earns the ENERGY STAR avoid ~3,000 lbs. of coal combustion each year."

SELLING ENERGY STAR

…this is a great story, but …

"If you don't tell your story, you give it away!"

Vern McKown,
President, Ideal Homes

Why…

…rats are leaving the ship?
…plug-in hybrids affect housing?
…infrared cameras change everything?
…home buyers are smarter?
… it's time to lead or get out of the way?

THRESHOLD OF PAIN


TOM'S SHELL
Self Serve
Cash or Credit
Regular
ARM 9
Plus
LEG 9
Premium
First Born 9

Small Cars in Focus As Gas Prices Rise

By MATT MOORE
The Associated Press
Tuesday, September 13, 2005; 11:52 AM

Power Information Network expects the number of compacts and sub-compacts on the U.S. market grow to grow from 33 this year to 40 in 2010.


You can do it . We can help.sm
REGISTER
CART
Keyword or item #
SEARCH
SHOP
GIFT CENTER
KNOW-HOW
SERVICES
PROMOTIONS
CUSTOMER SUPPORT
SIGN IN
STORE FINDER
ECO OPTIONS
Welcome to Eco Options
Only at The Home Depot
Learn More
Eco Options Virtual Home
Learn More
Personal Energy Audit
Learn More
Green Project Guides
Learn More
SUSTAINABLE FORESTRY
LEARN MORE
ENERGY EFFICIENT
LEARN MORE
HEALTHY HOME
LEARN MORE
CLEAN AIR
LEARN MORE
WATER CONSERVATION
LEARN MORE
TOUR THE ECO OPTIONS VIRTUAL HOME
LEARN MORE
Improve your Home.
And the Environment.
Eco Options Products Sold
354,105,804 items
Electricity Saved
3,744,146,266 kWh
CO2 Prevented from the Atmosphere
7,750,382,771 lbs
Trees Planted
90,141,693 trees
* The above numbers are based on averages and certain assumptions. Click on a ticker for details.
GreenTouchscreen

Wal-Mart Aims to Sell 100 Million Efficient Light Bulbs in 2007

December 20, 2006

Wal-Mart Stores, Inc. announced in late November that it has set a goal of selling 100 million compact fluorescent lamps (CFLs) at its Wal-Mart and Sam's Club stores by the end of 2007. CFLs can replace conventional incandescent bulbs in most light fixtures, using about 75 percent less electricity and generally lasting much longer than incandescent bulbs. The twisted spiral shape of modern CFLs allows them to fit into fixtures for which earlier CFLs were too big, and although CFLs have always paid for themselves many times over in energy savings, the dropping prices on CFLs are making their up-front costs more palatable for consumers. Wal-Mart plans to achieve its 2007 goal through marketing promotions and in-store displays. The company estimates that selling 100 million CFLs will save its

The twisted spiral shape of many of today's compact fluorescent lamps allows them to easily replace incandescent bulbs in most lighting fixtures.

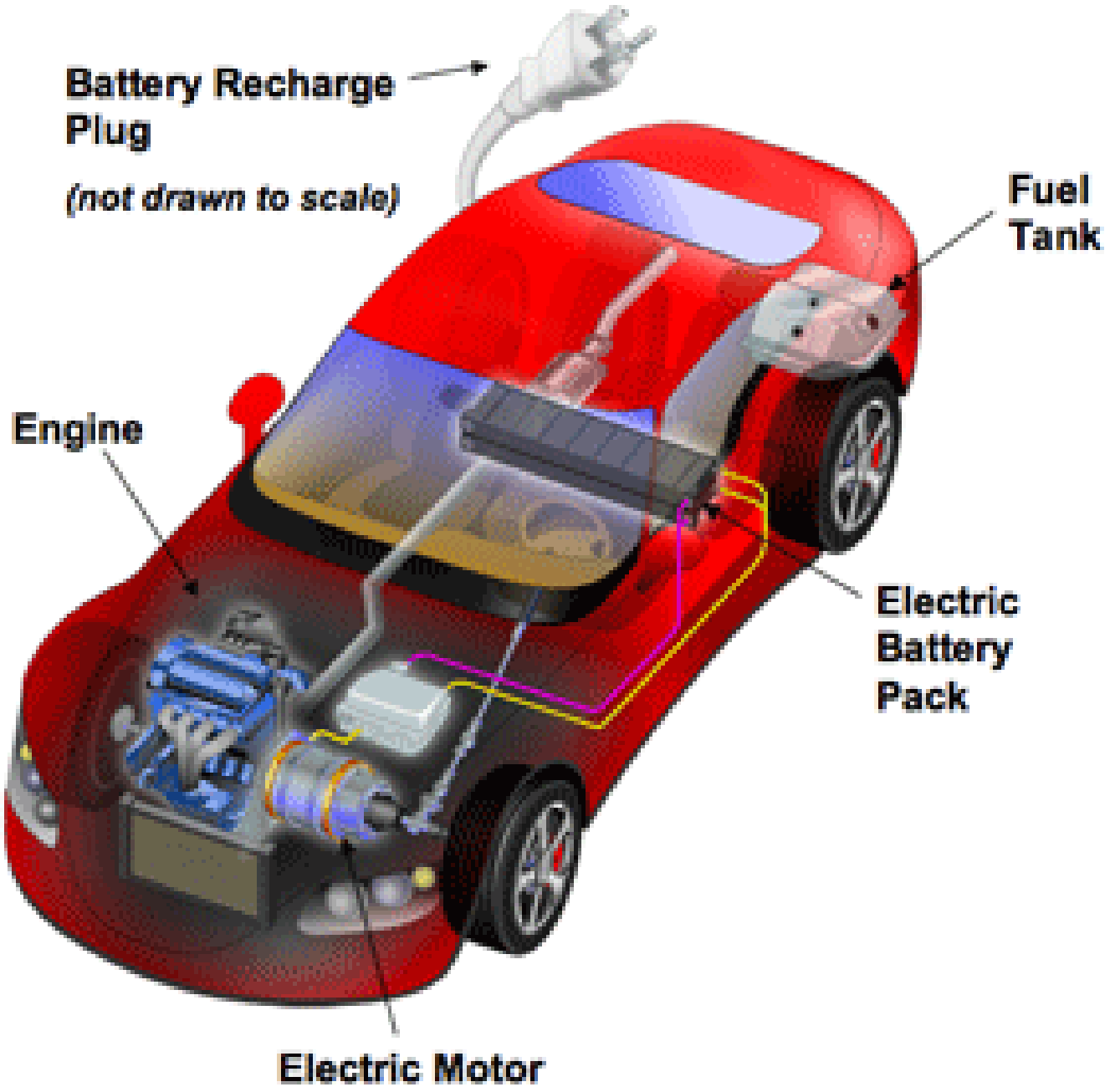

UNITED STATES
HAWAIIAN ISLANDS
ALASKA


CYPRUS
SYRIA
LEBANON
IRAQ
IRAN
JORDAN
ISREAL
KUWAIT
BAHRAIN
QATAR
SAUDI ARABIA
U.A.E
OMAN
YEMEN

For national security we need transportation fuel options:

- ~~Hydrogen~~
- ~~Fuel Cells~~
- ~~Ethanol~~
- ~~Hybrid~~
- Plug-in Hybrid

How a Plug-In Hybrid Works




100+ MPG
CALCARS.ORG

Likely Scenario:

$.40+/kWh Electricity


SPI
IR PRO CAMERA

Low Cost Infrared Cameras:

Panasonic

AW-E650 1/2-Inch 3-CCD Convertible System Camera with Extreme Low-Light Sensitivity, Built-In Filters and Infrared Total Darkness Vision More Info

Mfr # AWE650 • B&H # PAAWE650

Availability : Accepting Orders

Quantity 1 Add to Cart Add to Wishlist

Price : $ 4,099.95

Shipping Cost

The IRISYS

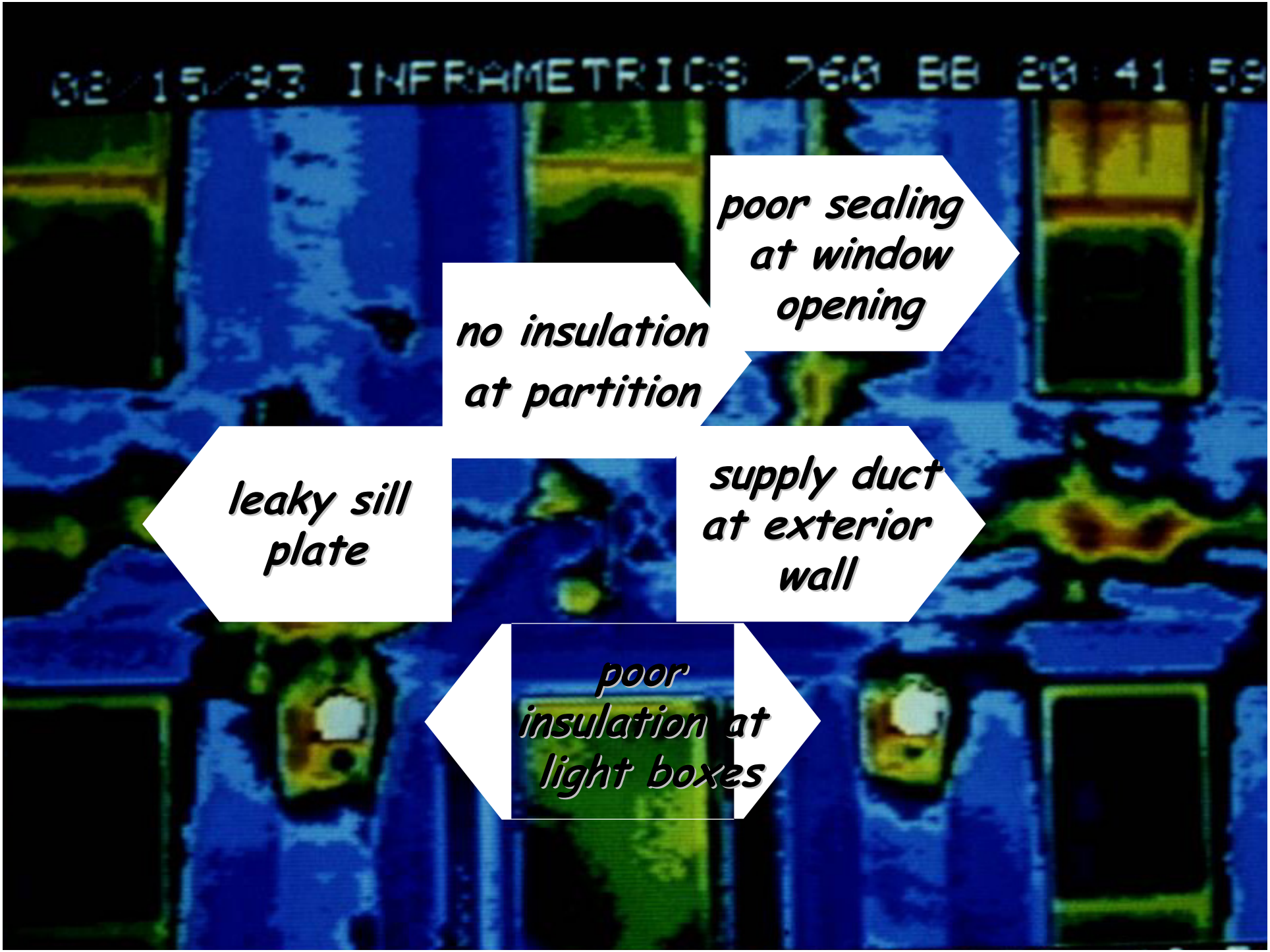
Buy It Now

$2000.00

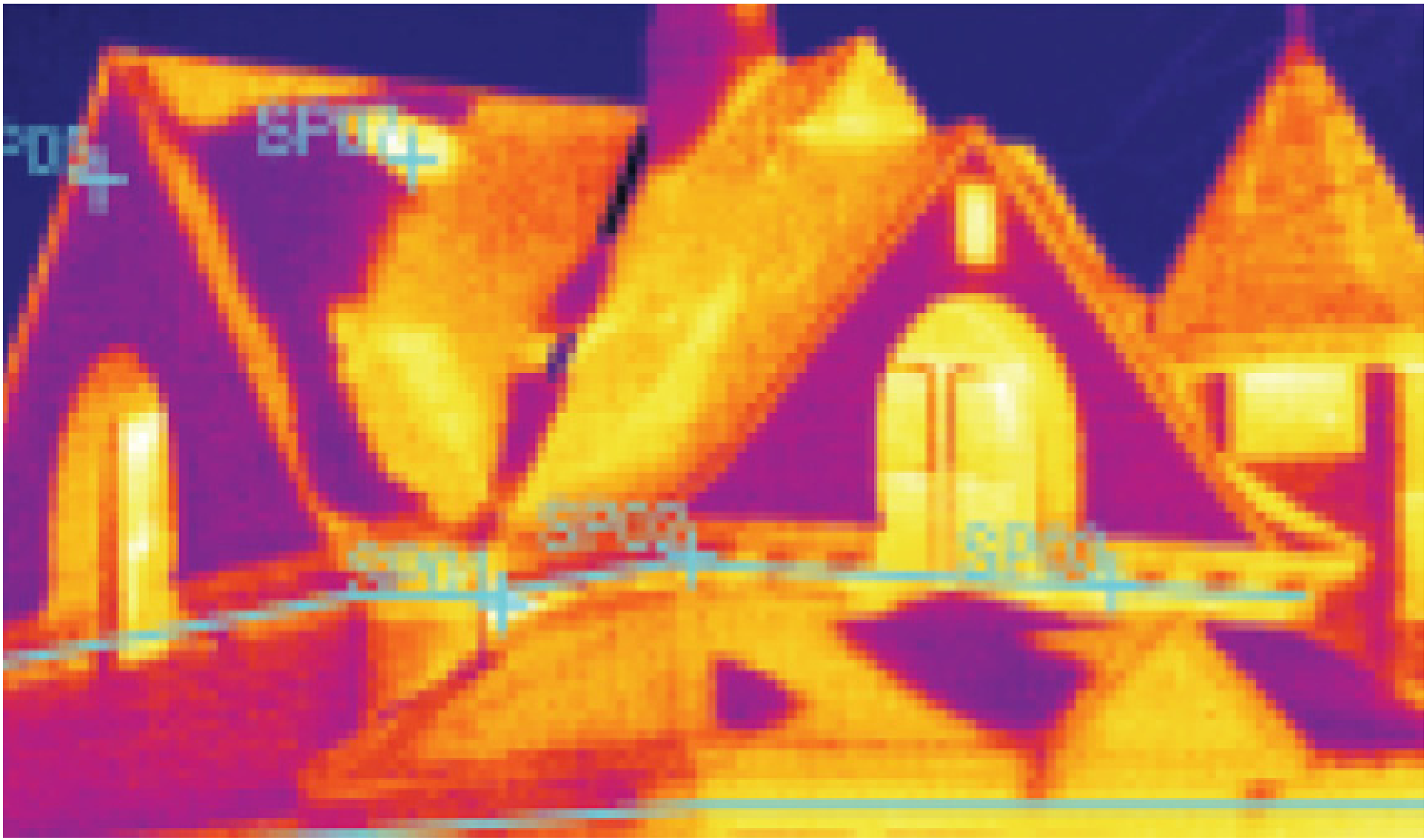
Making the Invisible, Visible…

…defects no longer hidden…

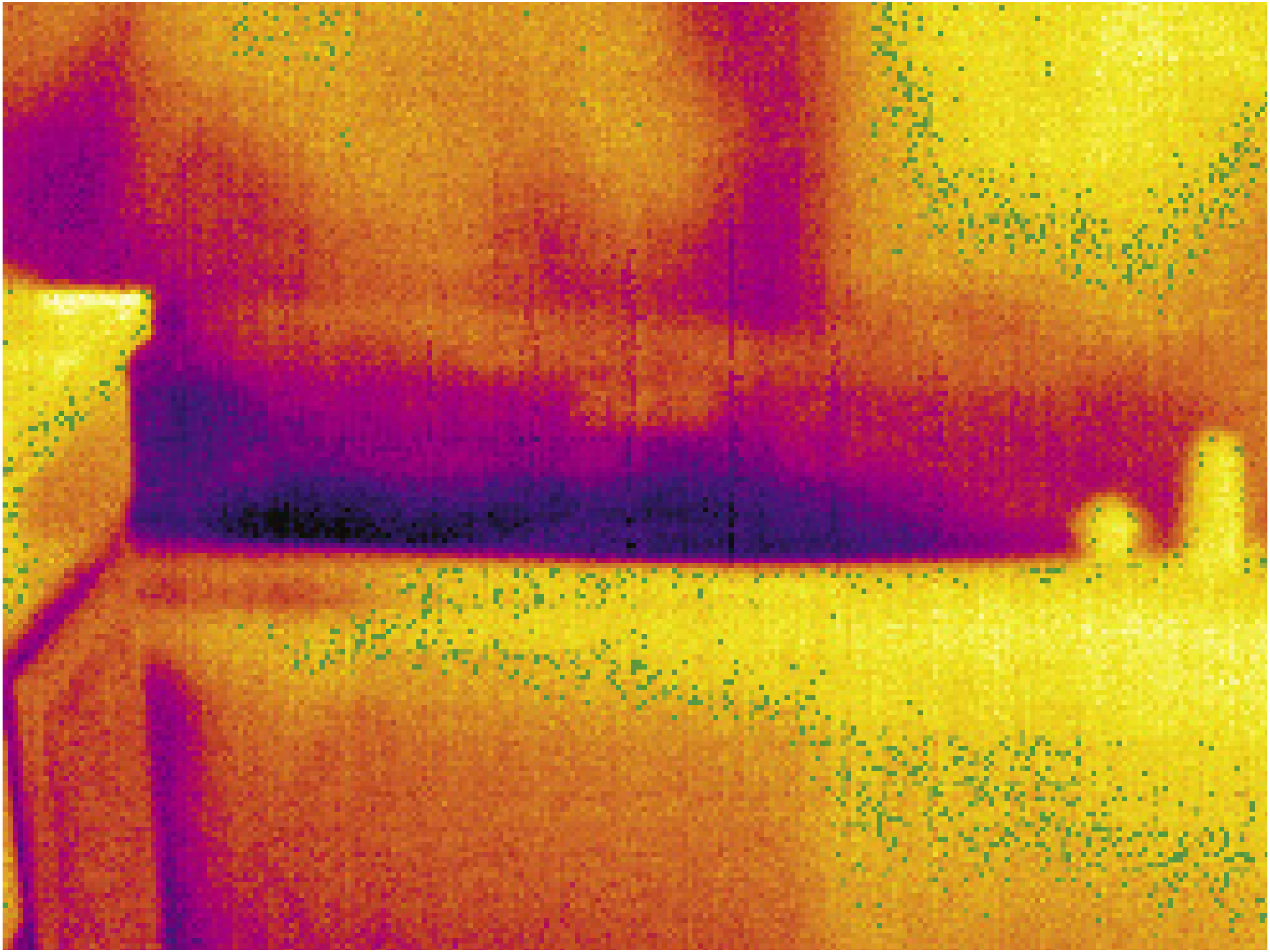
Obsolete Competition: Used Homes

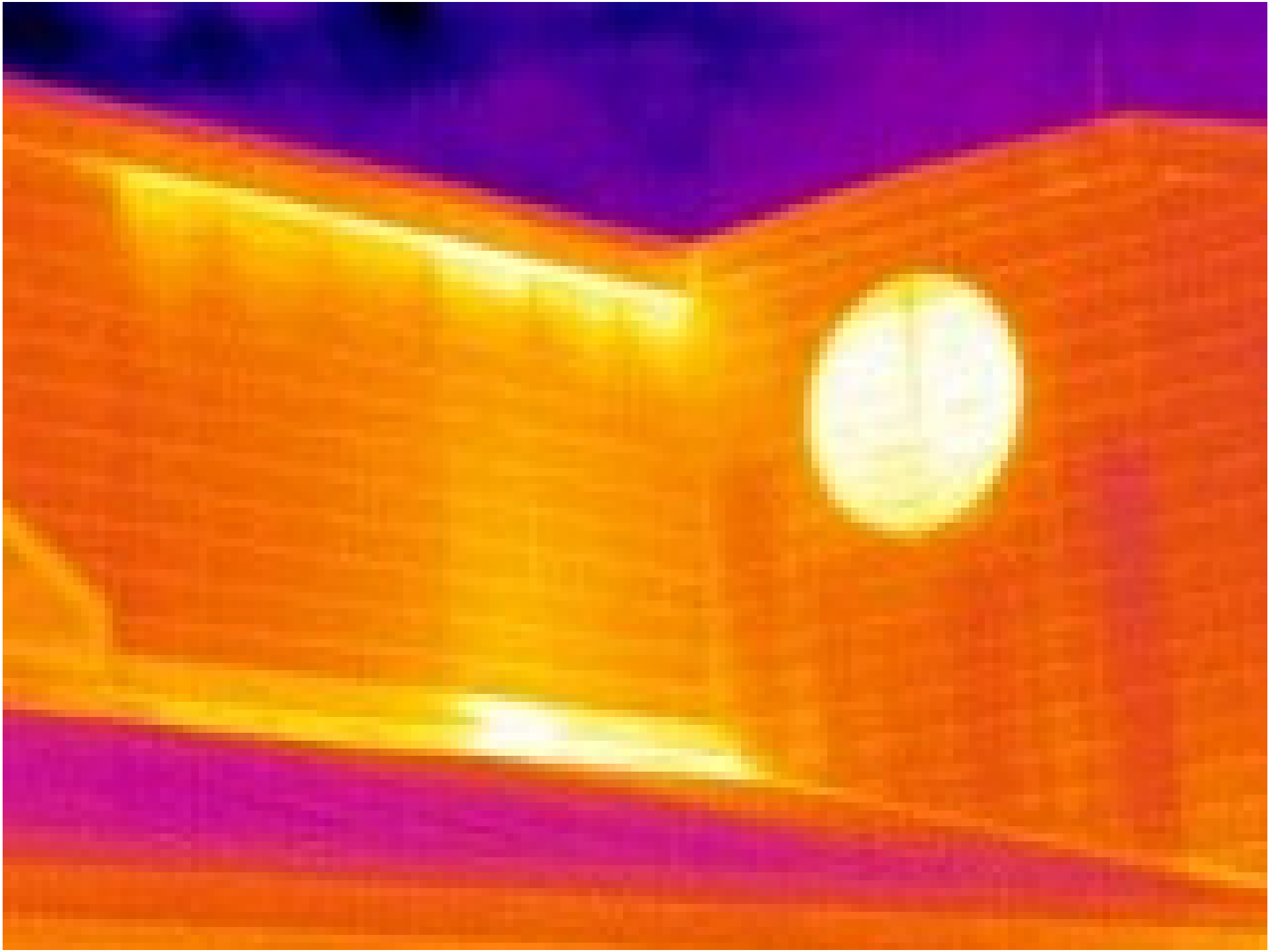

02/15/93 INFRAMETRICS 760 BB 20:41:59
poor sealing at window opening
no insulation at partition
leaky sill plate
supply duct at exterior wall
poor insulation at light boxes

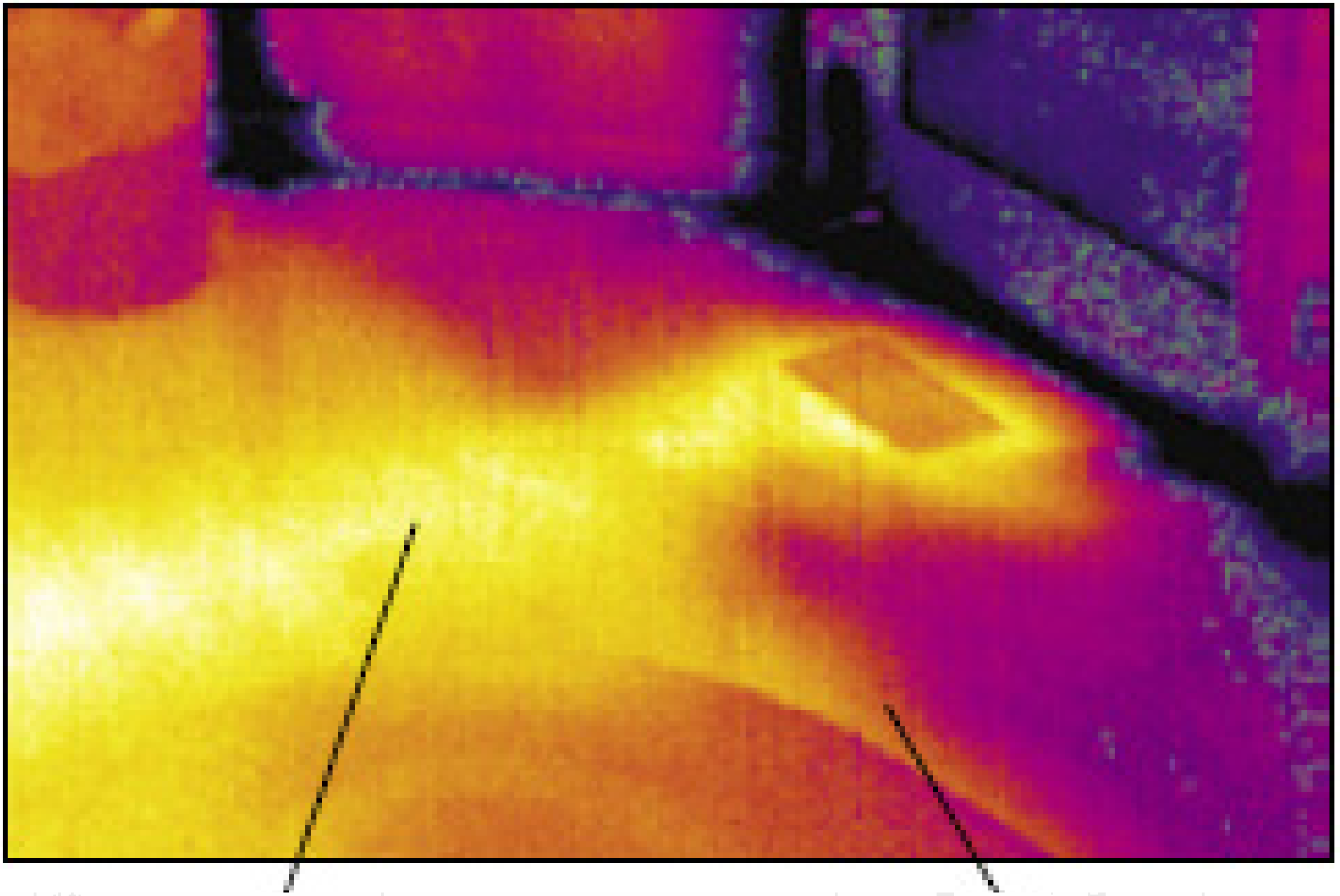
Obsolete Competition: Used Homes



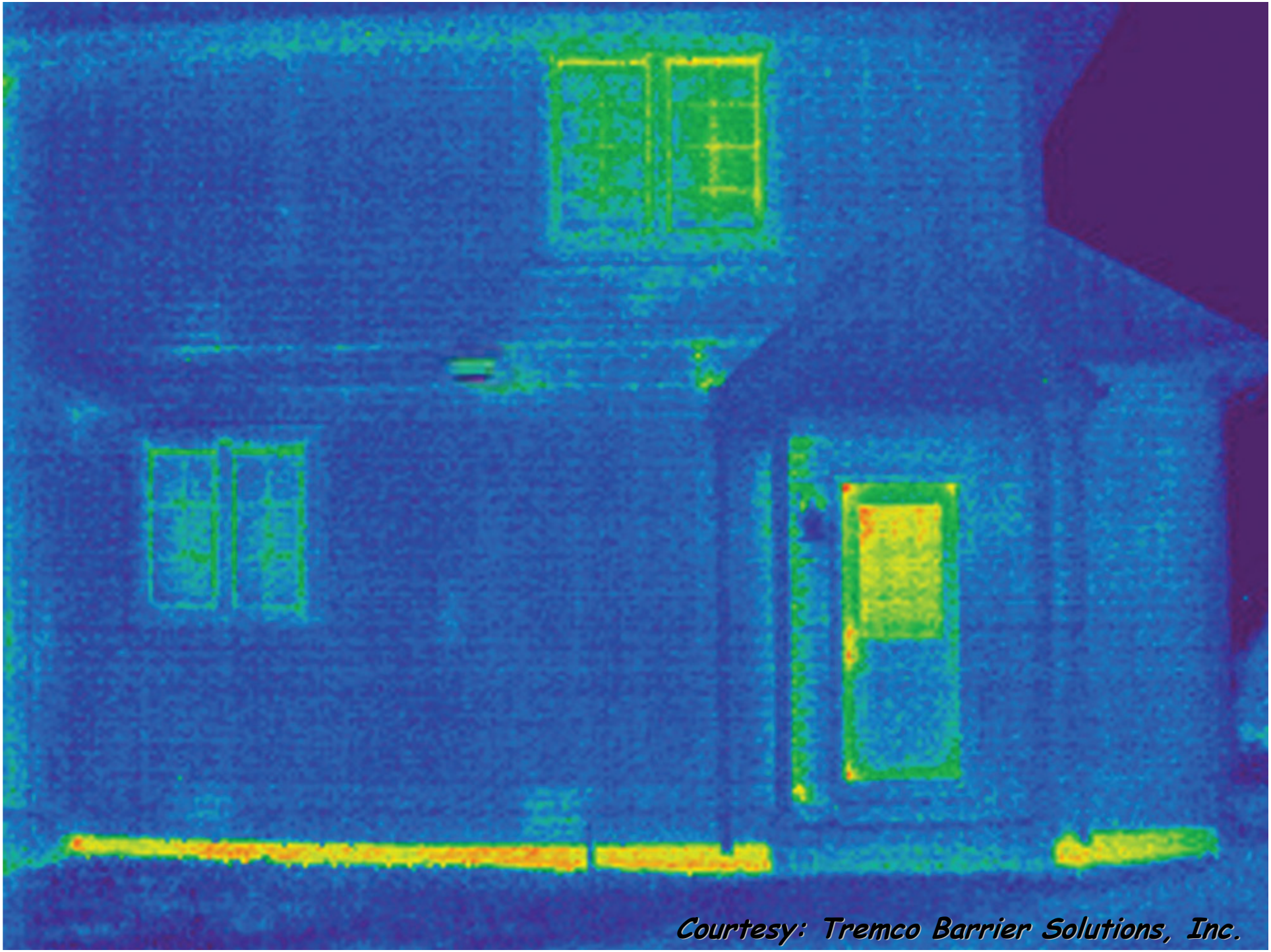
Obsolete Competition: New Homes



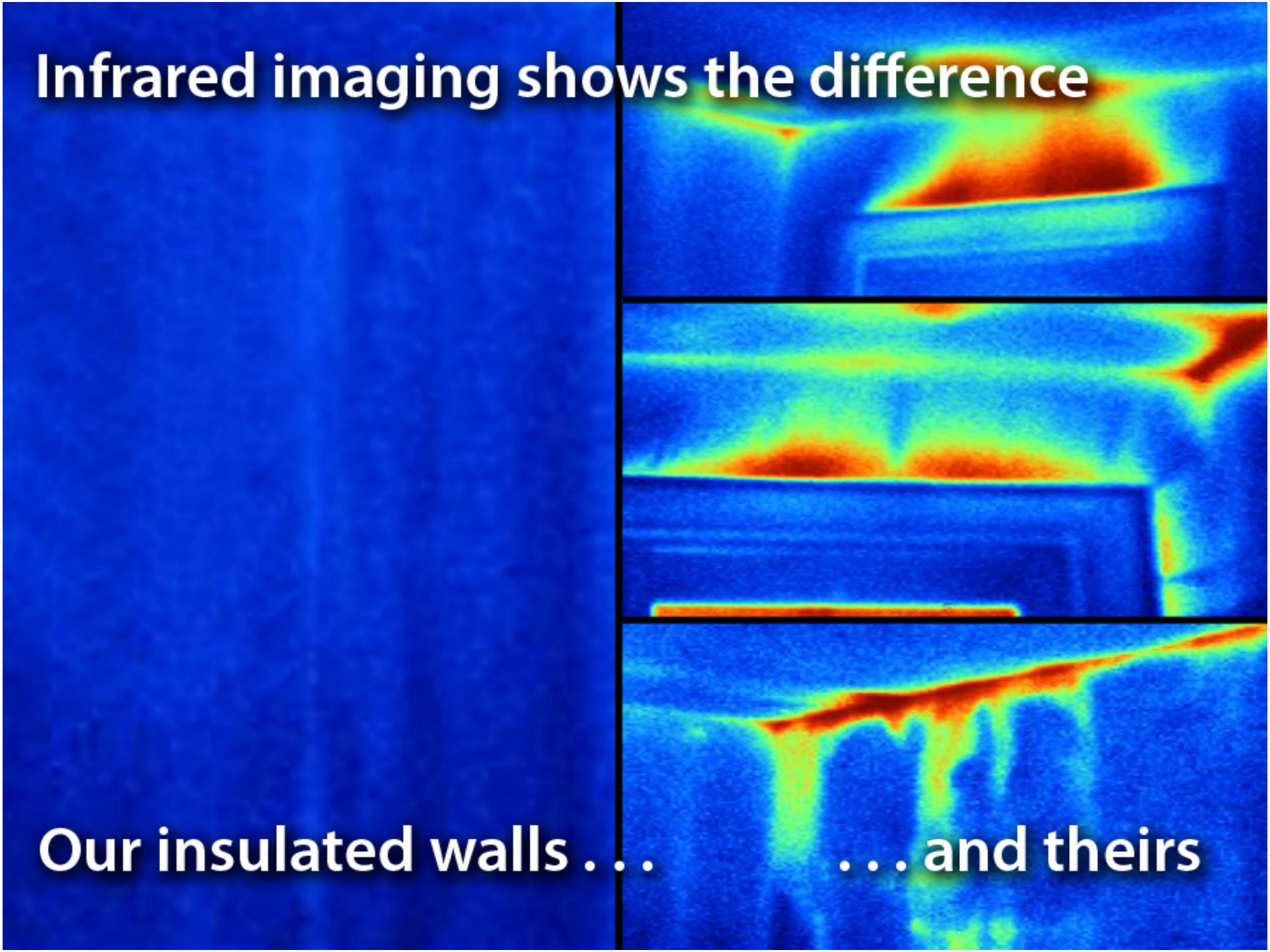




Courtesy of Fort Collins Utilities



Courtesy: Tremco Barrier Solutions, Inc.


Infrared imaging shows the difference
Our insulated walls . . .
. . . and theirs

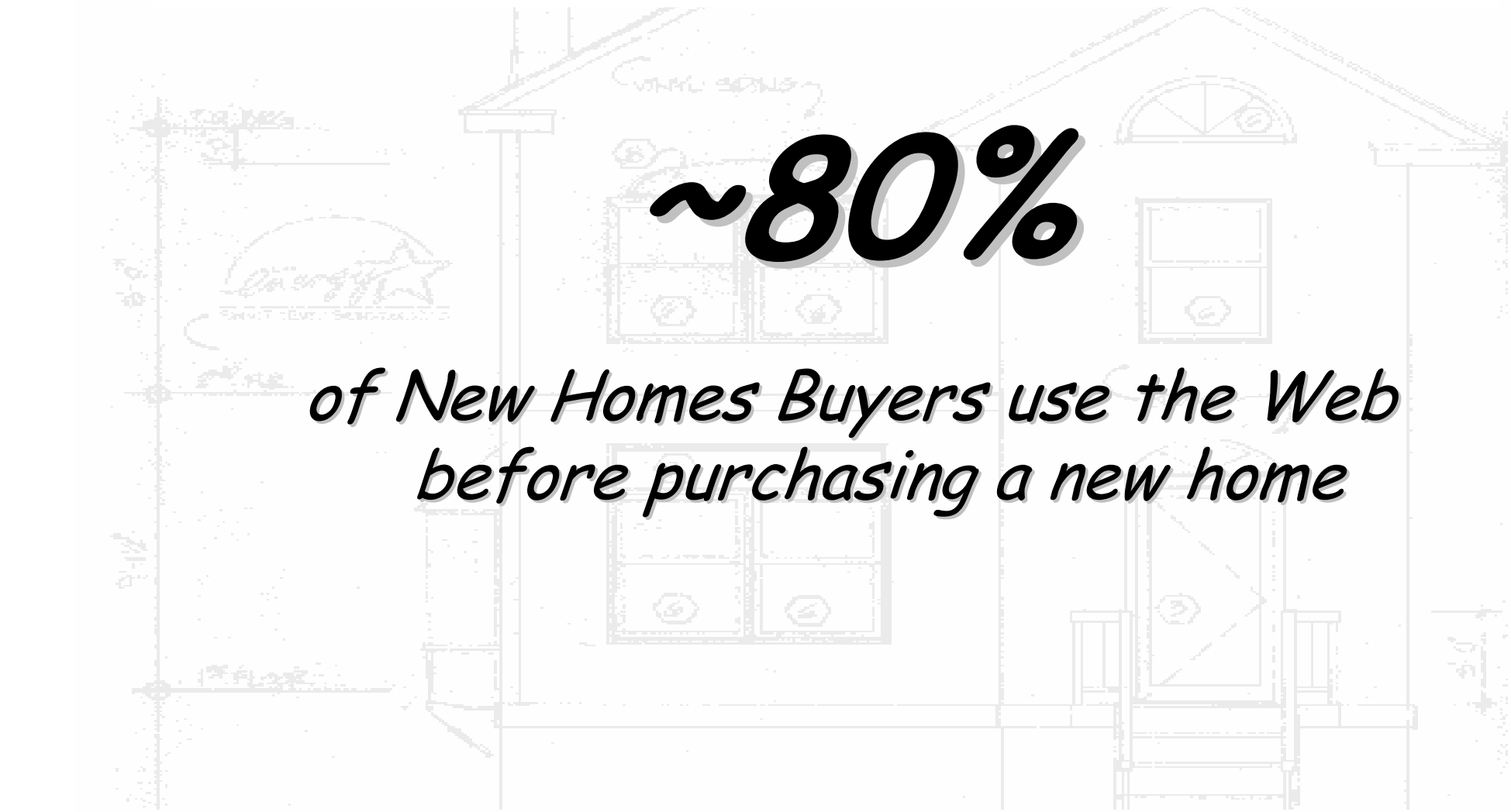
CODE NONCOMPLIANCE EXPOSED

- *insulation "substantial contact"*
- *warm side vapor retarder in CZ ≥5*
- *insulation per manufacturer specs*
- *fire-blocking and draft-stopping*
- *ICAT fixtures to unconditioned attic*

At least 50% of TBC required by code but not enforced…

Are builders still liable?

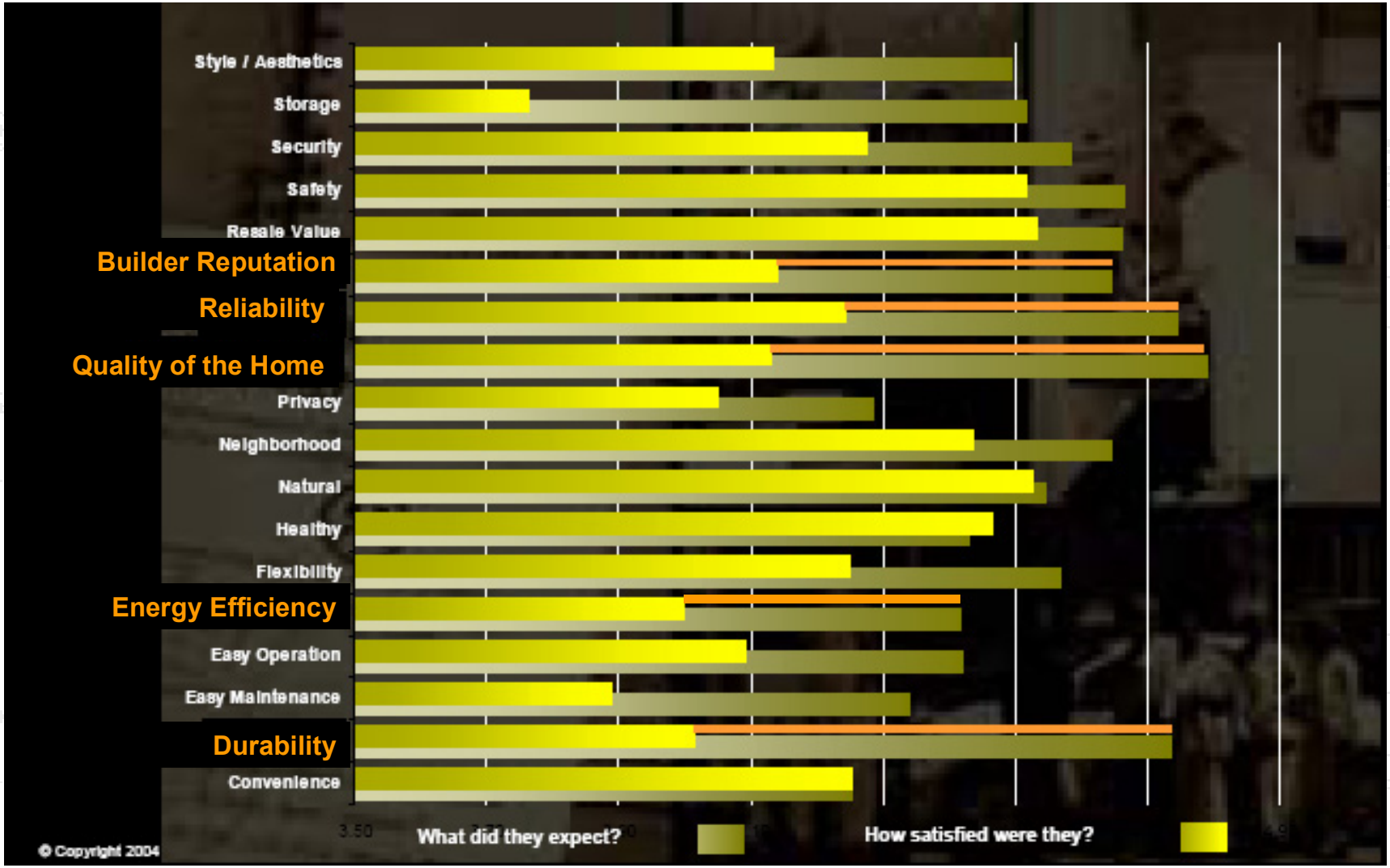
SMARTER CUSTOMERS



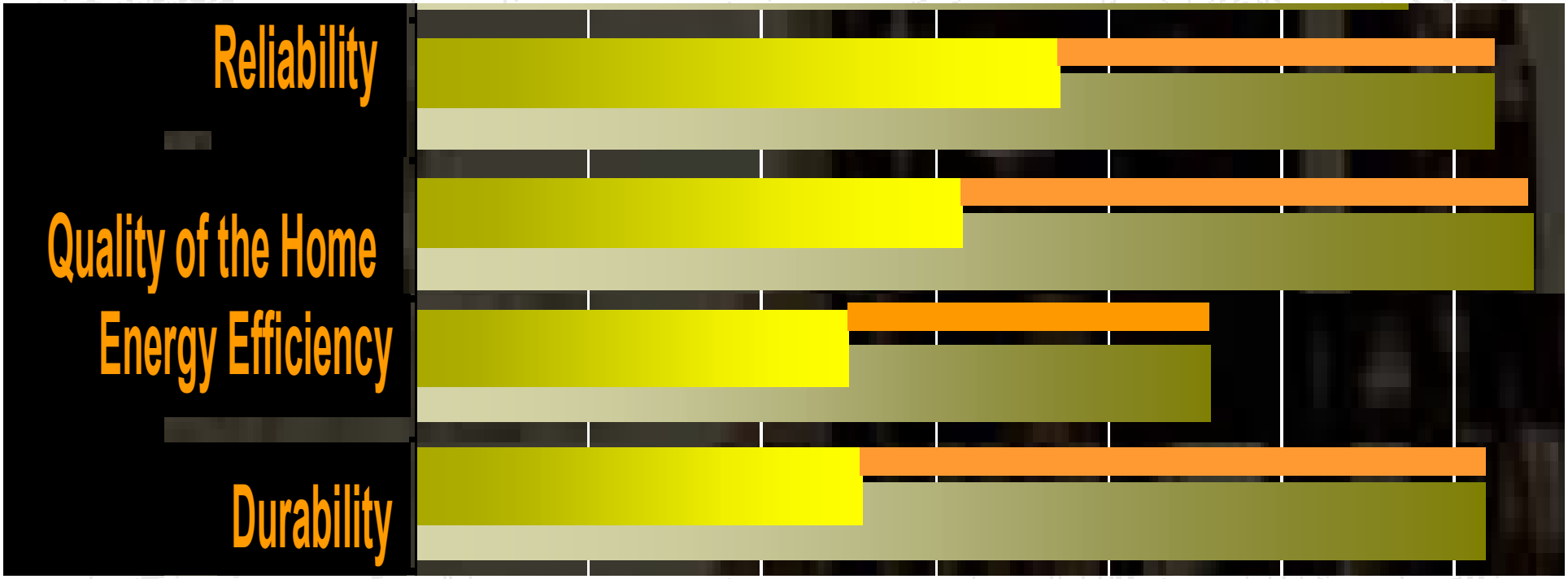
~80%

of New Homes Buyers use the Web before purchasing a new home

CUSTOMER SATISFACTION



CUSTOMER SATISFACTION



VALUE PROPOSITION = CUSTOMER SATISFACTION

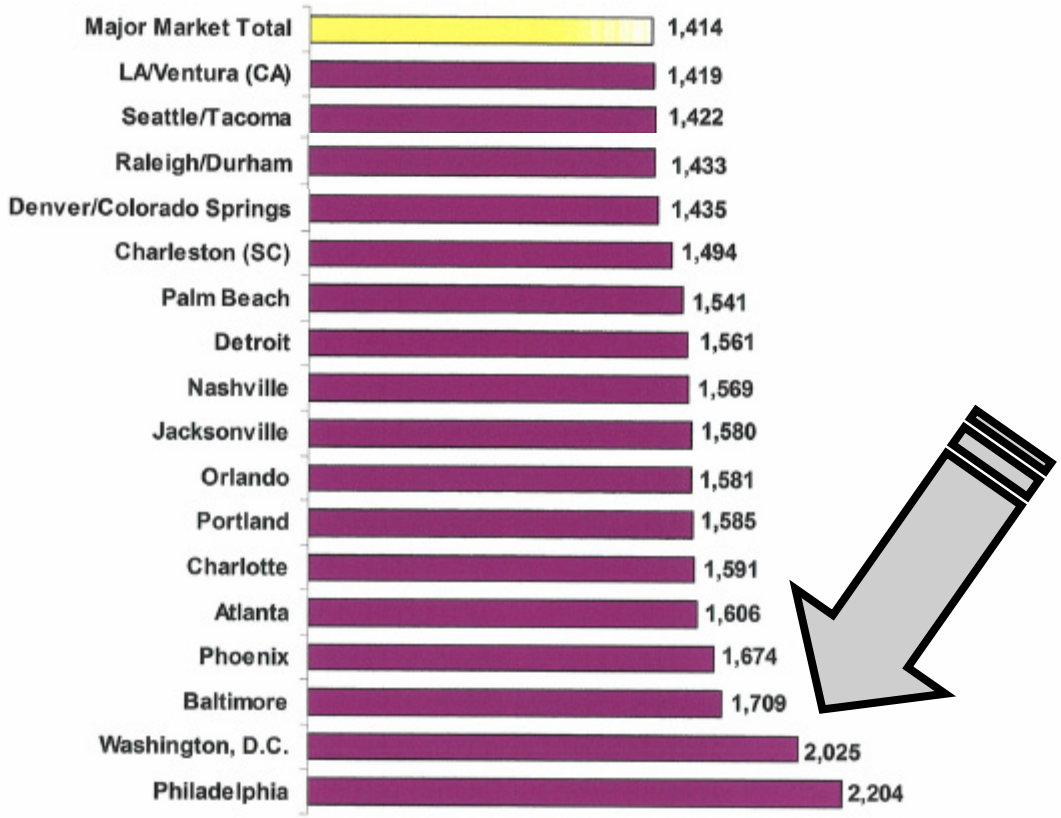
JD Powers and Assoc. 2005 Builder Quality Rankings

Market	2005
Major Market Total	**112**
Austin	122
Orange County (CA)**	122
Sacramento	120
Houston	118
Tucson	118
Dallas/Ft. Worth	117
Los Angeles/Ventura Counties**	116
Minneapolis	116
Charlotte	115
Chicago	115
Tampa	115
Phoenix	114
Inland Empire (CA)**	113
Las Vegas	113
Raleigh/Durham	113
Seattle/Tacoma	113
Denver/Colorado Springs	111
San Diego	111
San Francisco Bay Area	111
Portland*	109
Atlanta	108
Detroit	108
Ft. Myers/Naples	108
Palm Beach	107
Baltimore*	106
Albuquerque*	104
Orlando	104
Washington, D.C.	104
Philadelphia	101
Jacksonville	98

HOMEBUYER QUALITY SURVEY RESULTS

ENERGY STAR

Problems per 100 Homes by Market (Cont.)



J.D. POWER AND ASSOCIATES

CUSTOMER SATISFACTION

ENERGY STAR

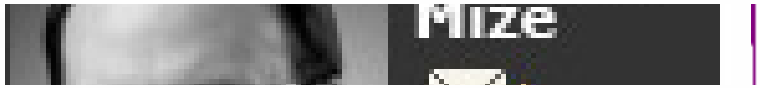
Make the scary man stop! Make the scary man from the government be quiet!! Make the scary man from the government quit talking about making houses more energy efficient!!!

By Richard Mize

BOOKMARK

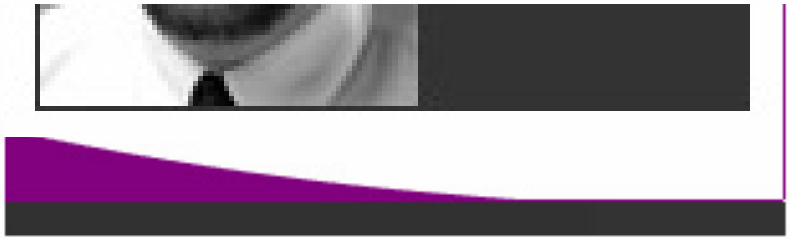
Make the scary man go away!

farmhouse I grew up in, where the wind came sweeping out of the hills, through the walls and across



My inner child grew up to live in a 22-year-old house, not a new one, and he wants to sell it someday and doesn't want it to be as obsolete as his grandpa's outhouse and wash basin.

Energy Star program. He was a speaker at the Best of Building Science seminar presented Thursday by Guaranteed Watt Saver, which consults on Energy Star homes and other energy-efficient construction.



Energy Star is a program that


ENERGY STAR
ENERGY STAR AWARD 2006
SUSTAINED EXCELLENCE
THERMAL BYPASS
Thermal Bypass =
Impressive Energy Savings and Improved Comfort
1" Insulating Foam Board and Metal Stucco Lath
ENERGY INSPECTORS

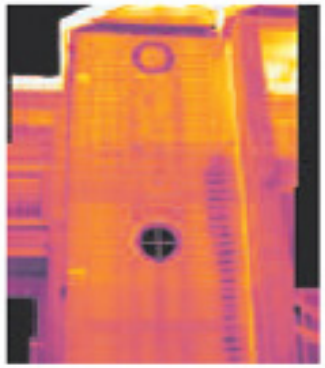

MONEY
ALERT
Paula Toti
MONET ALERT
ENERGY STAR
SAVING ENERGY BEHIND THE WALLS

Infrared Energy Auditing –
How Home Inspectors Gain a Competitive Edge

According to the U.S. Department of Energy, the typical family spends close to $2,000 a year on their home's utility bills, and unfortunately, a large portion of that energy is wasted due to insufficient insulation and a lack of weather stripping around doors and windows. Professional home inspectors and energy auditors have been using leading-edge infrared technology to perform energy auditing of homes and buildings to improve energy efficiency, thus leading to savings on energy costs.

Howard Vos of Building Performance Consulting in Schenectady, NY and Gary Goodman of Energy Construction, LLC in Ravena, NY rely on their FLIR Systems EXx20 infrared camera for home energy auditing assessments. Built for harsh environments, the EXx20 is a rugged yet flexible infrared solution featuring interchangeable optics, high-resolution imaging and extreme thermal sensitivity. Feature-rich and affordable; the EXx20 is the smallest, smartest infrared camera on the market today.

"We are thrilled to have this instrument," said Vos. "We use the EXx20 on every job, whether it's for a comprehensive home energy audit, heat loss analysis, or for a quality assurance check of installed insulation. As I complete the assessment, I can easily detect missing insulation in walls and ceilings, or air leakage around doors, windows and sills in the foundation. We can then develop an insulation and air-sealing strategy to address the problem. By using an infrared camera, I am able to instantly see and diagnose the problem, via a non-destructive method, which is a definite competitive edge for our business."



Both Vos and Goodman work with the New York State Energy Research and Development Authority (NYSERDA), and have been certified by the Building Performance Institute. The New York Energy $martSM Program and Energy Star® have partnered together to develop a program to assist homeowners to make energy efficiency improvements. Having a qualified home performance inspector, who has been trained in Building Science, perform a comprehensive energy audit will reveal where there is energy being wasted, so improvements can be made to enhance safety and comfort.

"We also use our FLIR infrared camera for the Energy STAR® new homes program as well," Vos explains. "First, I do an evaluation of the building plans, followed by two or three on-site inspections during critical stages of construction and heating system configuration. It is at the final stages (before and after drywall installation) that the ThermaCAM thermal imaging camera is key, because I can "see" duct leakage and inconsistencies of insulation." The final energy audit takes place when the construction is complete, just before the owner gets their certificate. "We have found that the IR camera is an invaluable tool when doing building diagnostics of newer homes."

Goodman, who specializes in the application and installation of insulation and air sealing techniques, uses the infrared camera before starting a job and after installation of insulation as a final quality assurance check, to make sure he hasn't missed a bay or some other source of cold air.

Infrared thermography is a well-accepted method of imaging and evaluating the thermal efficiency of home and building insulation, doors, windows, and other penetrations, along with the efficiency of heating and cooling systems. Home energy auditors have been able to proactively address the issue of wasted energy by using infrared cameras, and in turn help to make homes more energy efficient, saving money and natural resources.

About FLIR Systems, Inc.:

FLIR Systems, Inc., (NASDAQ: FLIR) designs, manufactures and markets infrared imaging systems worldwide. Commercial product applications include non-destructive testing, research and development, manufacturing process control, predictive maintenance/condition monitoring, and broadcast imaging. With over 30 years experience and more than 30,000 of its IR systems in use, FLIR is the global leader in infrared cameras, software, service, training and support. FLIR ThermaCAM thermal imaging cameras are the most widely used IR non-contact temperature measurement systems worldwide. FLIR products also play pivotal roles in such diverse applications as public safety, defense, navigation, and search and rescue. For more information, please visit our website at: www.flirthermography.com or call 1-800-464-6372.

Howard Vos is certified by the Building Performance Institute in Building Analysis and is a Certified Thermographer with a specialty in Building Science. He formed Building Performance Consulting in 2004 and serves the greater Capital region performing home energy audits, infrared thermography and building diagnostics. Gary Goodman is "triple certified" by the Building Performance Institute with specialties in Building Analysis, Shell, and Heating Systems and has been insulating and air sealing homes in the Capital region for over 25 years. For more information you can reach Howard Vos at (518) 356-4546 and Gary Goodman can be reached at (518) 756-6333.

FLIR
The Global Leader in Infrared Cameras

LEAD OR GET OUT OF THE WAY

WHY ENERGY STAR?
LEADERSHIP OPPORTUNITY

ENERGY STAR Cost: $3,000

Avg. Cost of New Home: $600,000+

Visible Quality
Obsolete Competition
Reduced Risk
Customer Satisfaction
Added Recognition

~.5%

How…

…building science applies to homes?
…to apply Thermal Bypass Checklist?
…to partner with ENERGY STAR?

Crash Course in Building Science

THE SCIENCE BEHIND HOME PERFORMANCE

ALL ACTION HAPPENS AT SURFACES

ENERGY STAR

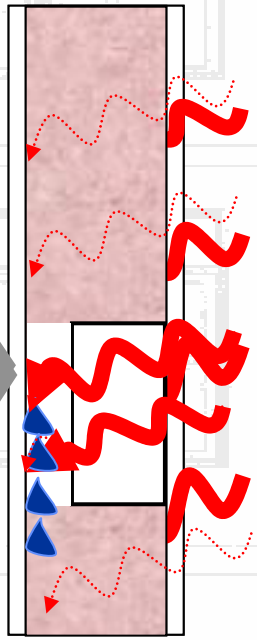
Without Insulation:

Potential Problem!

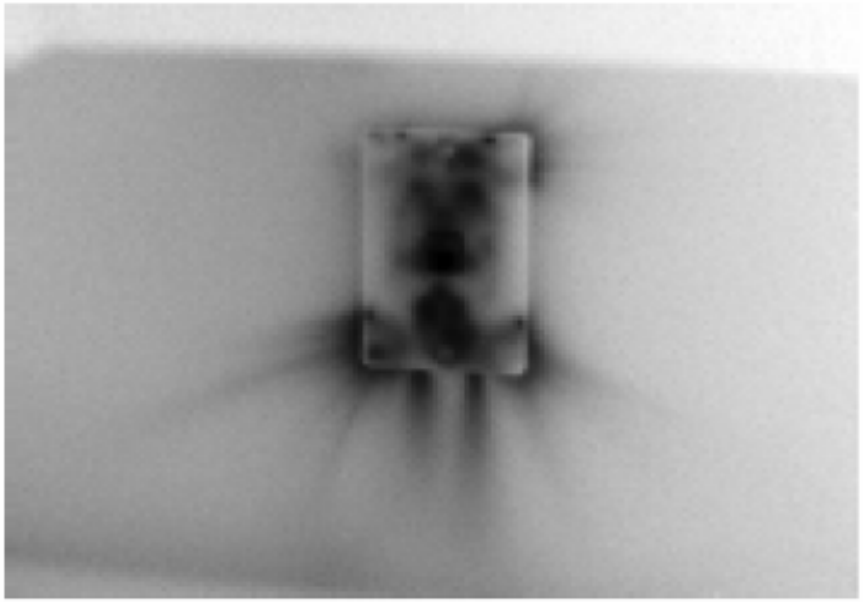
Outside:
30°F

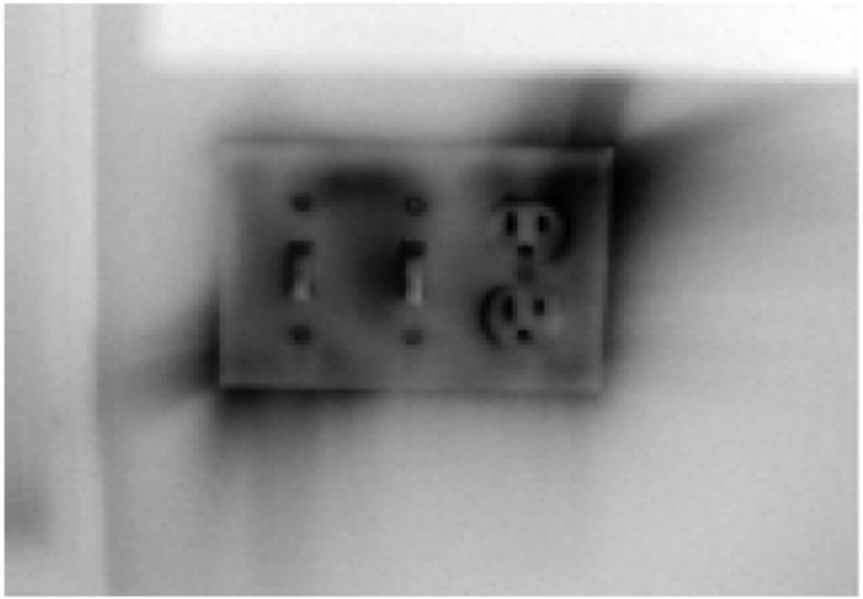
Inside:
70°F, 45°F Dew Pt.

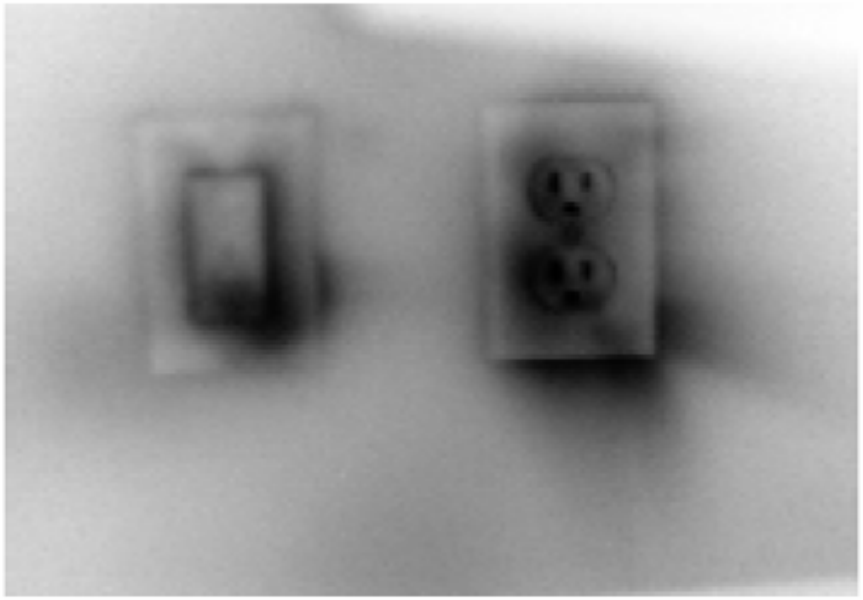
35°F Cold Surface



Therefore, must control air leakage!!!







THE SCIENCE BEHIND HOME PERFORMANCE

CONDENSATION AT SURFACE

Courtesy of Building Science Corp.

THE SCIENCE BEHIND HOME PERFORMANCE

DRIVING FORCES PREDICTABLE

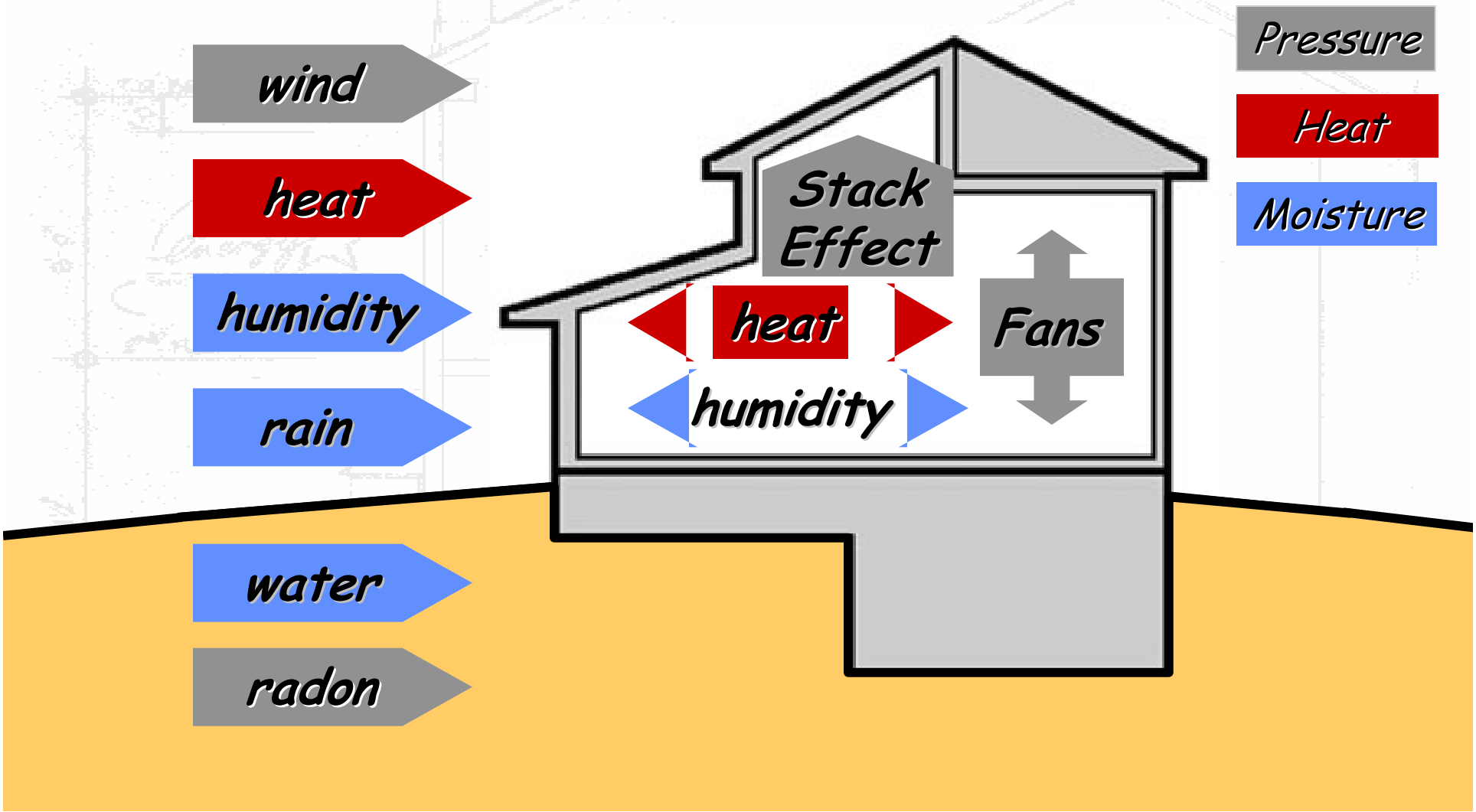
ENERGY STAR

Pressure
Hot
Moisture

Pressure
Hot
Moisture

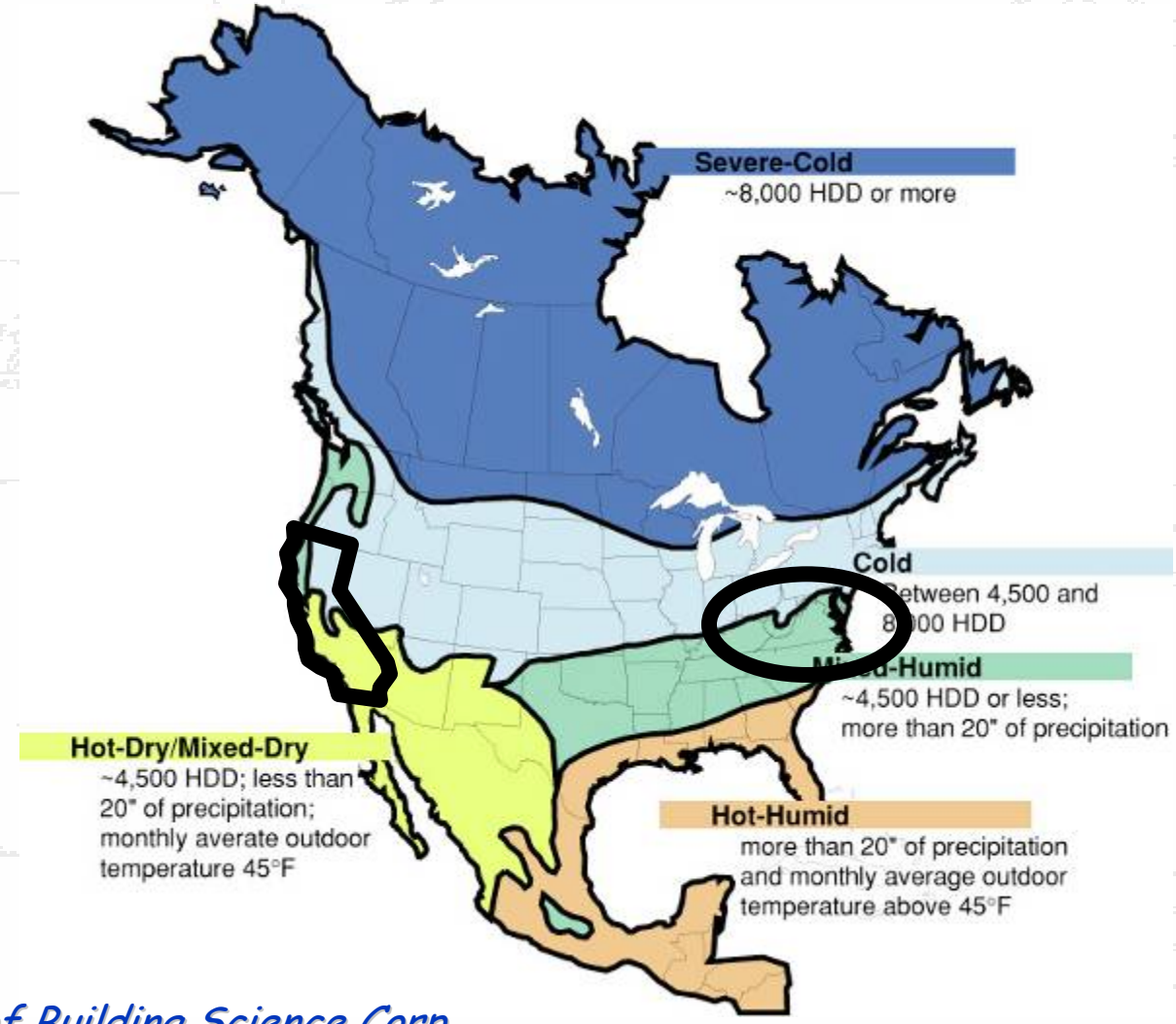
THE SCIENCE BEHIND HOME PERFORMANCE

LOTS OF DRIVING FORCES



THE SCIENCE BEHIND HOME PERFORMANCE

DRIVING FORCES: HEAT/MOISTURE



Courtesy of Building Science Corp.

THE SCIENCE BEHIND HOME PERFORMANCE

DRIVING FORCES: MOSITURE (BULK)

Rainfall Exposure

Extreme	Over 60"
High	40" - 60"
Moderate	20" -40"
Low	Under 20"

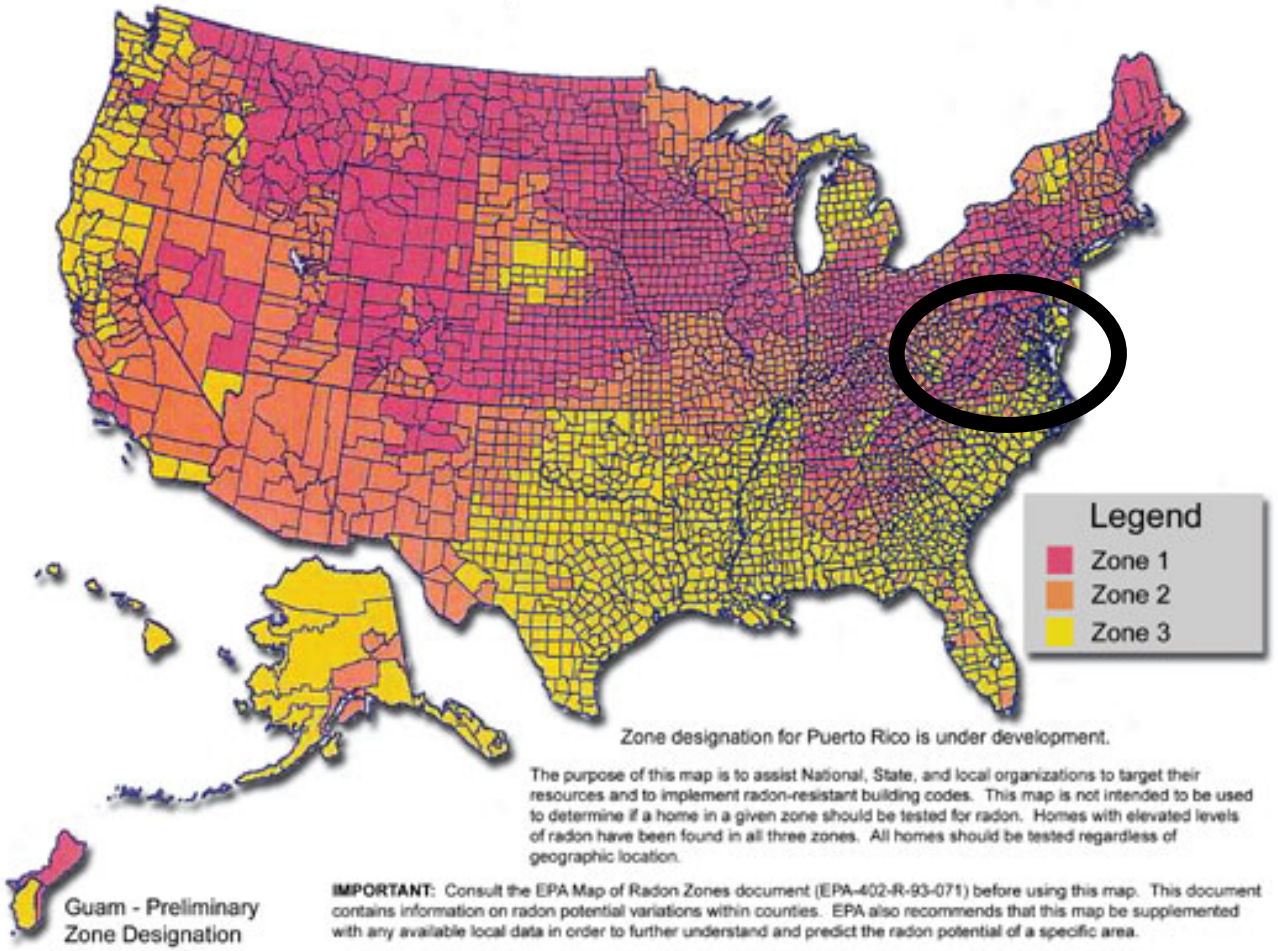
Courtesy of Building Science Corp.

THE SCIENCE BEHIND HOME PERFORMANCE

DRIVING FORCES: RADON GASES

ENERGY STAR

EPA Map of Radon Zones



Zone designation for Puerto Rico is under development.

The purpose of this map is to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. This map is not intended to be used to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones. All homes should be tested regardless of geographic location.

IMPORTANT: Consult the EPA Map of Radon Zones document (EPA-402-R-93-071) before using this map. This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.

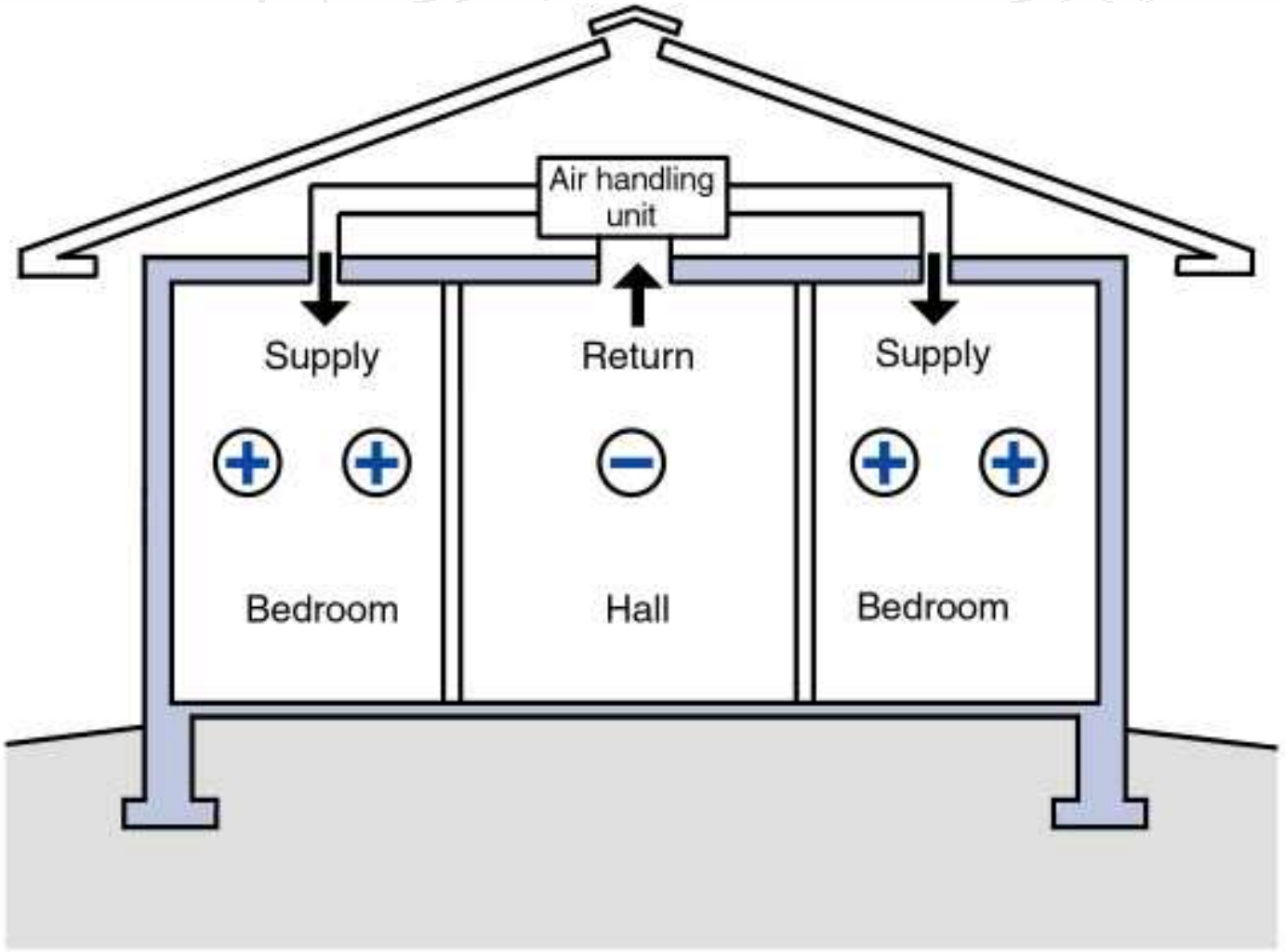
THE SCIENCE BEHIND HOME PERFORMANCE

DRIVING FORCES: FANS = 10,000's CFM

	CFM
HVAC fan:	1,600 – 2,400
Clothes Dryers:	150 – 250
Bat Exhaust Fans:	50 – 100
Kitchen Exhaust Fan:	100 – 600
Whole-House:	~2,500 – 5,000
Central Vacuums:	~100
Fireplaces:	up to 400
Stack Affect:	~15 – 30

THE SCIENCE BEHIND HOME PERFORMANCE

DRIVING FORCES: HVAC FANS



THE SCIENCE BEHIND HOME PERFORMANCE

WHY BALANCE HOMES

ENERGY STAR

Courtesy of American Lung Association

THE SCIENCE BEHIND HOME PERFORMANCE

PRESSURE BALANCING SOLUTIONS

TRANSFER GRILLE

JUMP DUCT

THE SCIENCE BEHIND HOME PERFORMANCE

TWO CONDITIONS FOR AIR LEAKAGE

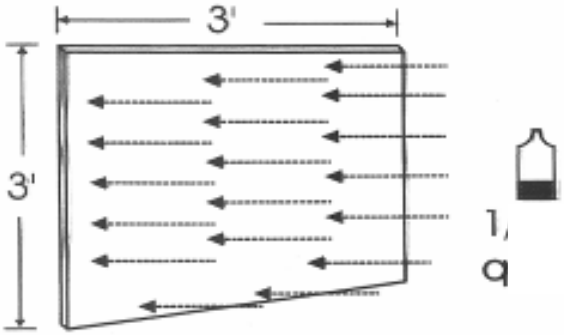
ENERGY STAR

- *Holes*
- *Driving Forces Across the Holes*

THE SCIENCE BEHIND HOME PERFORMANCE

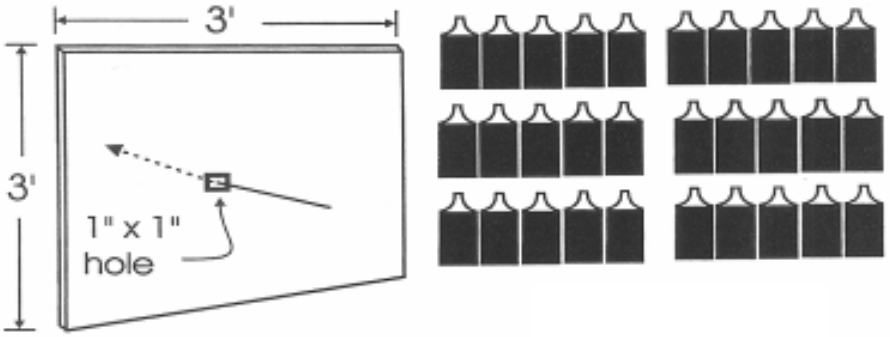
WHY WE CARE ABOUT THE BIG HOLES

Moisture Transport Over One Heating Season
(outdoor design temperature -13°F)



Transportation via diffusion
through 9 square feet

1/3 quart vs. 30 quarts



Transportation via air leakage
through 1square inch

THE SCIENCE BEHIND HOME PERFORMANCE

WHAT ARE THE BIG HOLES

ENERGY STAR

NOT ALL HOLES NEED TO BE SEALED!

ENERGY STAR

Key is to make sure crews have been trained to identify transitions between conditioned and unconditioned spaces

Courtesy of Building Science Corp.

THE SCIENCE BEHIND HOME PERFORMANCE

POWER/DIRECT VENTED EQUIPMENT


SIMPSON
Strong-Tie
H2.5L
NER-393

THE SCIENCE BEHIND HOME PERFORMANCE

WHY SEAL HOLES

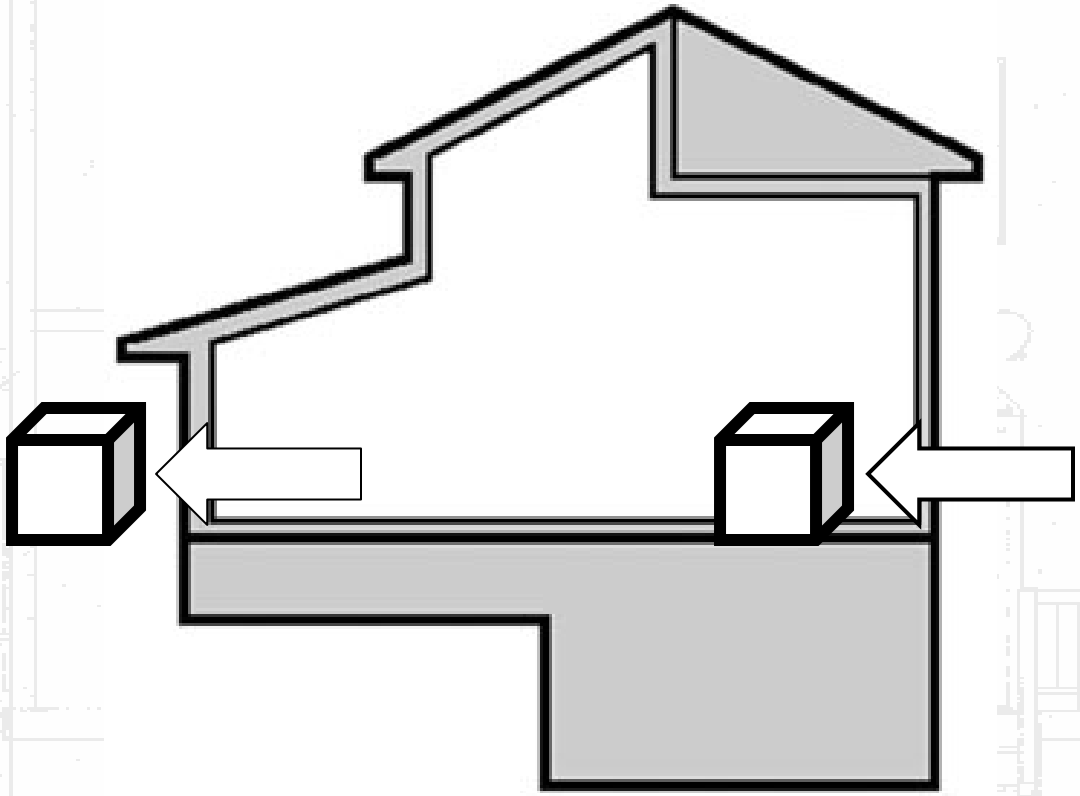
Courtesy of Building Science Corp.

THE SCIENCE BEHIND HOME PERFORMANCE

HOMES STAY IN BALANCE

ENERGY STAR

One Out = One In



Courtesy of Southface Institute

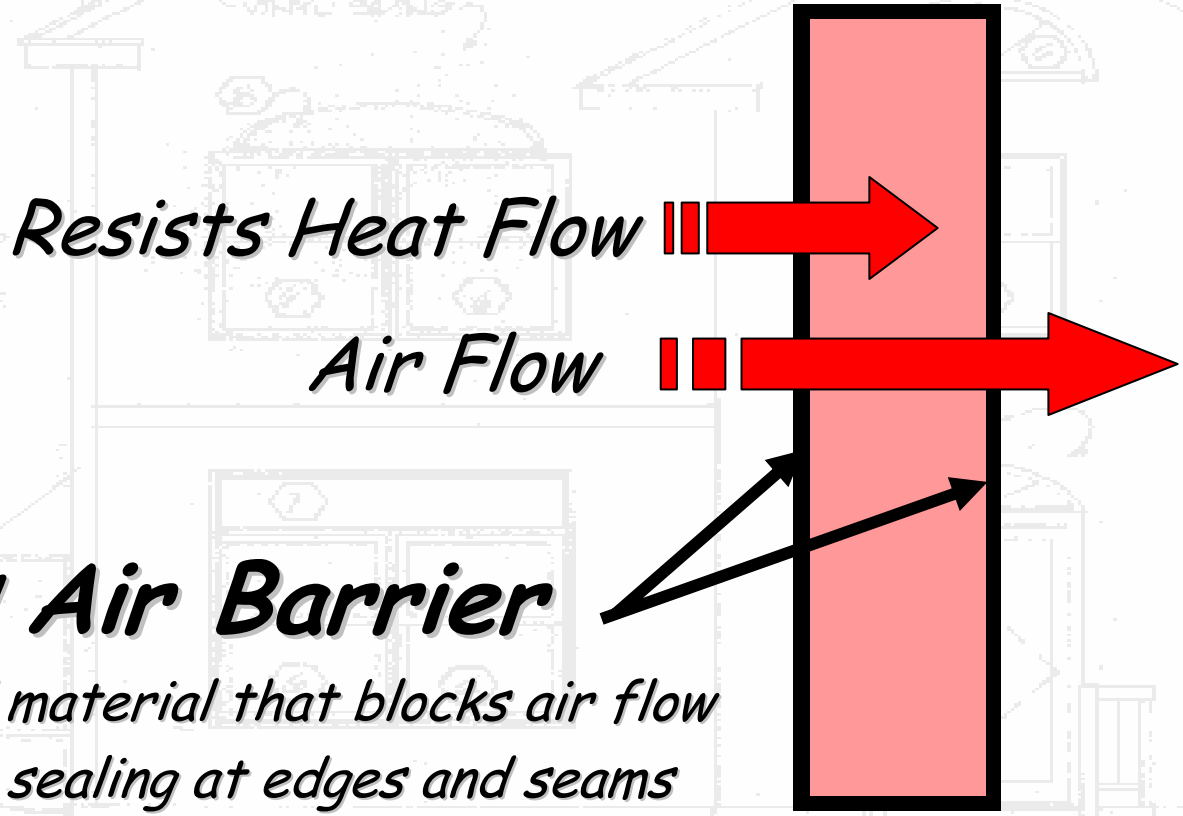
THE SCIENCE BEHIND HOME PERFORMANCE

ONE OUT = ONE IN: CLOTHES DRYER

- *200 cfm*
- *60 minute cycle*
- *12,000 cubic feet out*
- *12,000 cubic feet in*

THE SCIENCE BEHIND HOME PERFORMANCE

INSULATION IS NOT AN AIR BARRIER



...need Air Barrier

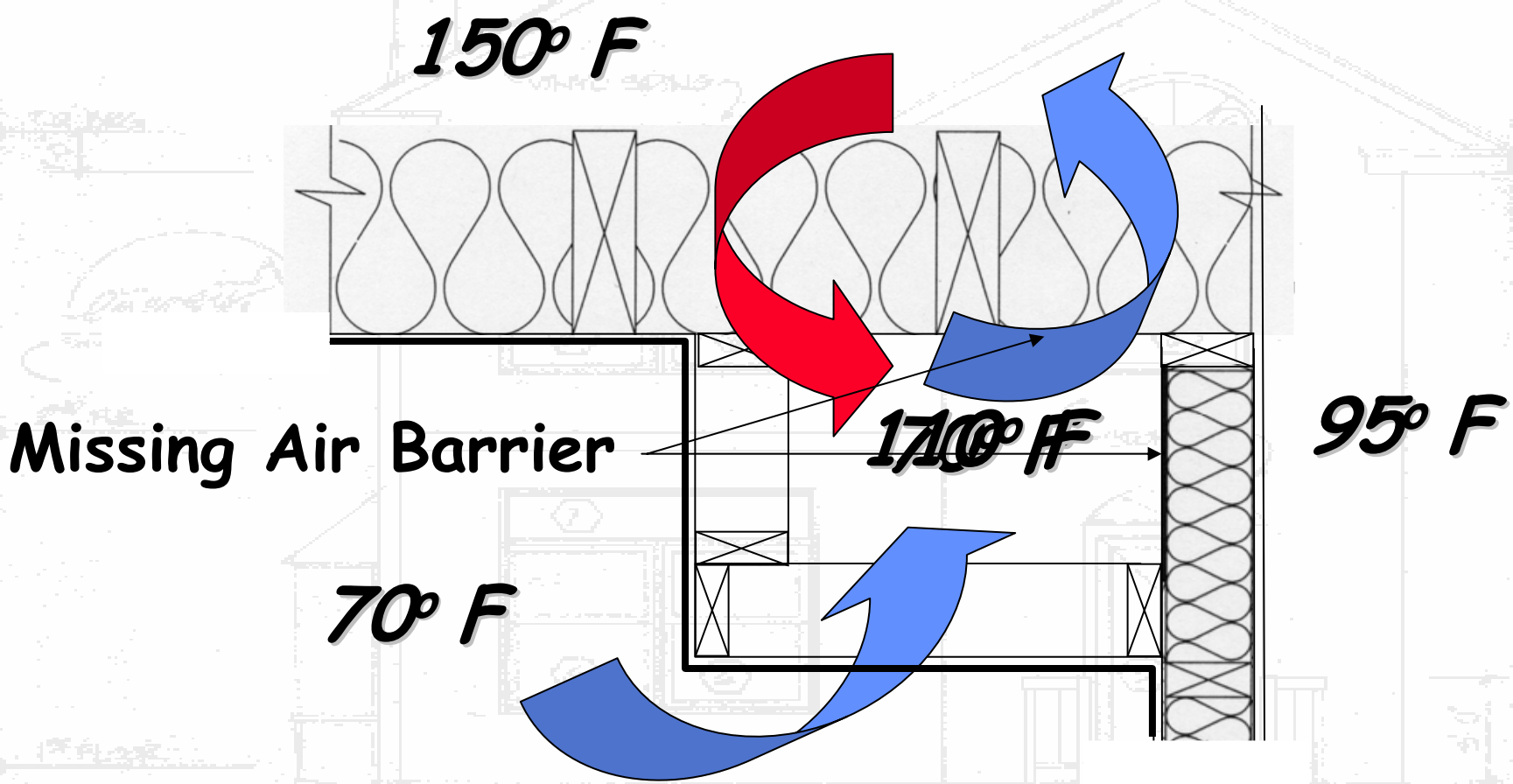
any solid material that blocks air flow
including sealing at edges and seams

THE SCIENCE BEHIND HOME PERFORMANCE

AIR BARRIER EXPERIMENT

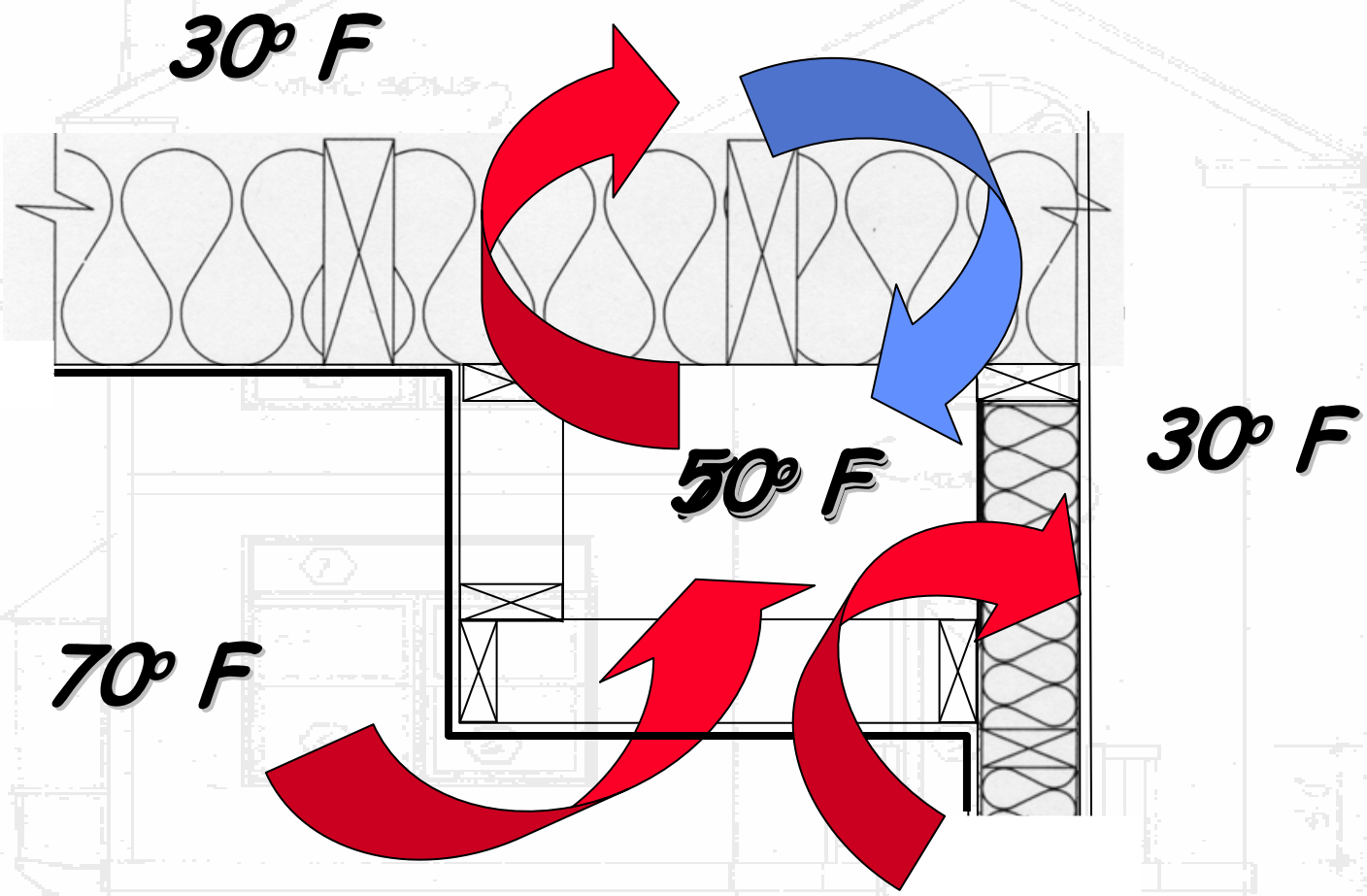
THE SCIENCE BEHIND HOME PERFORMANCE

WHY COMPLETE AIR BARRIER



THE SCIENCE BEHIND HOME PERFORMANCE

WHY COMPLETE AIR BARRIER

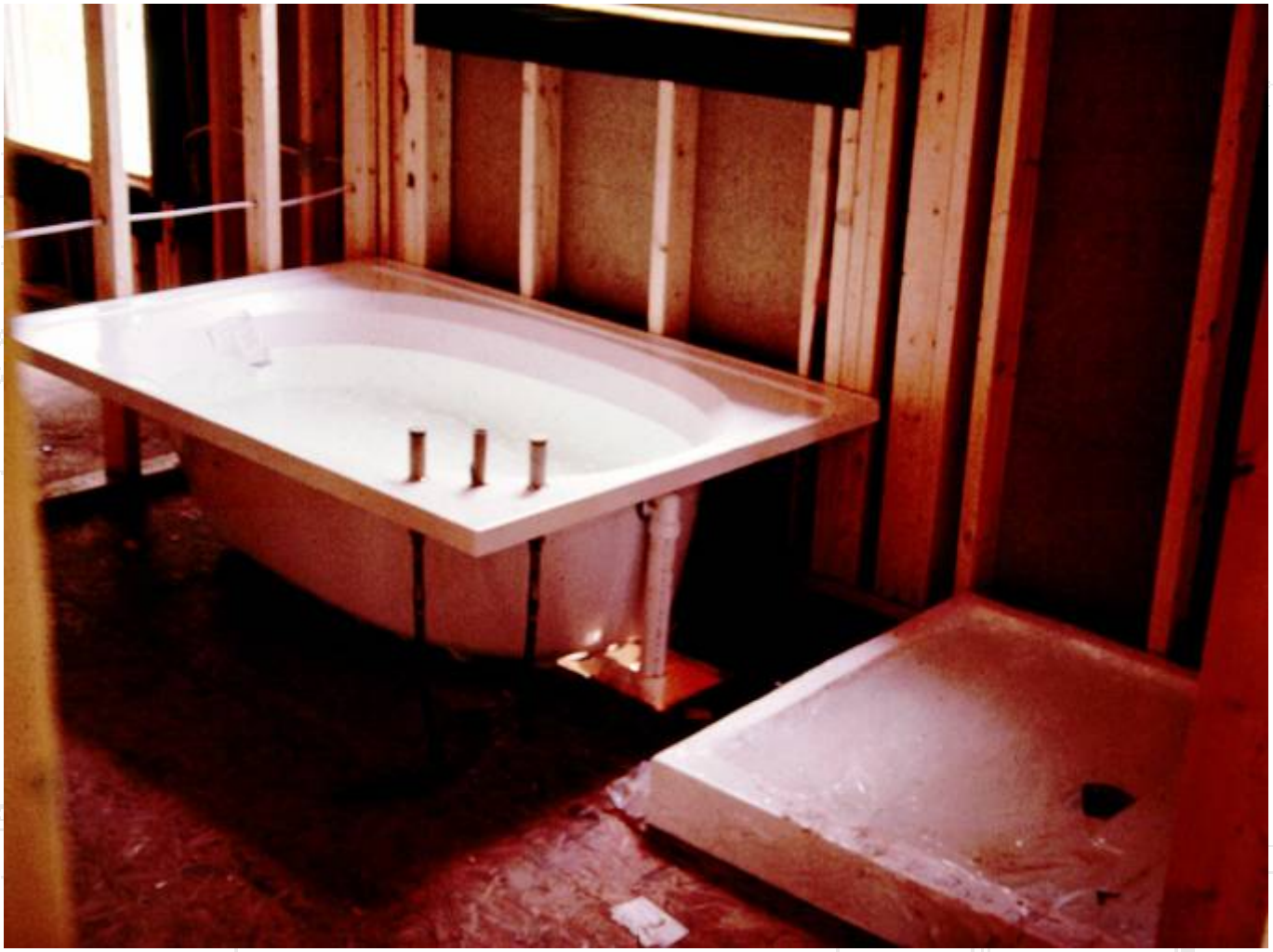


THE SCIENCE BEHIND HOME PERFORMANCE

WHY COMPLETE AIR BARRIER

THE SCIENCE BEHIND HOME PERFORMANCE

WHY COMPLETE AIR BARRIER

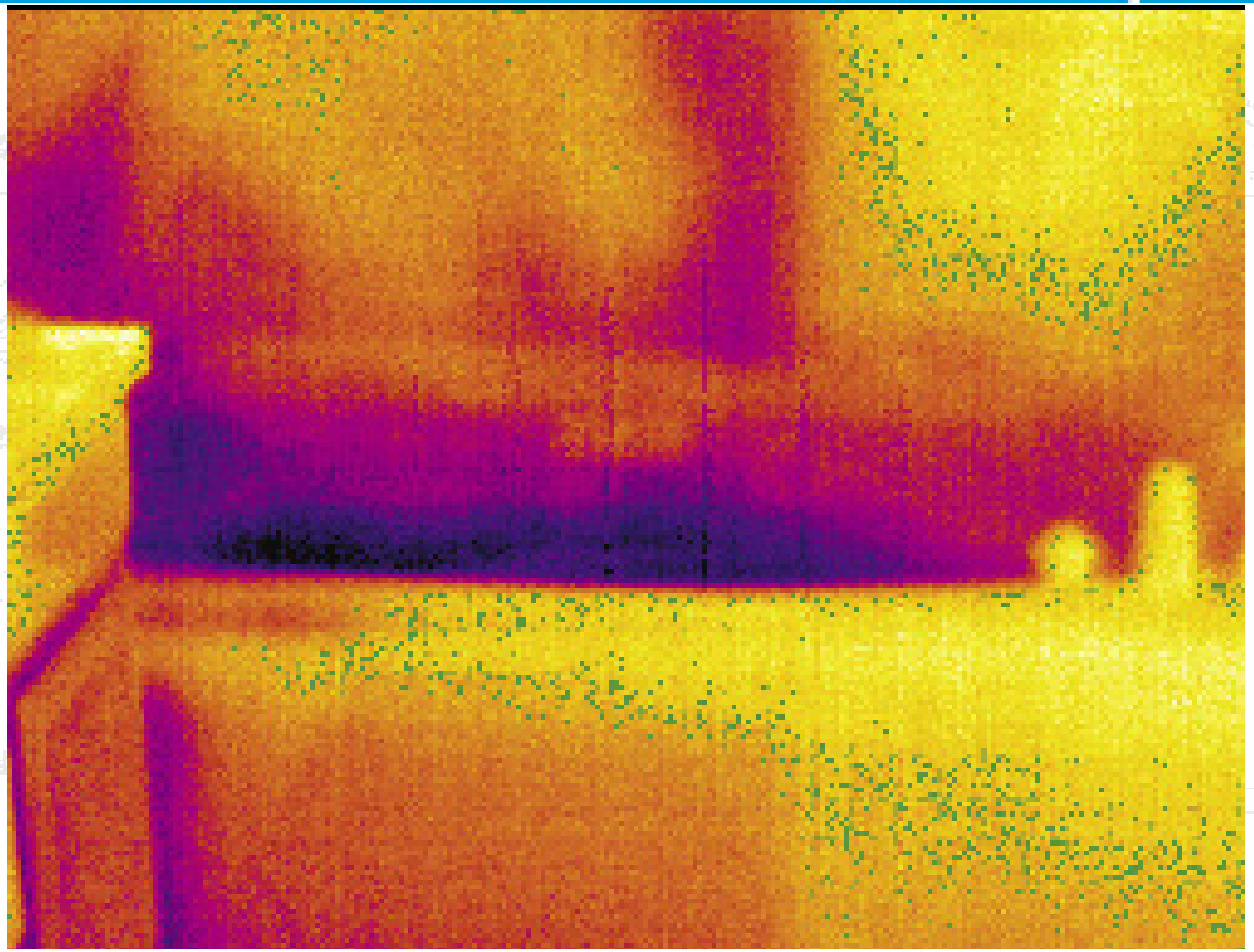


Courtesy of Building Science Corp.

THE SCIENCE BEHIND HOME PERFORMANCE

WHY COMPLETE AIR BARRIER

ENERGY STAR



THE SCIENCE BEHIND HOME PERFORMANCE

PROPER INSTALLATION OF INSULATION

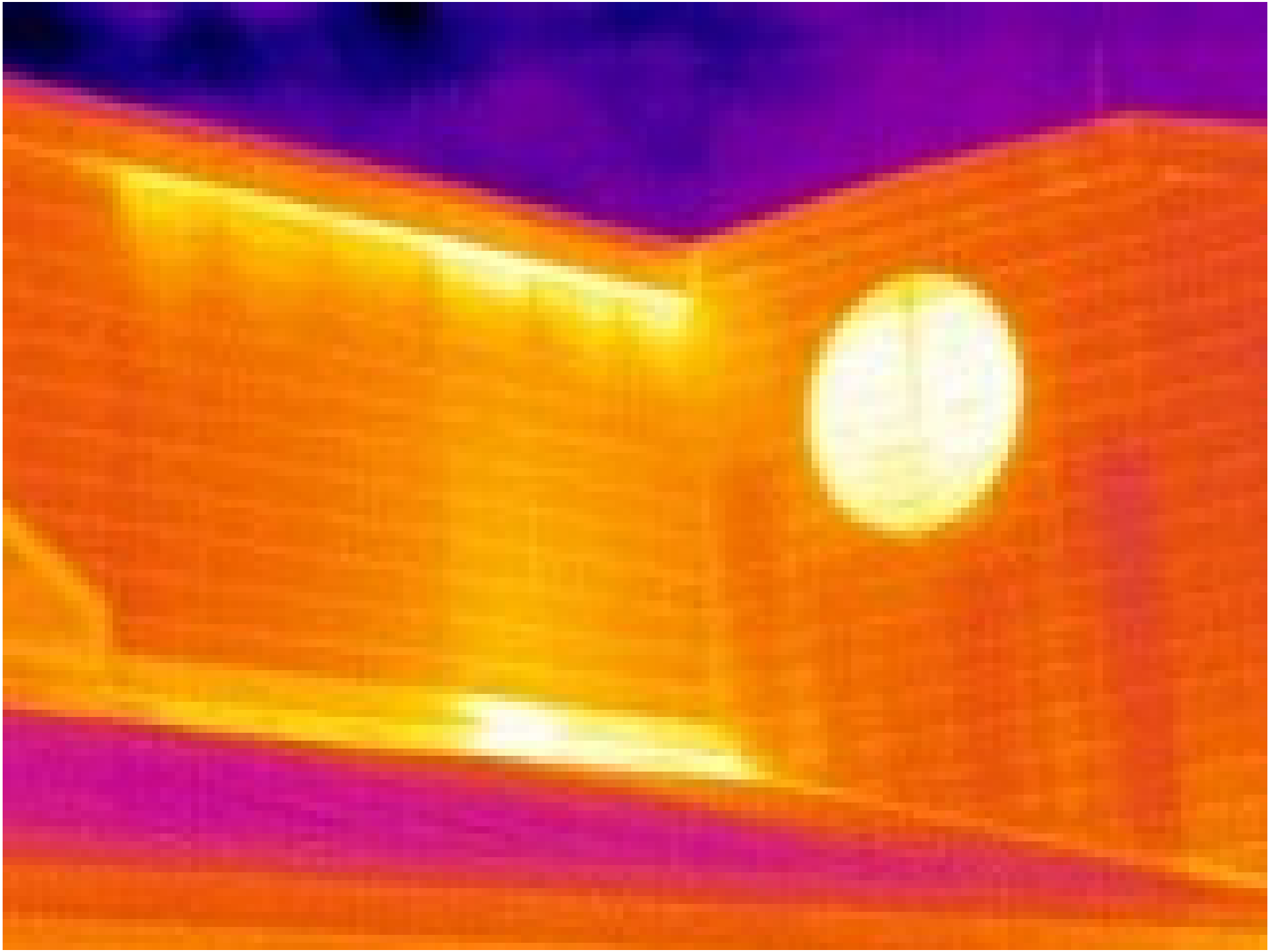
ENERGY STAR

Insulation must be installed without gaps, voids, and compression, and be fully aligned with the air barrier

to be an effective thermal barrier.

THE SCIENCE BEHIND HOME PERFORMANCE

MISALIGNED/COMPRESSED INSULATION



THE SCIENCE BEHIND HOME PERFORMANCE

BUILIDNG SCIENCE RULE #8

ENERGY STAR

Mean Radiant Temperature (MRT) dominates comfort (40% > than ambient temp.).

30 °F

THE SCIENCE BEHIND HOME PERFORMANCE

THERMAL BYPASS MRT PROBLEM

THE SCIENCE BEHIND HOME PERFORMANCE

INEFFICIENT WINDOW MRT PROBLEM

THE SCIENCE BEHIND HOME PERFORMANCE

FRAMING MRT PROBLEM

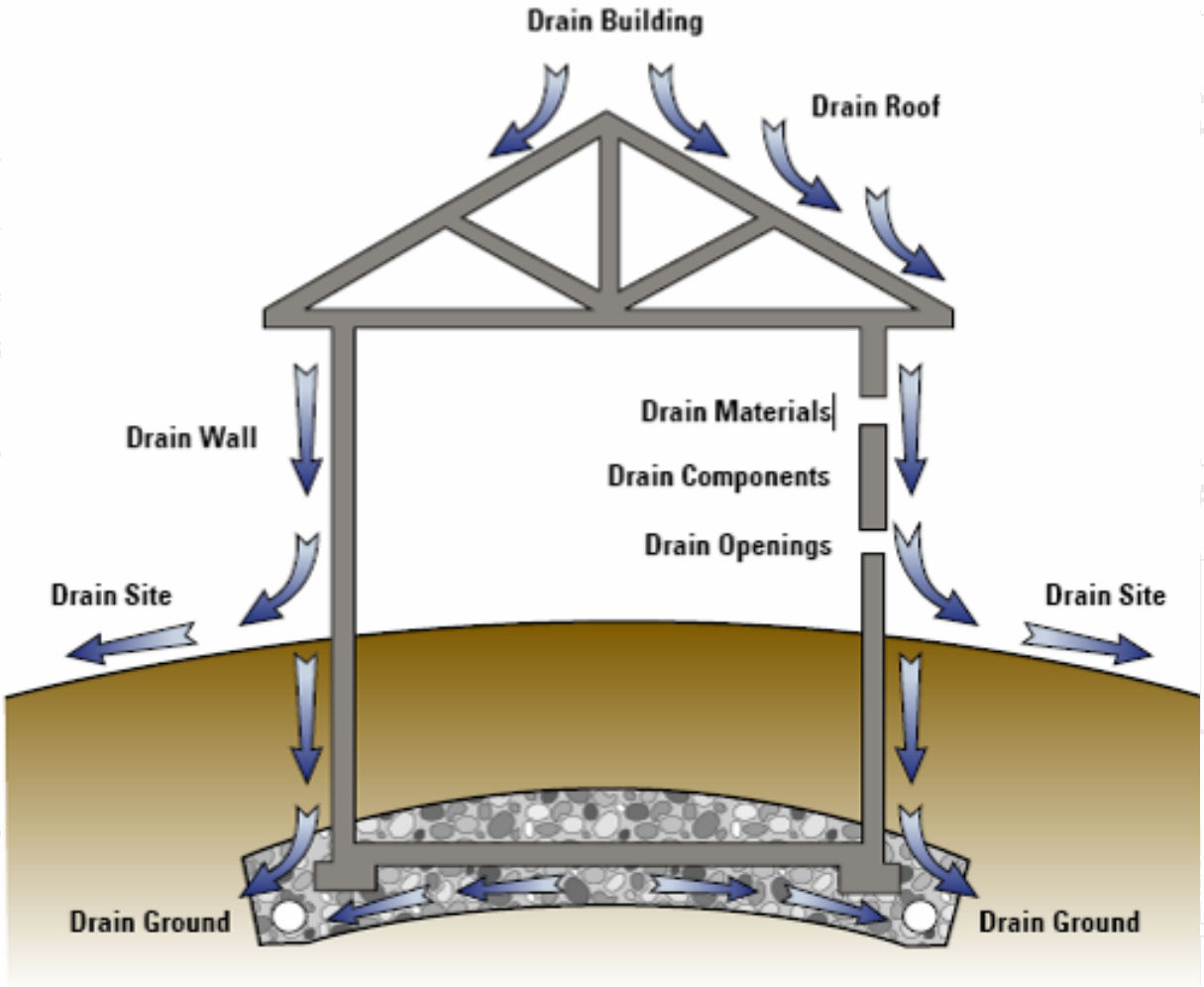
THE SCIENCE BEHIND HOME PERFORMANCE

FRAMING MRT PROBLEM

ENERGY STAR

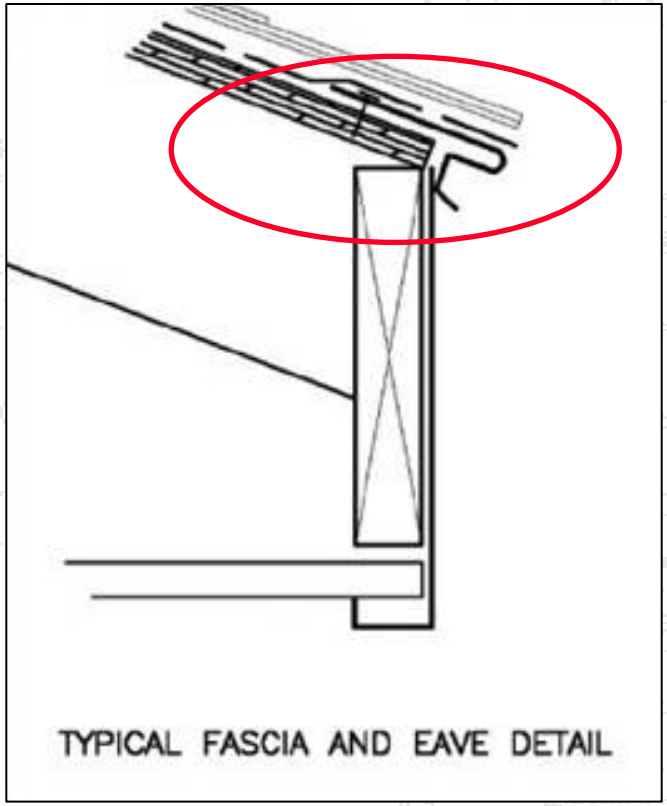
THE SCIENCE BEHIND HOME PERFORMANCE

DRAIN BULK MOISTURE



THE SCIENCE BEHIND HOME PERFORMANCE

WATER MANAGED ROOFS



TYPICAL FASCIA AND EAVE DETAIL

BITUMINOUS MEMBRANE AT VALLEYS

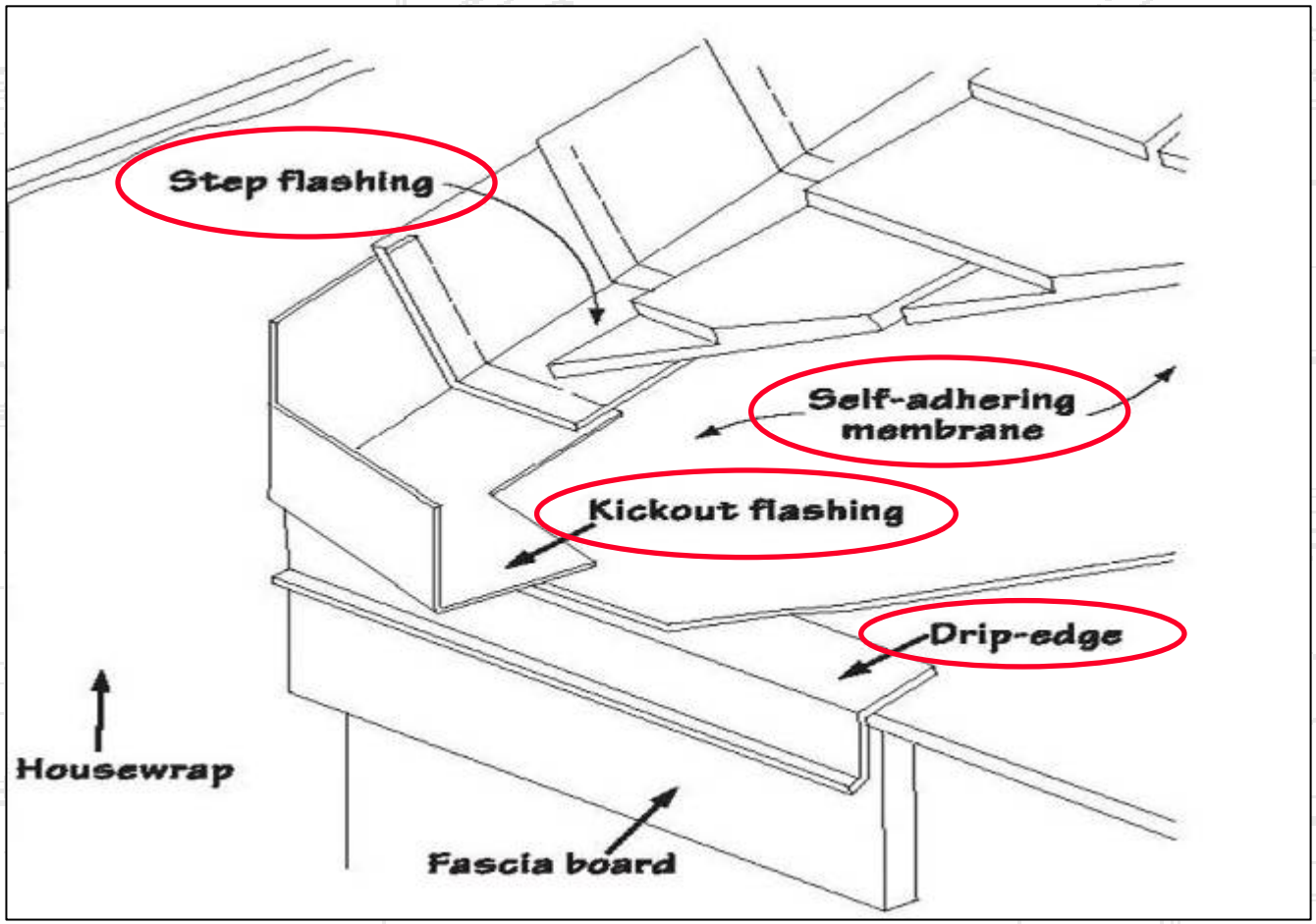

1402.1
SBCCI 2103
BOCA 2146
.fortifiber.com
Made in USA

THE SCIENCE BEHIND HOME PERFORMANCE

WATER MANAGED ROOFS

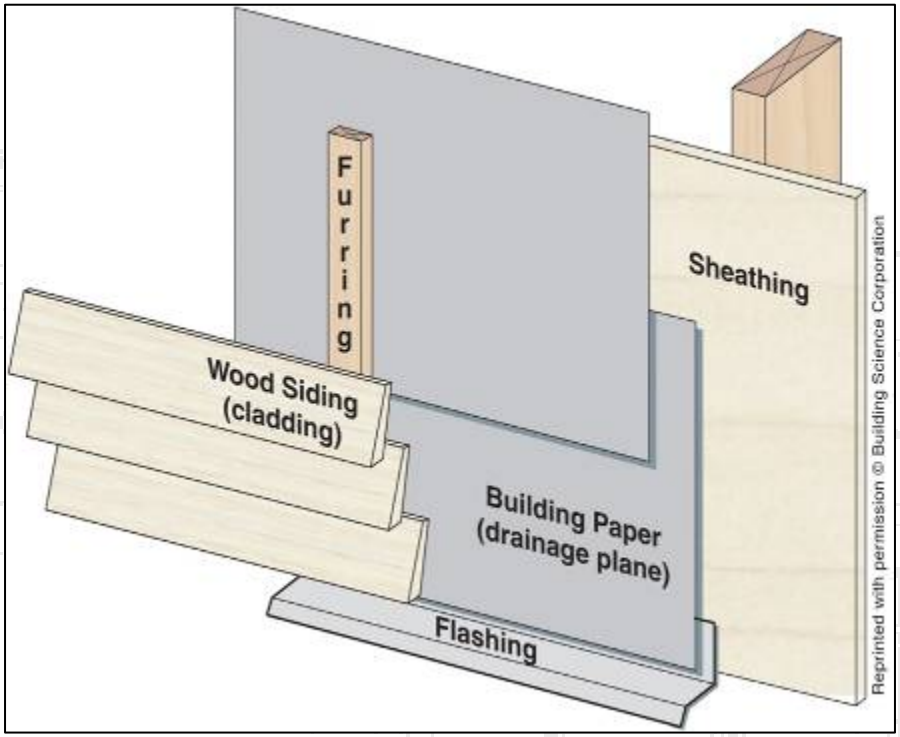
ENERGY STAR

MORE ROOF FLASHING DETAILS …



THE SCIENCE BEHIND HOME PERFORMANCE

WATER MANAGED WALLS

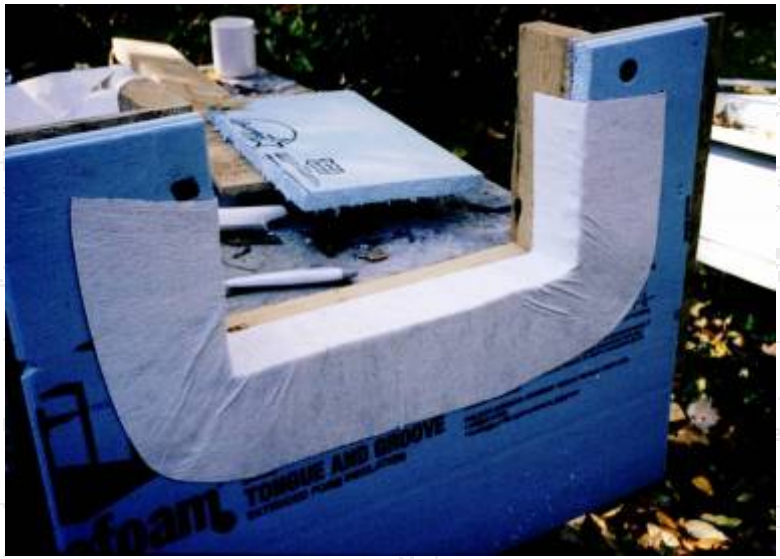


DRAINAGE PLANE DESIGN

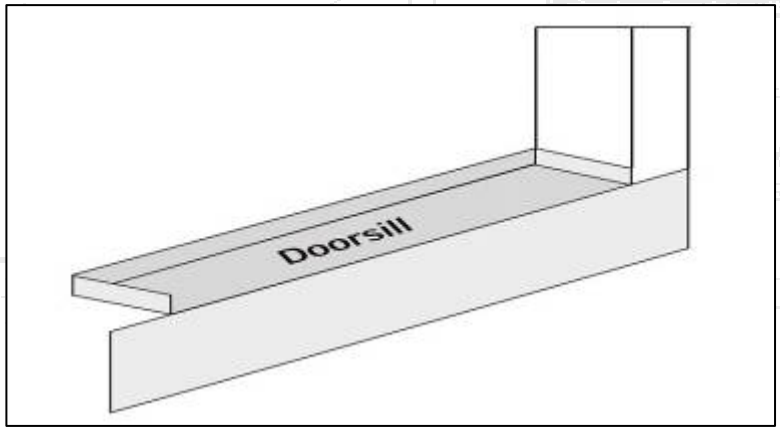
THE SCIENCE BEHIND HOME PERFORMANCE

WATER MANAGED WALLS

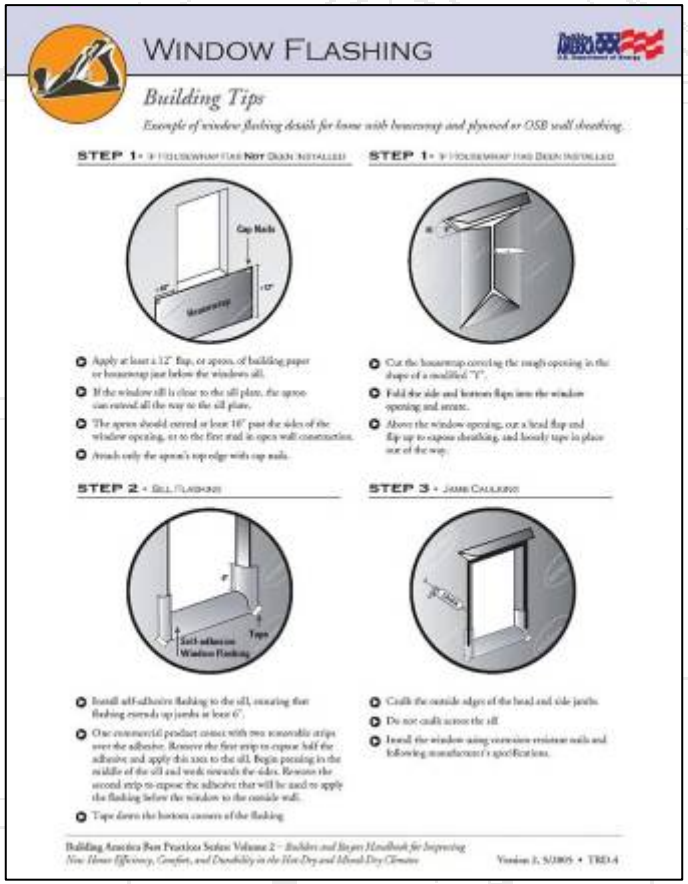
ENERGY STAR



WINDOW/DOOR PAN FLASHING



BEST PRACTICE INSTALLATION



WINDOW FLASHING

Building Tips

Example of window flashing details for home with housewrap and plywood or OSB wall sheathing.

STEP 1 • If Housewrap Has **Not** Been Installed

- Apply at least a 12" flap, or apron, of building paper or housewrap just below the window's sill.
- If the window sill is close to the sill plate, the apron can extend all the way to the sill plate.
- The apron should extend at least 10" past the sides of the window opening, to the first stud in open wall construction.
- Attach only the apron's top edge with cap nails.

STEP 1 • If Housewrap Has Been Installed

- Cut the housewrap covering the rough opening in the shape of a modified "I".
- Fold the side and bottom flaps into the window opening and secure.
- Above the window opening, cut a head flap and flip up to expose sheathing, and loosely tape in place out of the way.

STEP 2 • Sill Flashing

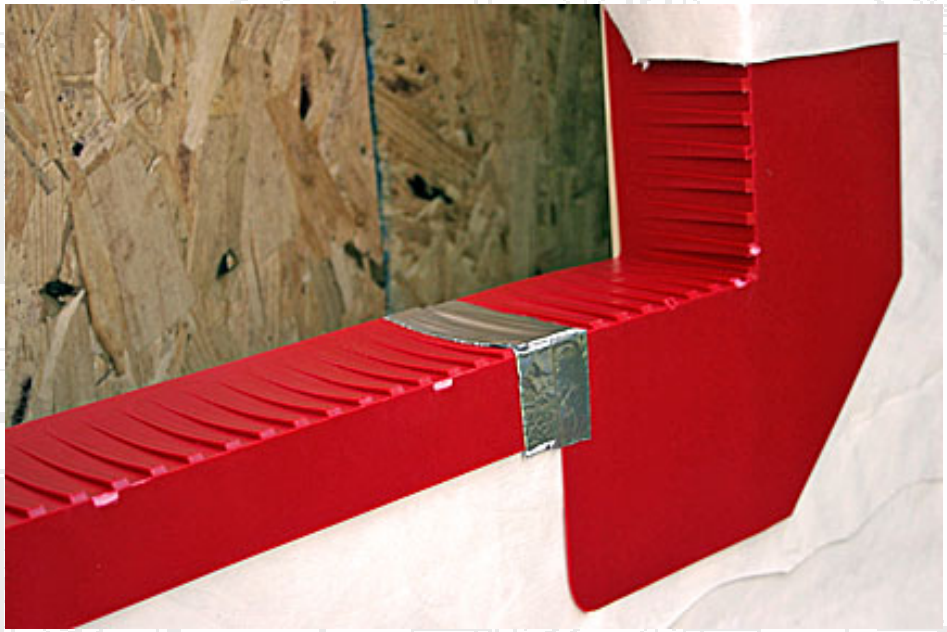
- Install self-adhesive flashing to the sill, ensuring that flashing extends up jambs at least 6".
- One commercial product comes with two removable strips over the adhesive. Remove the first strip to expose half the adhesive and apply this area to the sill. Begin pressing in the middle of the sill and work towards the sides. Remove the second strip to expose the adhesive that will be used to apply the flashing below the window to the outside wall.
- Tape down the bottom corners of the flashing.

STEP 3 • Jamb Caulking

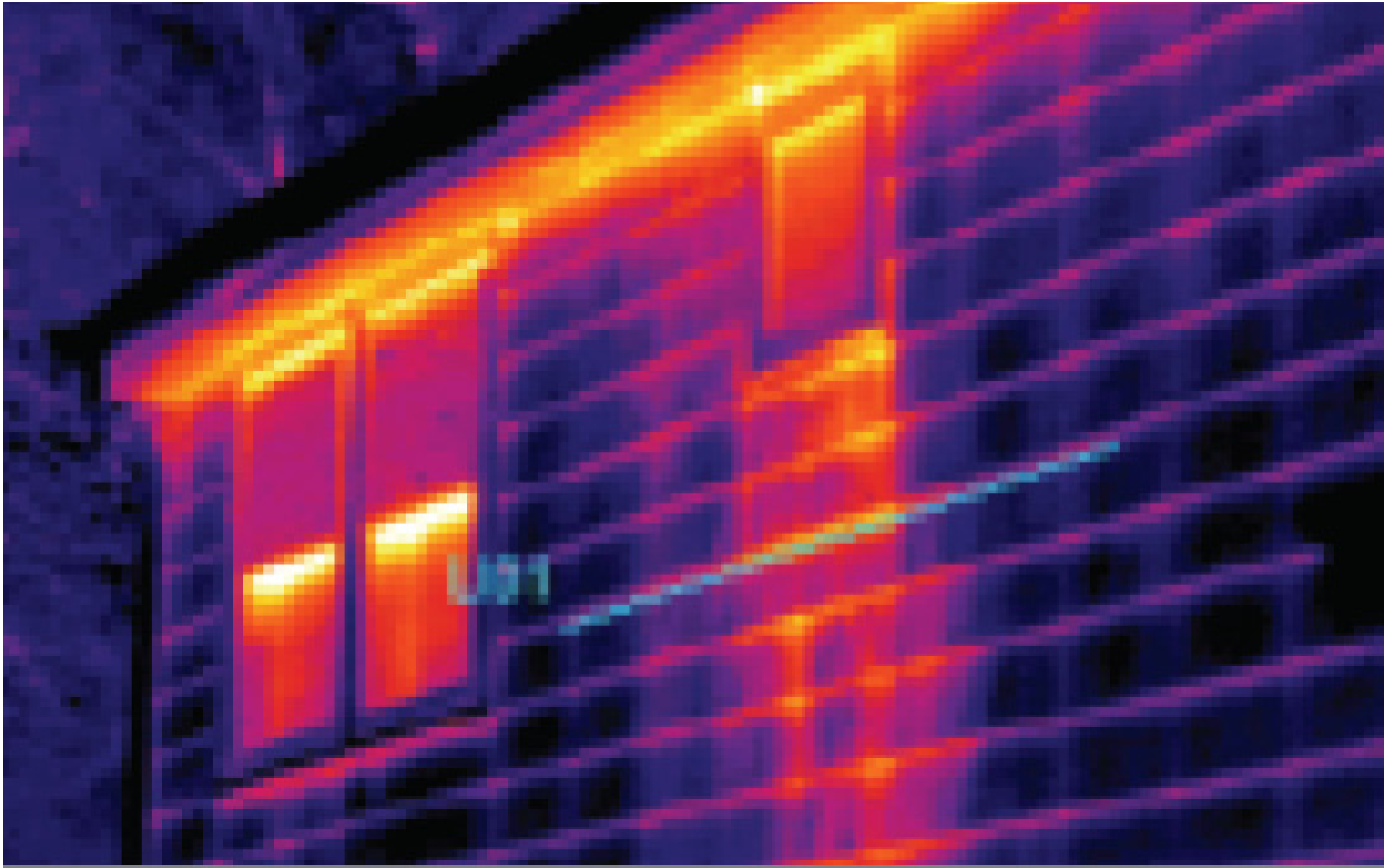
- Caulk the outside edges of the head and side jambs.
- Do not caulk across the sill.
- Install the window using corrosion-resistant nails and following manufacturer's specifications.

THE SCIENCE BEHIND HOME PERFORMANCE

WATER MANAGED WALLS



WINDOW/DOOR PAN FLASHING



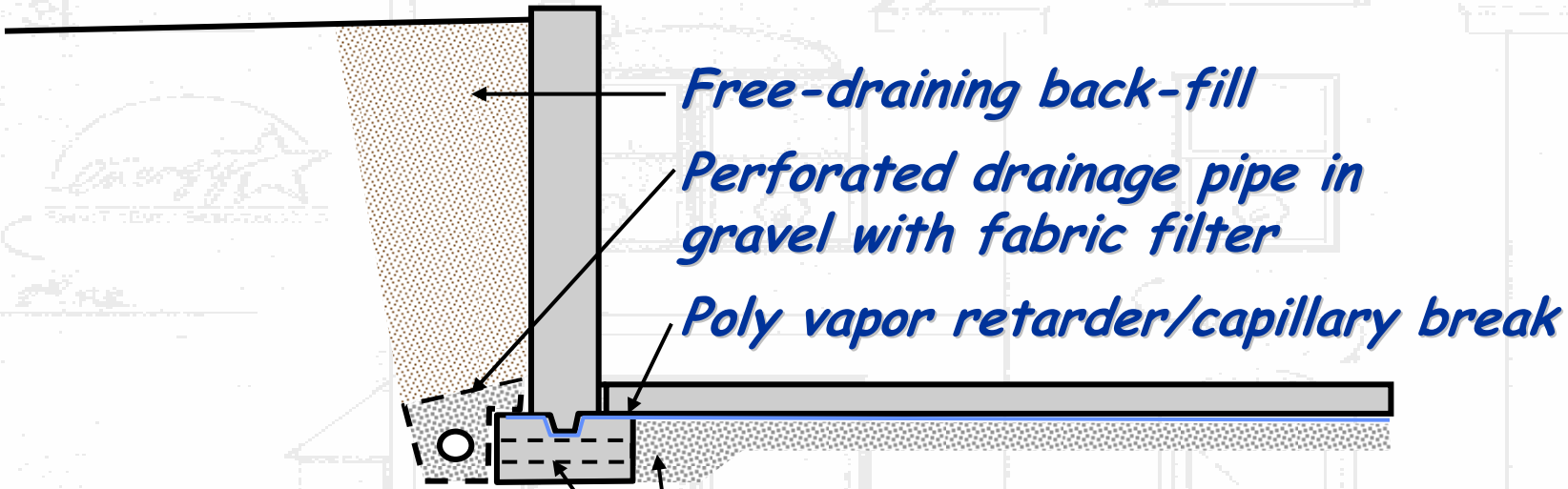
Water Damage

THE SCIENCE BEHIND HOME PERFORMANCE

WATER MANAGED FOUNDATIONS

ENERGY STAR

FOUNDATION DRAINAGE SYSTEM
WITH CAPILLARY BREAKS

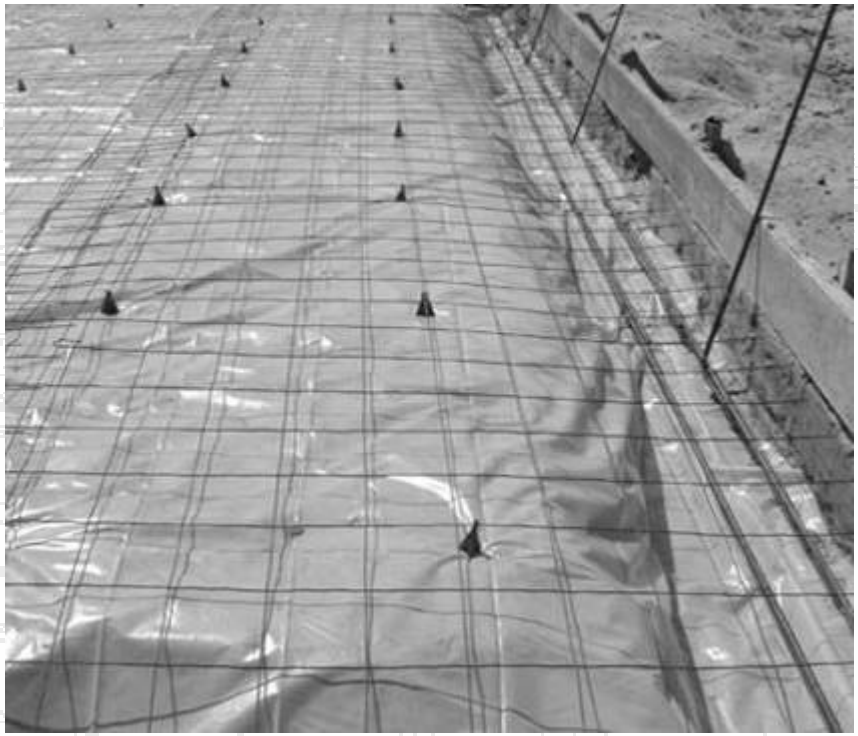


THE SCIENCE BEHIND HOME PERFORMANCE

WATER MANAGED FOUNDATIONS

ENERGY STAR

UNVENTED CRAWLSPACE



POLY UNDER SLAB
VAPOR AND RADON BARRIER

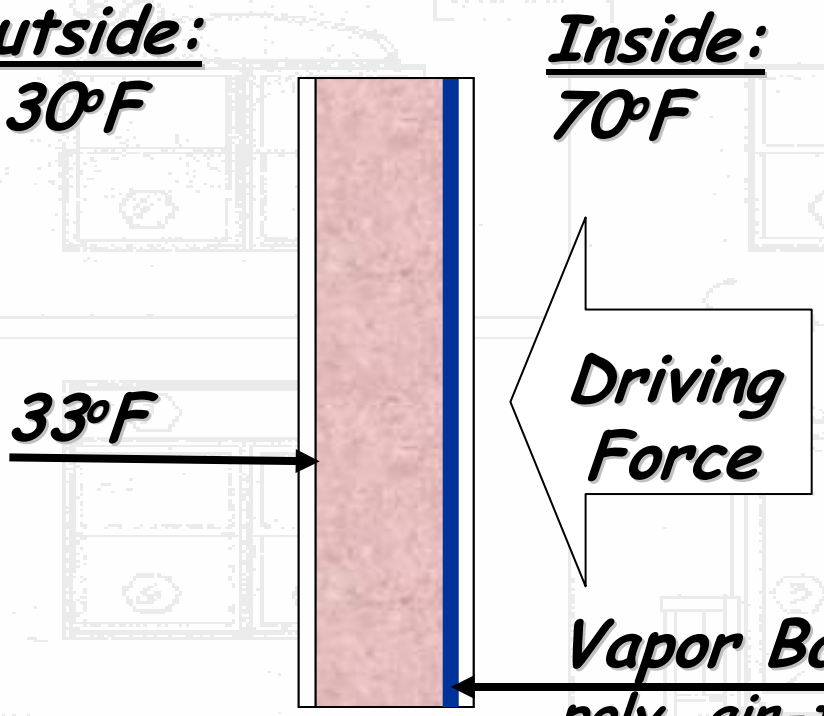
THE SCIENCE BEHIND HOME PERFORMANCE

BUILDING SCIENCE RULE #7

ENERGY STAR

Things always get wet; let them dry.

Cold Climate:



THE SCIENCE BEHIND HOME PERFORMANCE

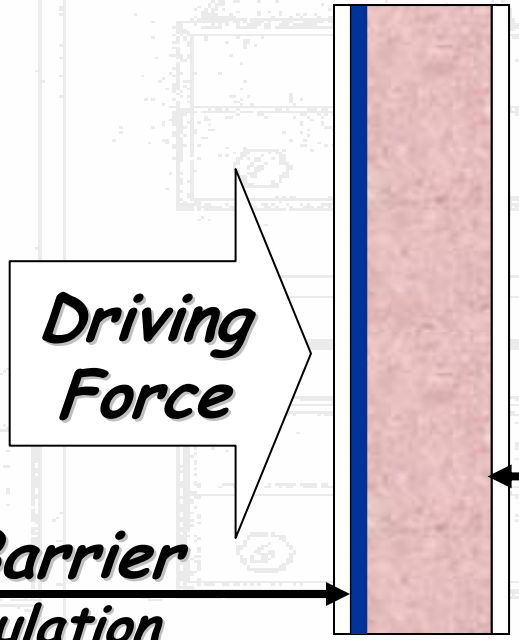
BUILDING SCIENCE RULE #7

ENERGY STAR

Things always get wet; let them dry.

Outside:
85°F,

Inside:
70°F



Hot-Humid Climate:

72°F

Vapor Barrier
faced insulation,
faced sheathing,
unfaced insulation.

THE SCIENCE BEHIND HOME PERFORMANCE

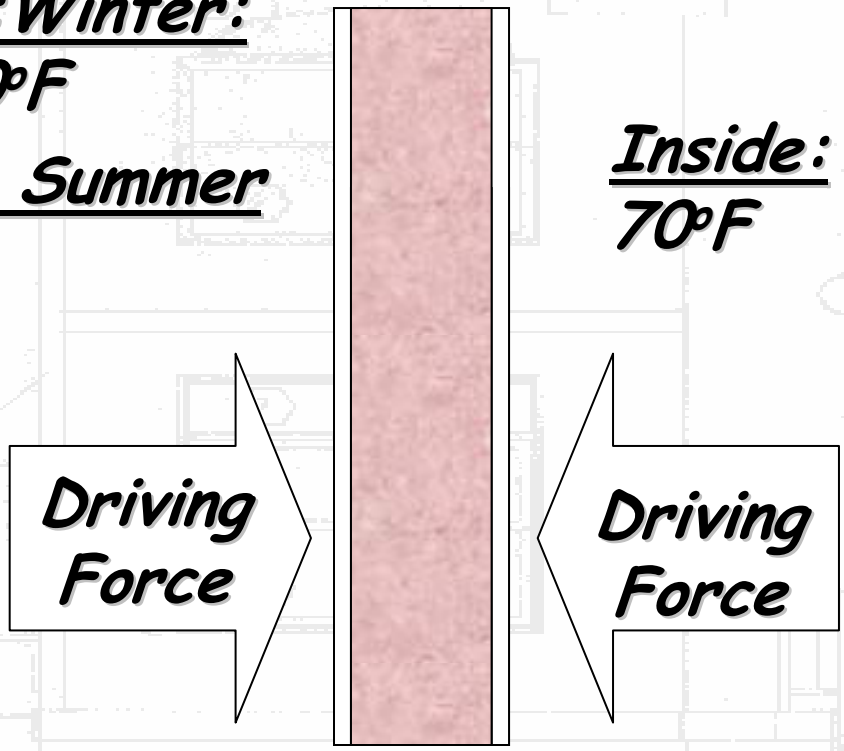
BUILIDNG SCIENCE RULE #7

ENERGY STAR

Things always get wet; let them dry.

Outside: Winter:
30°F

Outside: Summer
85°F



Inside:
70°F

Mixed Climate:

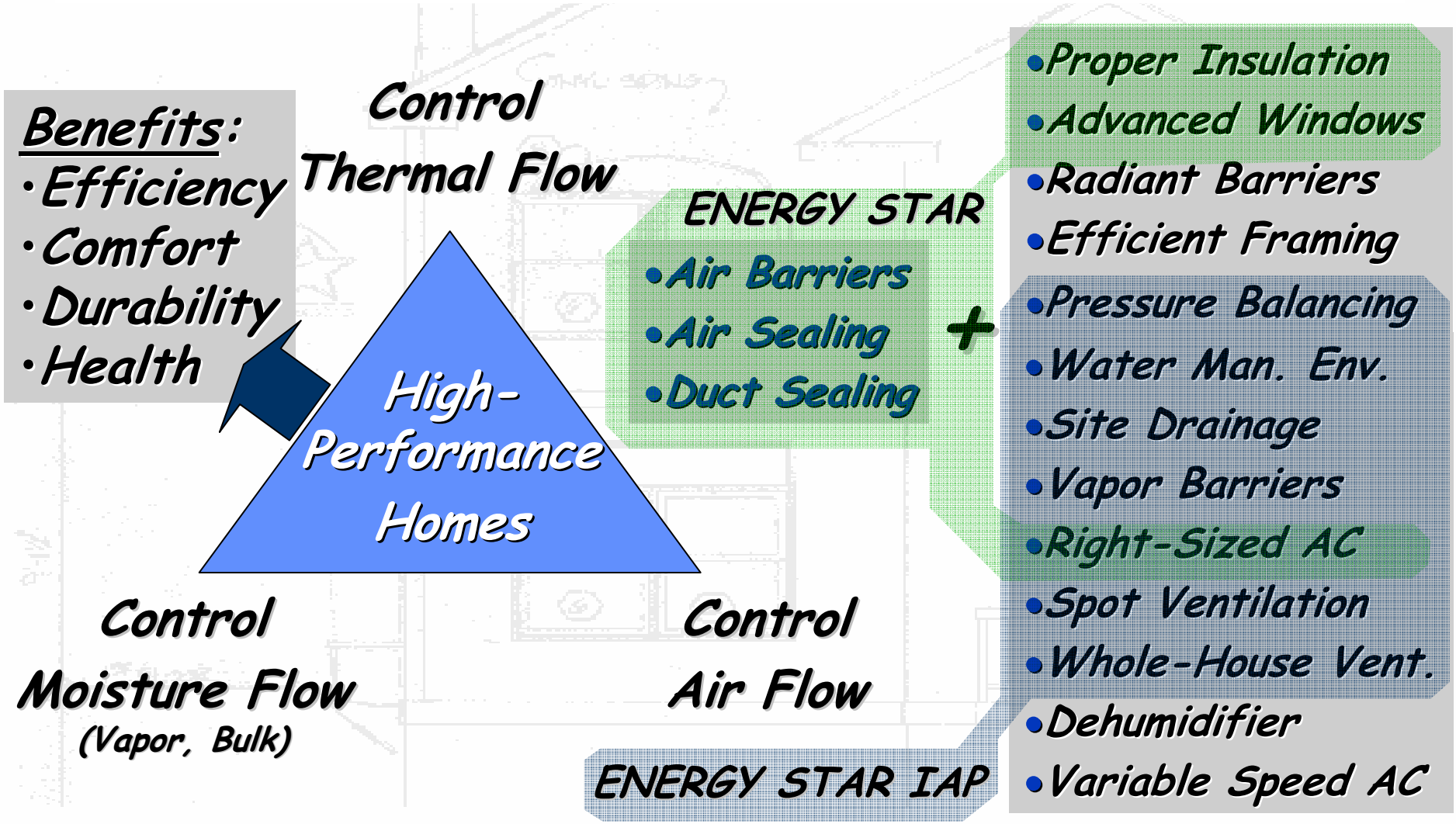
No Vapor Barrier on either side!

THE SCIENCE BEHIND THE VALUE

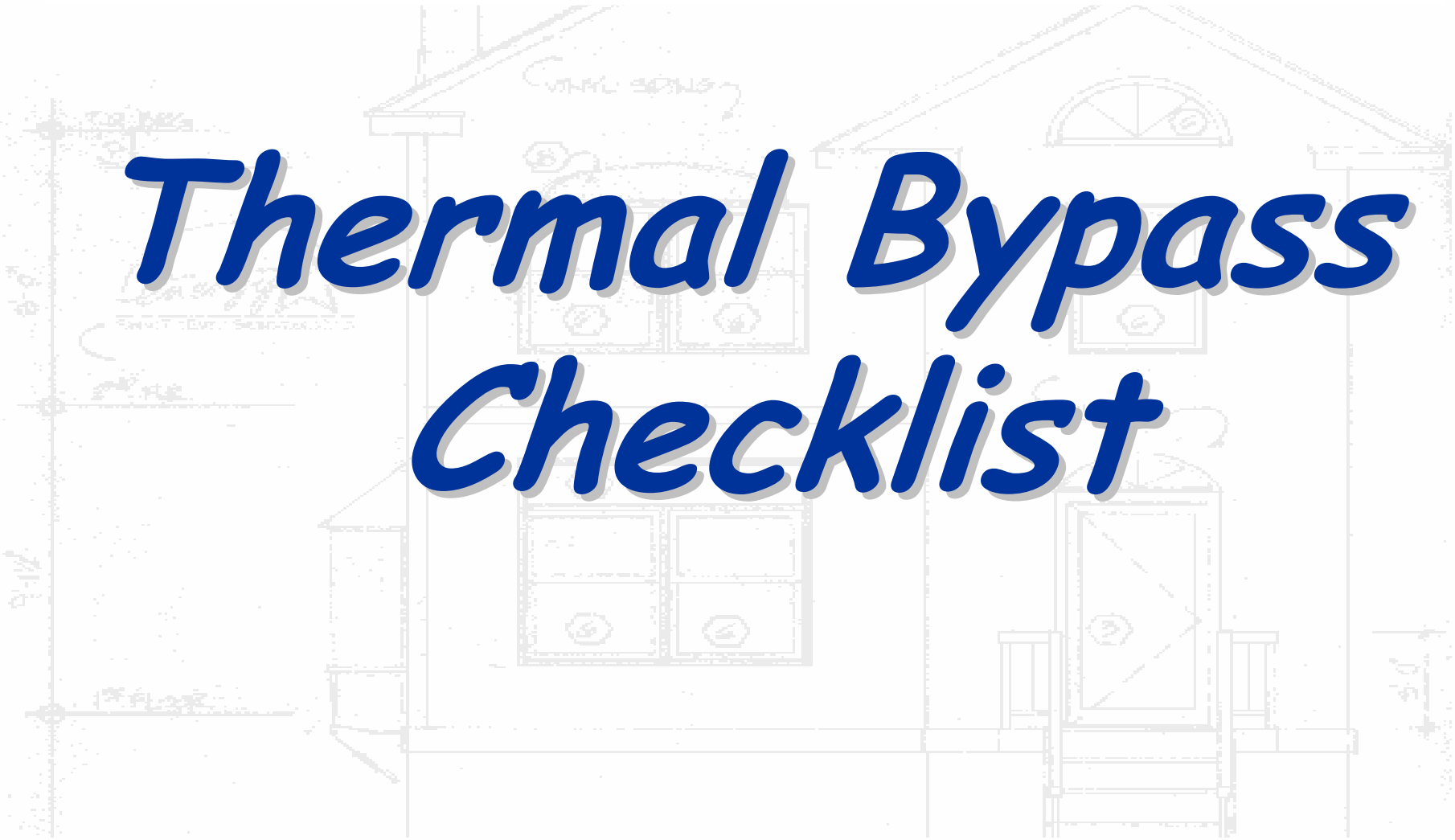
WHY LET THEM DRY

THE SCIENCE BEHIND HOME PERFORMANCE

PUTTING IT ALL TOGETHER

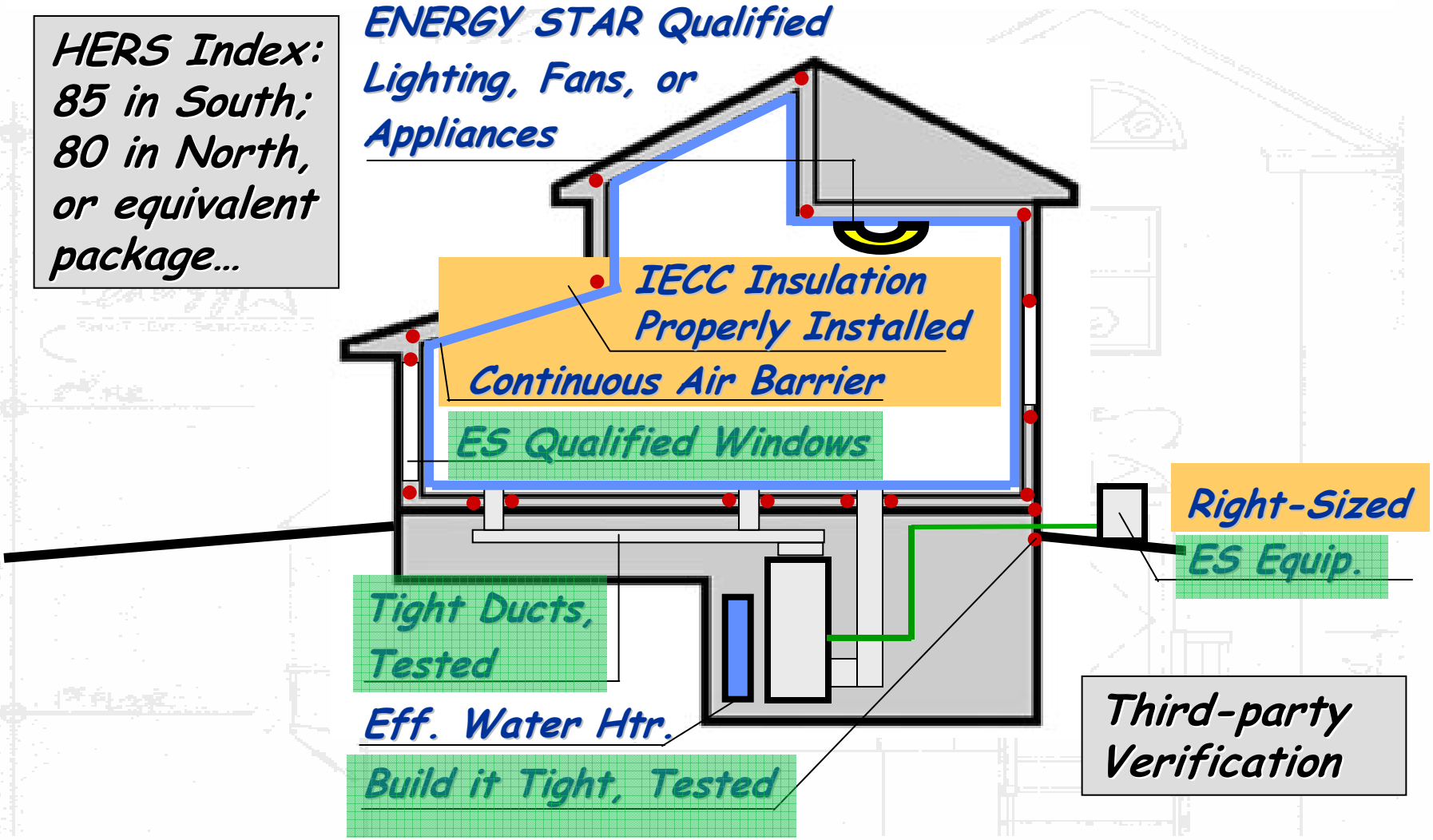


Thermal Bypass Checklist



ENERGY STAR FOR HOMES SPEC

HERS Index: 85 in South; 80 in North, or equivalent package…



Third-party Verification

KEY EMPHASIS OF SPECIFICATIONS…

ENERGY STAR

Thermal enclosures that work:

- *Gaps*
- *Voids*
- *Compression*

Insulation Installation Inspection

- *Incomplete Air Barrier*
- *Misalignment with Air Barrier*
- *Wind Intrusion*

Thermal Bypass Checklist

ENERGY STAR Qualified Homes
Thermal Bypass Inspection Checklist

Home Address: _____ City: _____ State: _____

Thermal Bypass	Inspection Guidelines	Corrections Needed	Builder Verified	Rater Verified	N/A
1. Overall Air Barrier and Thermal Barrier Alignment	Requirements: Insulation shall be installed in full contact with sealed interior and exterior air barrier except for alternate to interior air barrier under Item no. 2 (Walls Adjoining Exterior Walls or Unconditioned Spaces)				
	All Climate Zones:				
	1.1 Overall Alignment Throughout Home	☐	☐	☐	☐
	1.2 Garage Band Joist Air Barrier (at bays adjoining conditioned space)	☐	☐	☐	☐
	1.3 Attic Eave Baffles Where Vents/Leakage Exist	☐	☐	☐	☐
	Only at Climate Zones 4 and Higher:				
	1.4 Slab-edge Insulation (A maximum of 25% of the slab edge may be uninsulated in Climate Zones 4 and 5.)	☐	☐	☐	☐
	Best Practices Encouraged, Not Req'd.:				
	1.5 Air Barrier At All Band Joists (Climate Zones 4 and higher)	☐	☐	☐	☐
	1.6 Minimize Thermal Bridging (e.g., OVE framing, SIPs, ICFs)	☐	☐	☐	☐
2. Walls Adjoining Exterior Walls or Unconditioned Spaces	Requirements: • Fully insulated wall aligned with air barrier at both interior and exterior, OR • Alternate for Climate Zones 1 thru 3, sealed exterior air barrier aligned with RESNET Grade 1 insulation fully supported • Continuous top and bottom plates or sealed blocking				
	2.1 Wall Behind Shower/Tub	☐	☐	☐	☐
	2.2 Wall Behind Fireplace	☐	☐	☐	☐
	2.3 Insulated Attic Slopes/Walls	☐	☐	☐	☐
	2.4 Attic Knee Walls	☐	☐	☐	☐
	2.5 Skylight Shaft Walls	☐	☐	☐	☐
	2.6 Wall Adjoining Porch Roof	☐	☐	☐	☐
	2.7 Staircase Walls	☐	☐	☐	☐
	2.8 Double Walls	☐	☐	☐	☐
3. Floors between Conditioned and Exterior Spaces	Requirements: • Air barrier is installed at any exposed insulation edges • Insulation is installed to maintain permanent contact w/ sub-floor above • Optional until July 1, 2008, insulation is installed to maintain permanent contact with air barrier below				
	3.1 Insulated Floor Above Garage	☐	☐	☐	☐
	3.2 Cantilevered Floor	☐	☐	☐	☐
4. Shafts	Requirements: Openings to unconditioned space are fully sealed with solid blocking or flashing and any remaining gaps are sealed with caulk or foam (provide fire-rated collars and caulking where required)				
	4.1 Duct Shaft	☐	☐	☐	☐
	4.2 Piping Shafts/Penetrations	☐	☐	☐	☐
	4.3 Flue Shaft	☐	☐	☐	☐
5. Attic/ Ceiling Interface	Requirements: • All attic penetrations and dropped ceilings include a full interior air barrier aligned with insulation with any gaps fully sealed with caulk, foam or tape • Movable insulation fits snugly in opening and air barrier is fully gasketed				
	5.1 Attic Access Panel (fully gasketed and insulated)	☐	☐	☐	☐
	5.2 Attic Drop-down Stair (fully gasketed and insulated)	☐	☐	☐	☐
	5.3 Dropped Ceiling/Soffit (full air barrier aligned with insulation)	☐	☐	☐	☐
	5.4 Recessed Lighting Fixtures (ICAT labeled and sealed to drywall)	☐	☐	☐	☐
	5.5 Whole-house Fan (insulated cover gasketed to the opening)	☐	☐	☐	☐
6. Common Walls Between Dwelling Units	Requirements: Gap btwn drywall shaft wall (common wall) and structural framing btwn units is sealed at all exterior boundary conditions				
	6.1 Common Wall Between Dwelling Units	☐	☐	☐	☐

Rater Inspection Date: _____ Builder Inspection Date: _____

Home Energy Rating Provider: _____ Builder Company Name: _____

Home Energy Rater Company Name: _____ Builder Division Name: _____

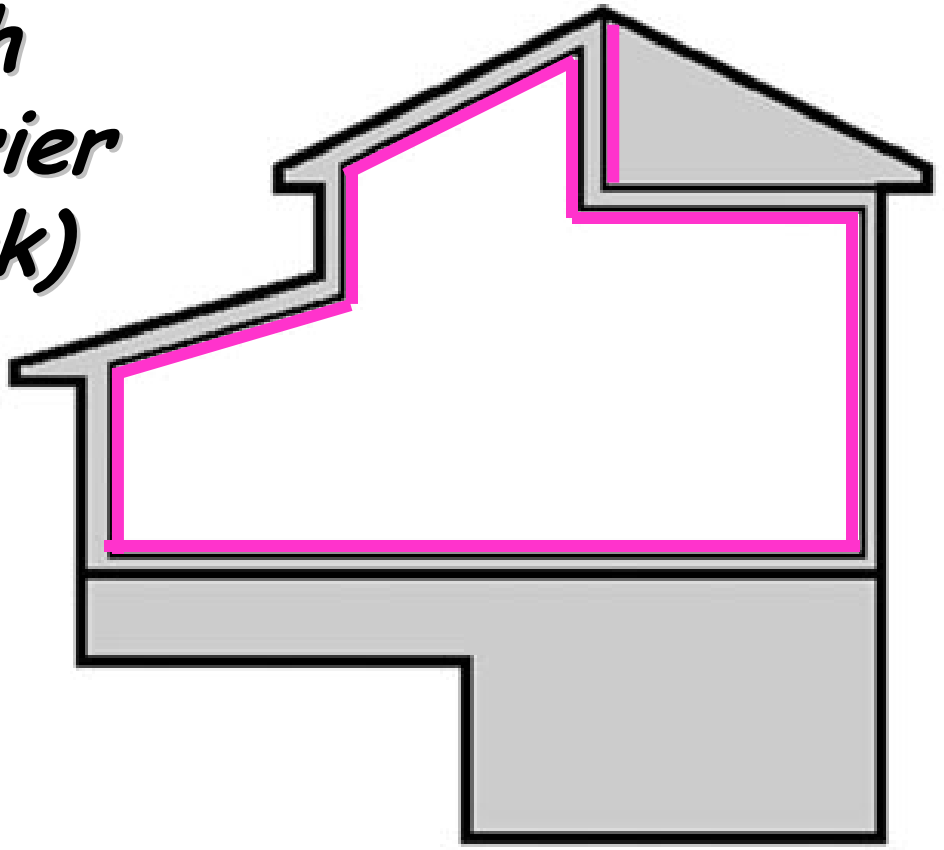
Home Energy Rater Signature: _____ Builder Employee Signature: _____

1.

OVERALL AIR BARRIER AND THERMAL BARRIER ALILGNMENT

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
COMPLETE THERMAL BOUNDARY

- *Continuous*
- *Full contact with interior air barrier (e.g., sheet rock)*
- *Fully enclose conditioned space*



Courtesy of Southface Institute

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

PROBLEM: INSET STAPLING

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

PROBLEM: POOR ALIGNMENT

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

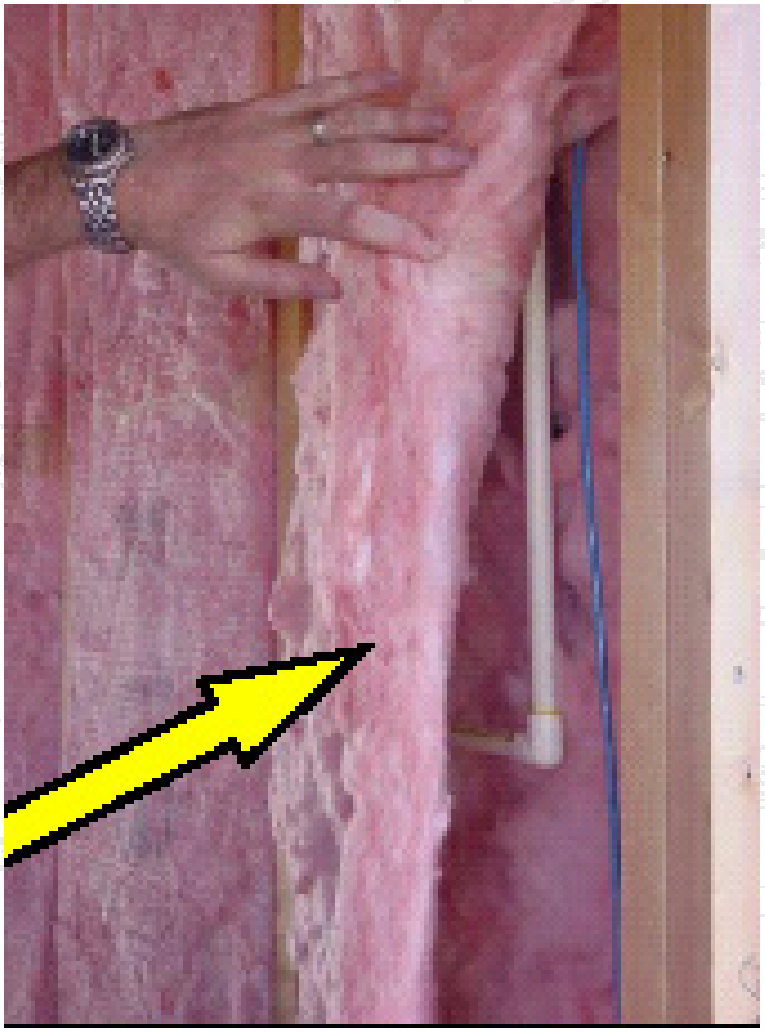
PROBLEM: COMPRESSION

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

PROBLEM: INSET STAPLING

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

PROPERLY INSTALLED BATTS



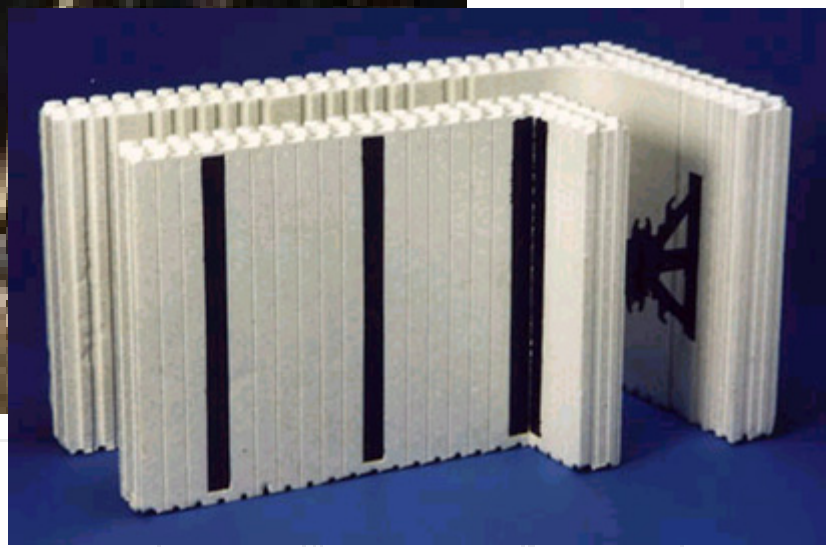
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

PROPERLY INSTALLED BLOWN-IN

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
SPRAY FOAM

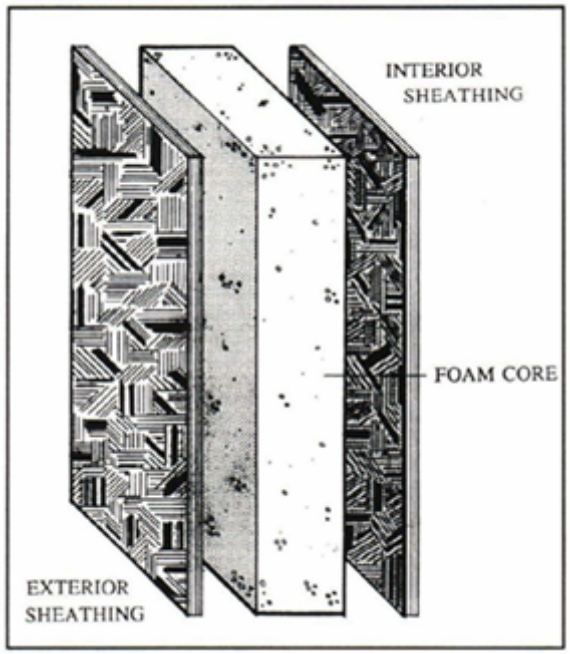
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

INSULATED CONCRETE FORMS (ICFs)



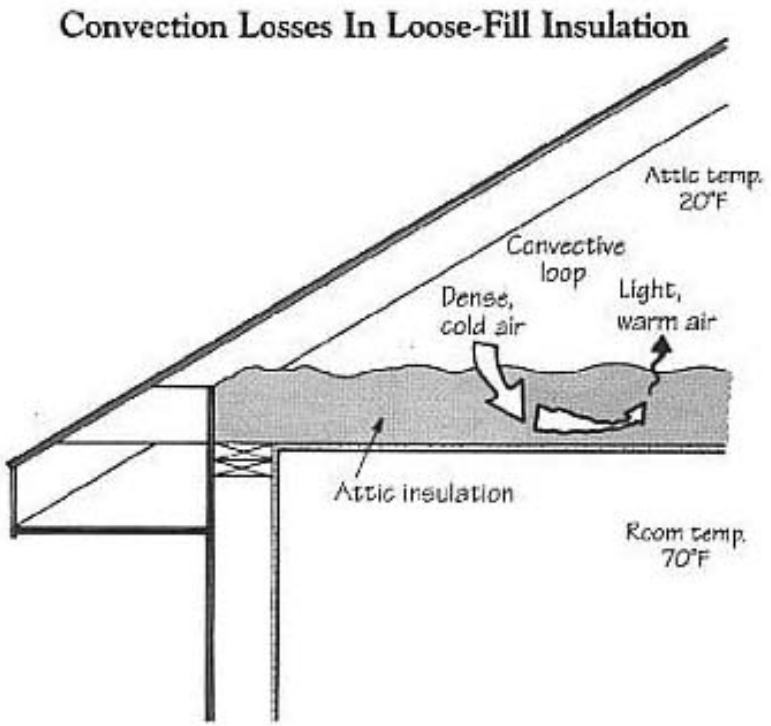
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
STRUCTURAL INSULATED PANELS (SIPs)

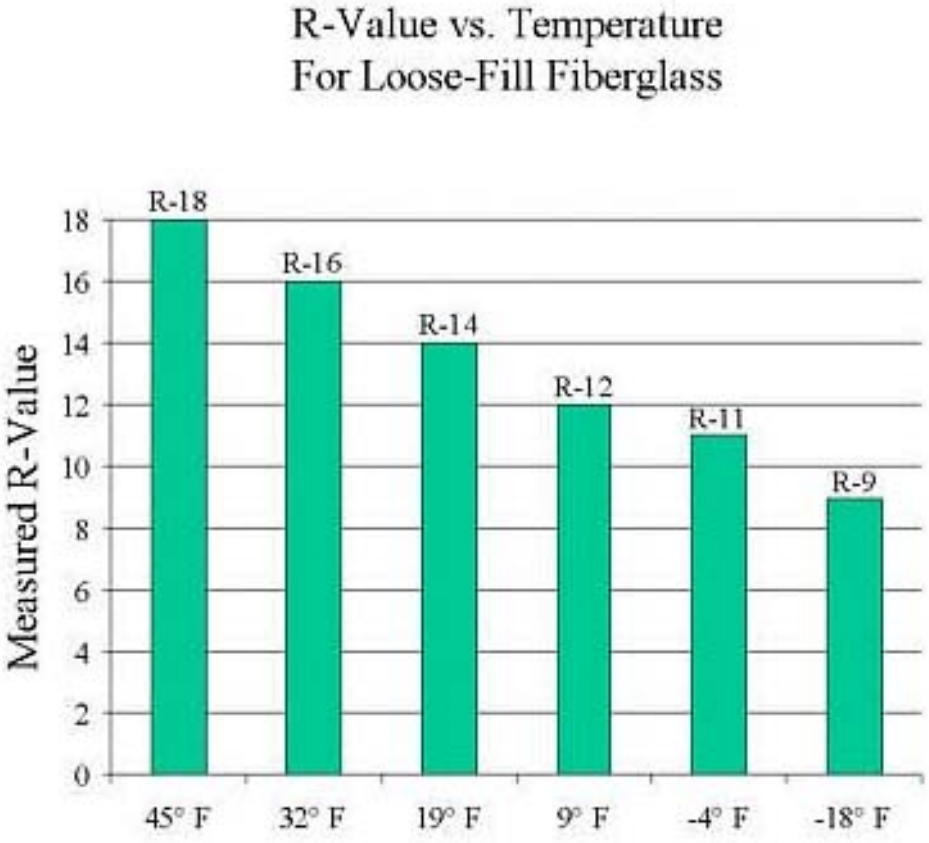
ENERGY STAR



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

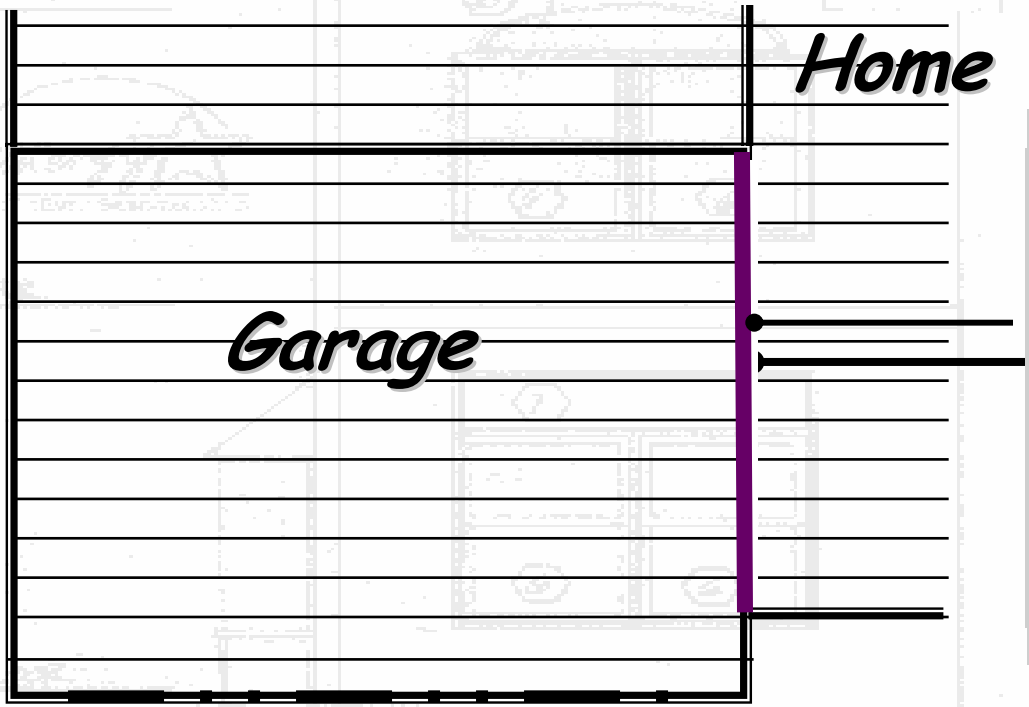
EXCEPTION TO SIX-SIDED AIR BARRIER



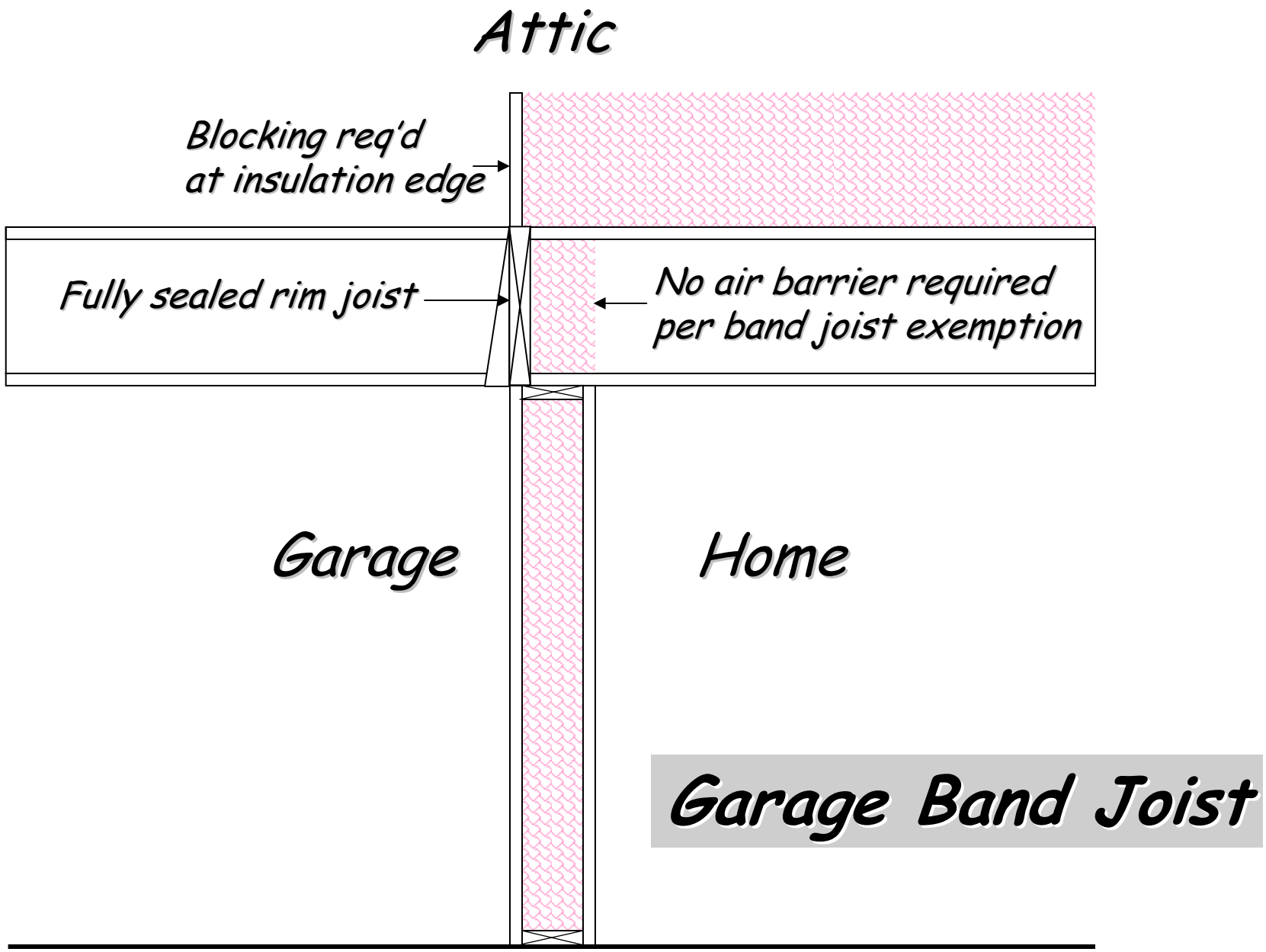


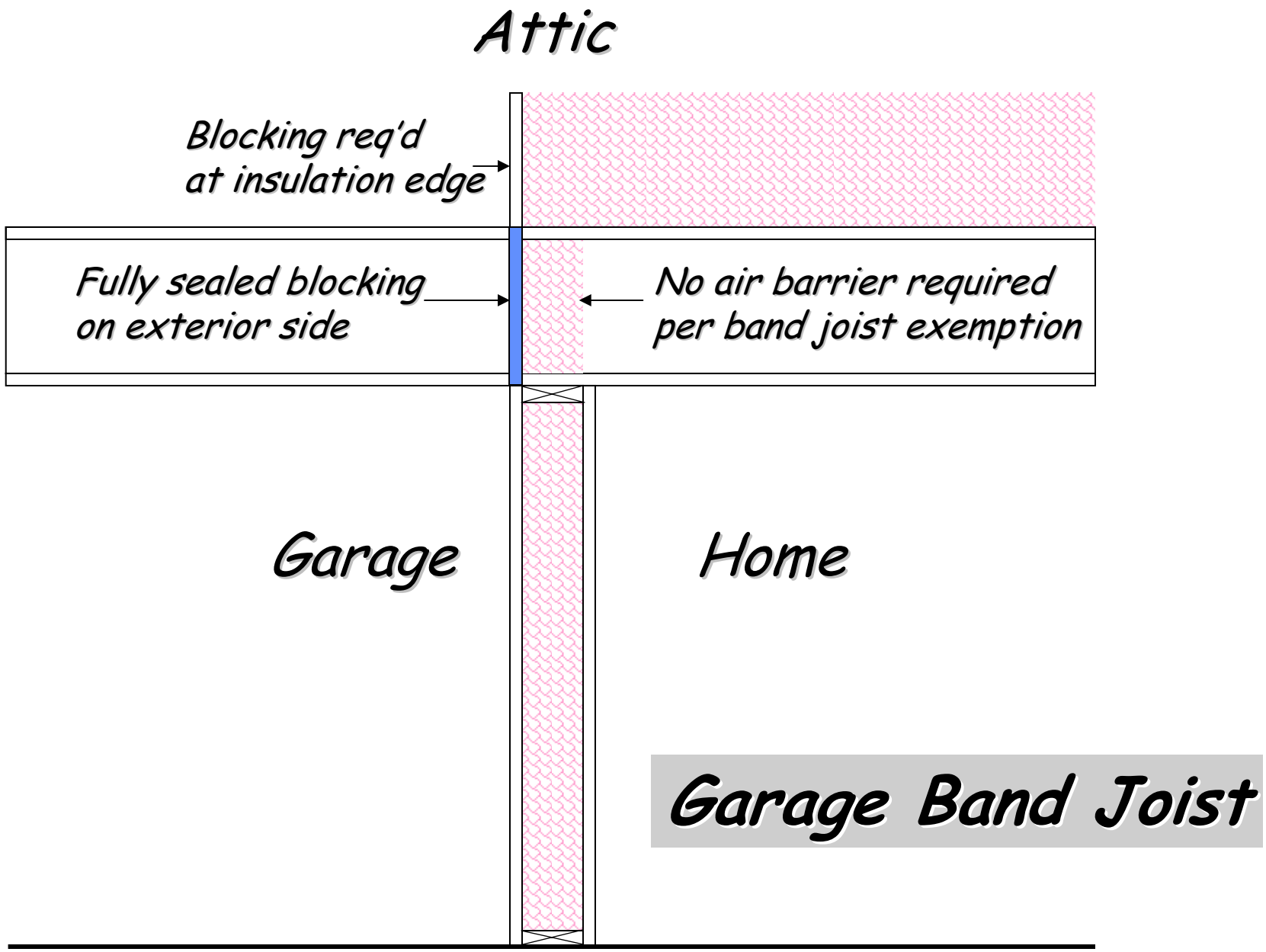
Source:
David South
Enviro-Seal Foam Insulation

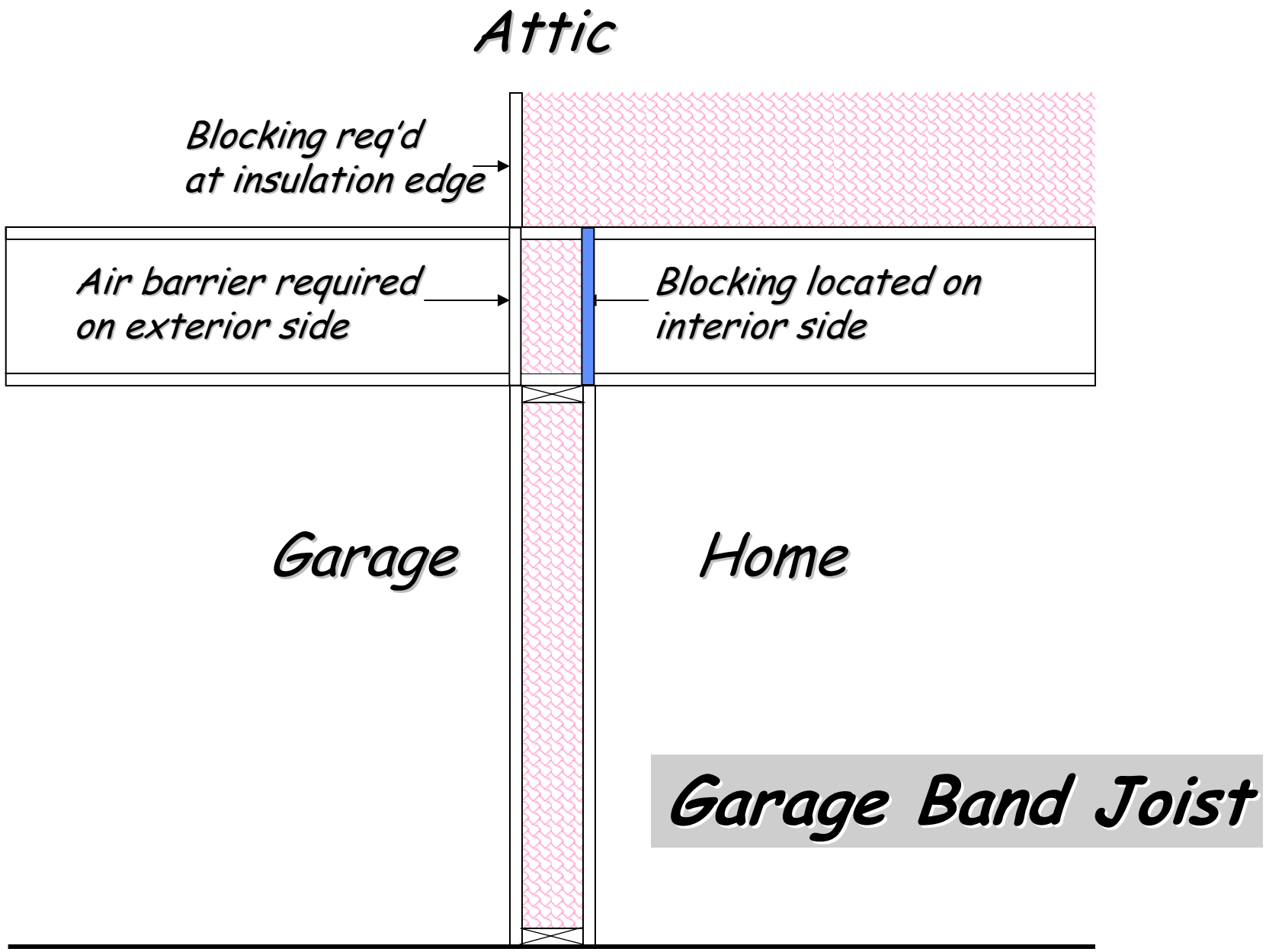
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
GARAGE FRAMING



Using adjoining wall as structural break allows for simpler blocking with framing


Attic
Blocking req'd
at insulation edge
Fully sealed rim joist
No air barrier required
per band joist exemption
Garage
Home
Garage Band Joist


Attic
Blocking req'd
at insulation edge
Fully sealed blocking
on exterior side
No air barrier required
per band joist exemption
Garage
Home
Garage Band Joist


Attic
Blocking req'd
at insulation edge
Air barrier required
on exterior side
Blocking located on
interior side
Garage
Home
Garage Band Joist

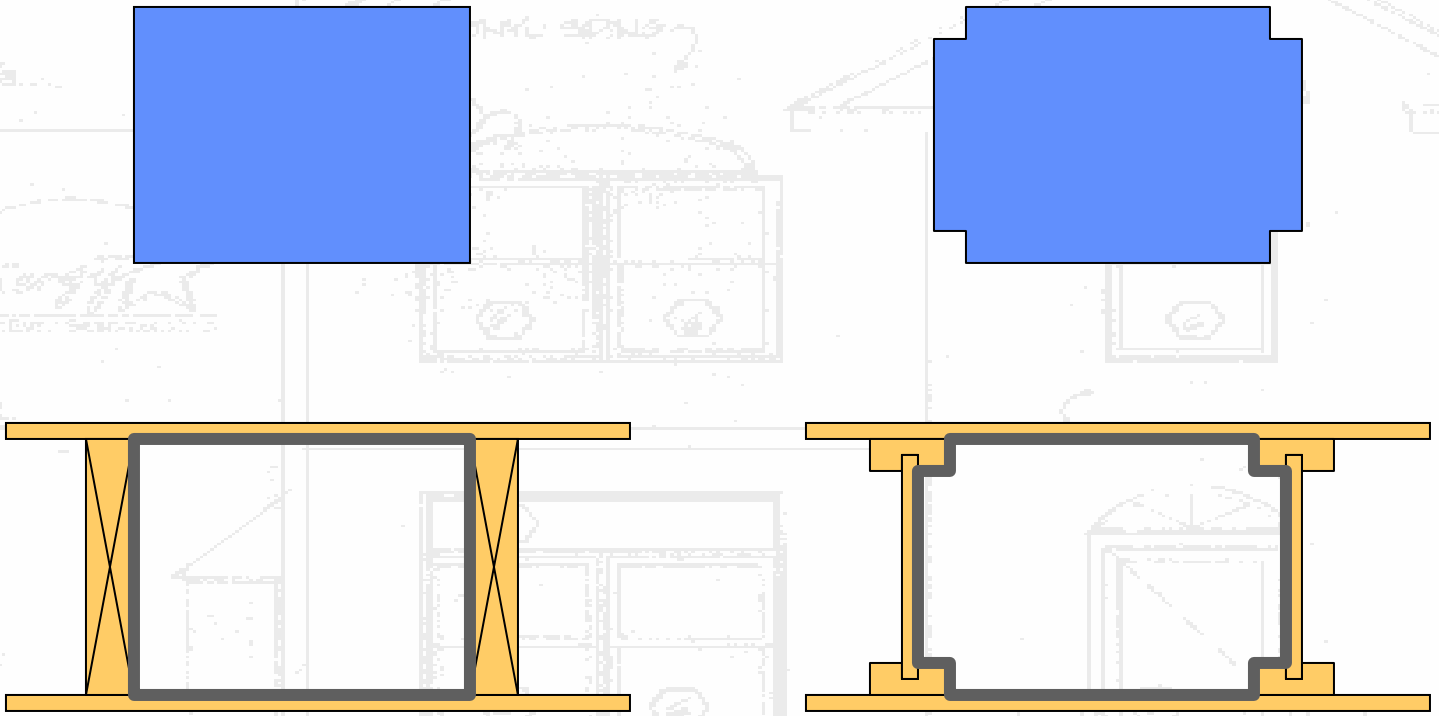
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

GARAGE/HOME BAND JOISTS

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

GARAGE/HOME BAND JOISTS

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
BAND JOIST BLOCKING

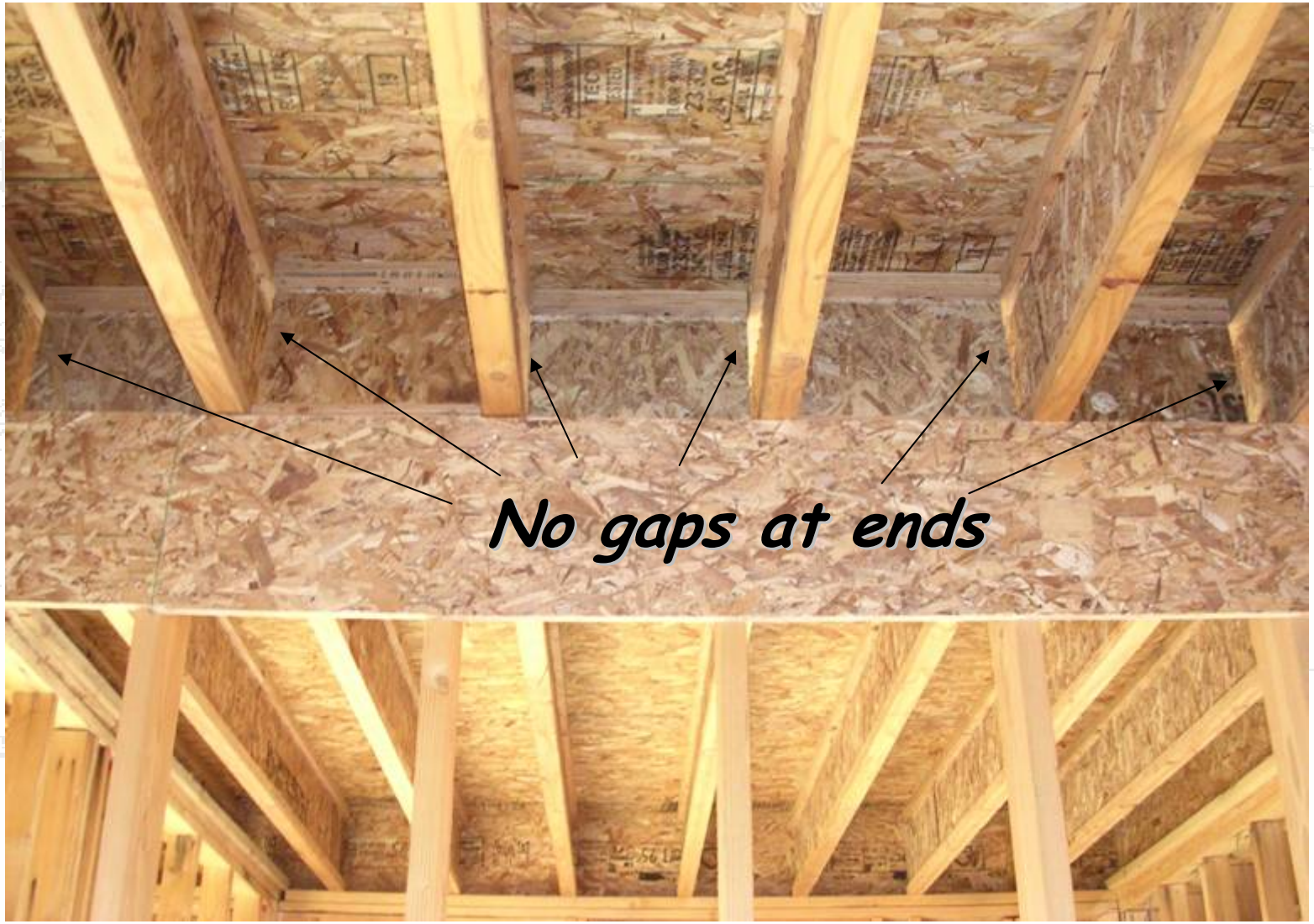


Filler blocking much simpler shape with dimensional lumber

Filler blocking much harder shape with Engineered lumber

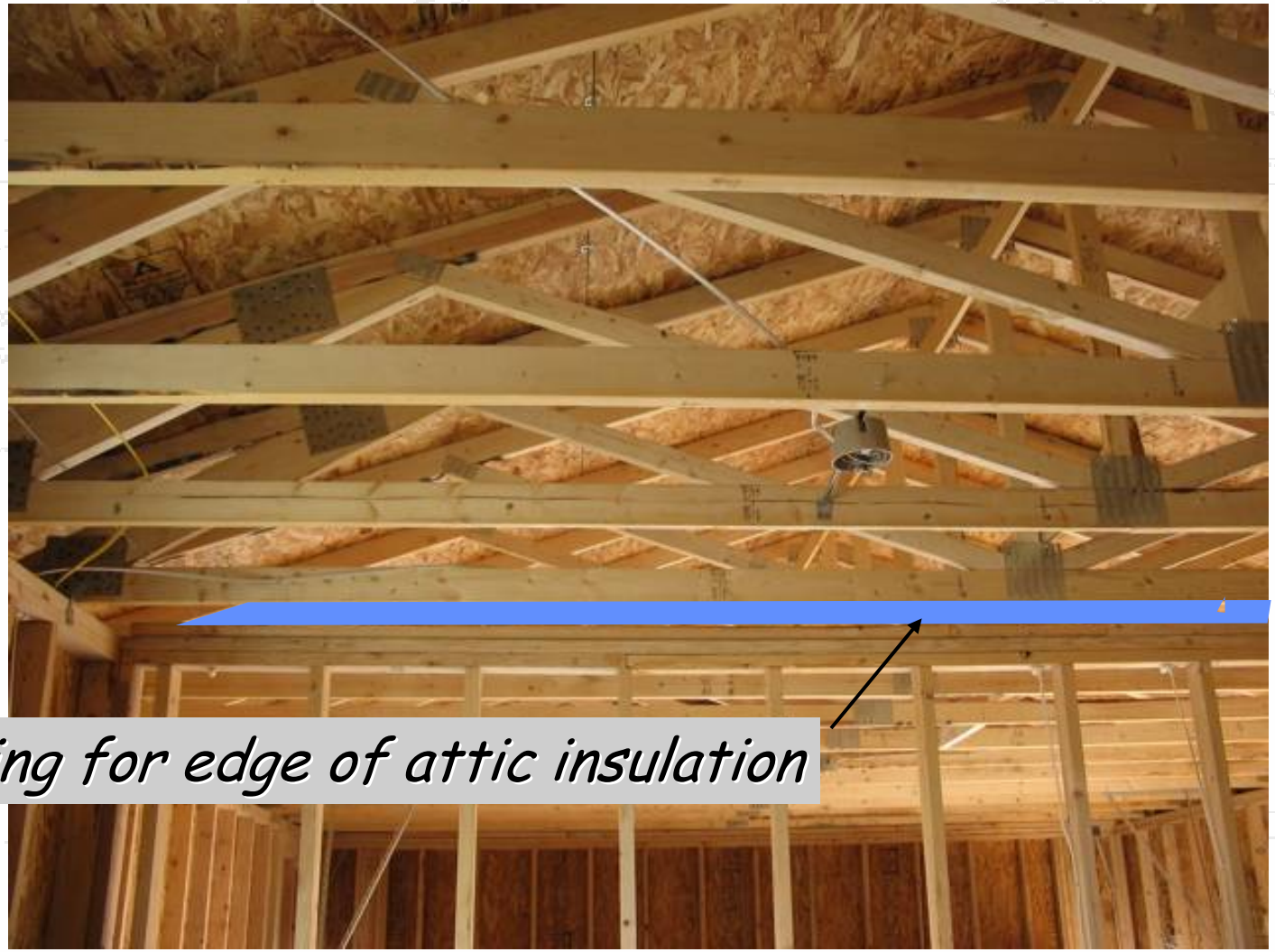
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

GARAGE/HOME BAND JOISTS



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
GARAGE/HOME BLOCKING

ENERGY STAR

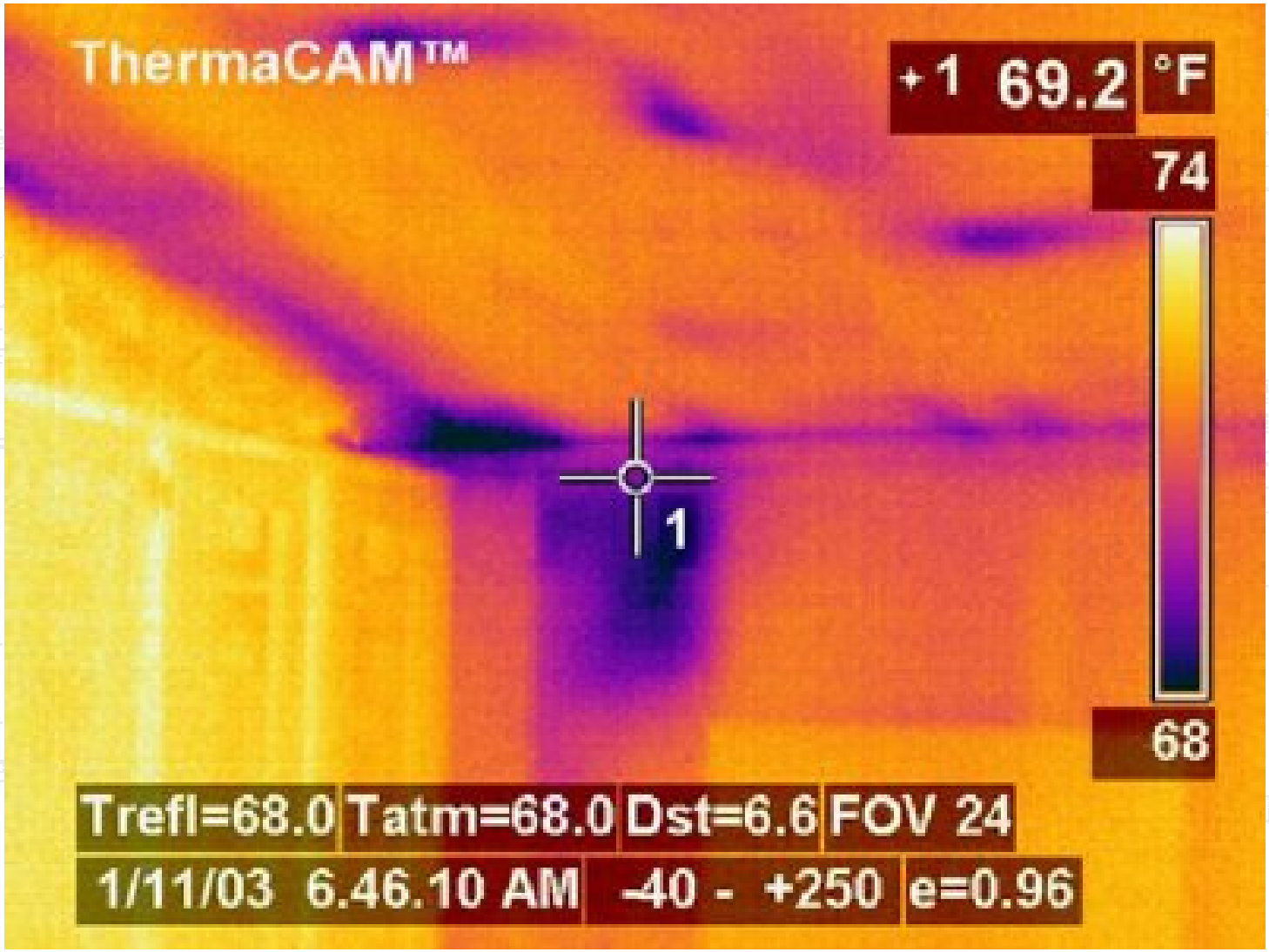


1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

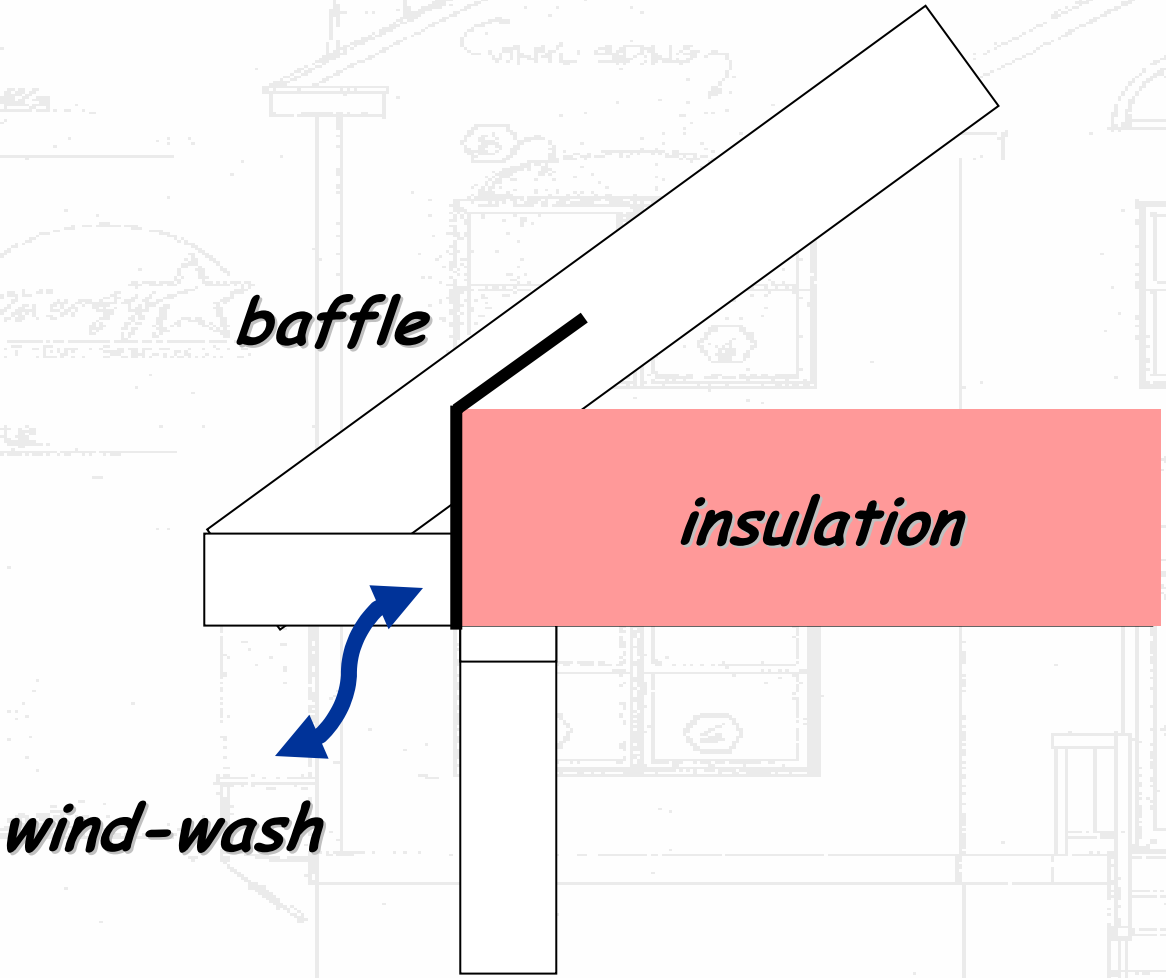
ATTIC EAVES

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

ATTIC EAVES



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
ATTIC EAVES

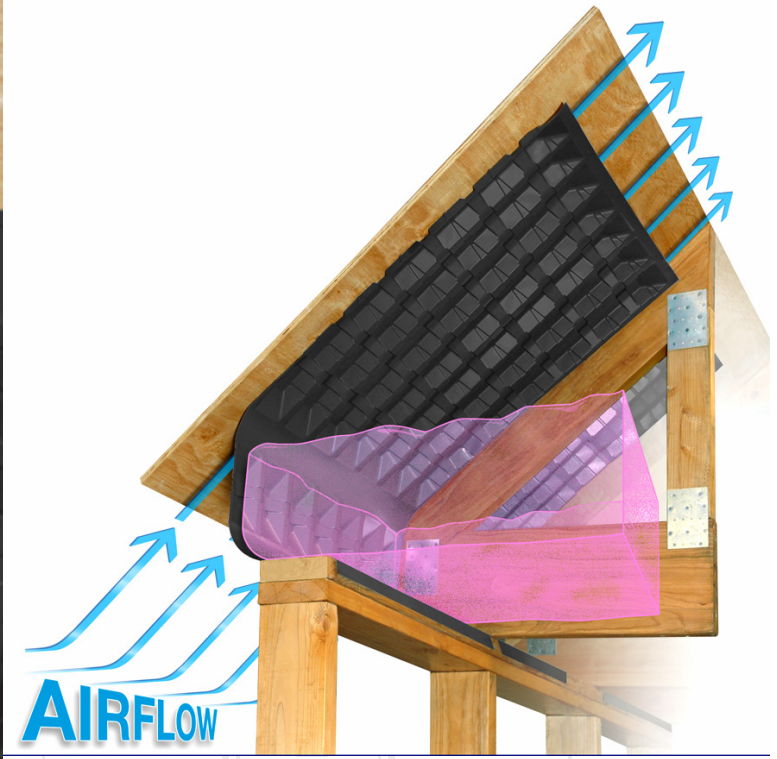


1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

ATTIC EAVES

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
ATTIC EAVES

Image courtesy of MaGrann Associates


AIRFLOW

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

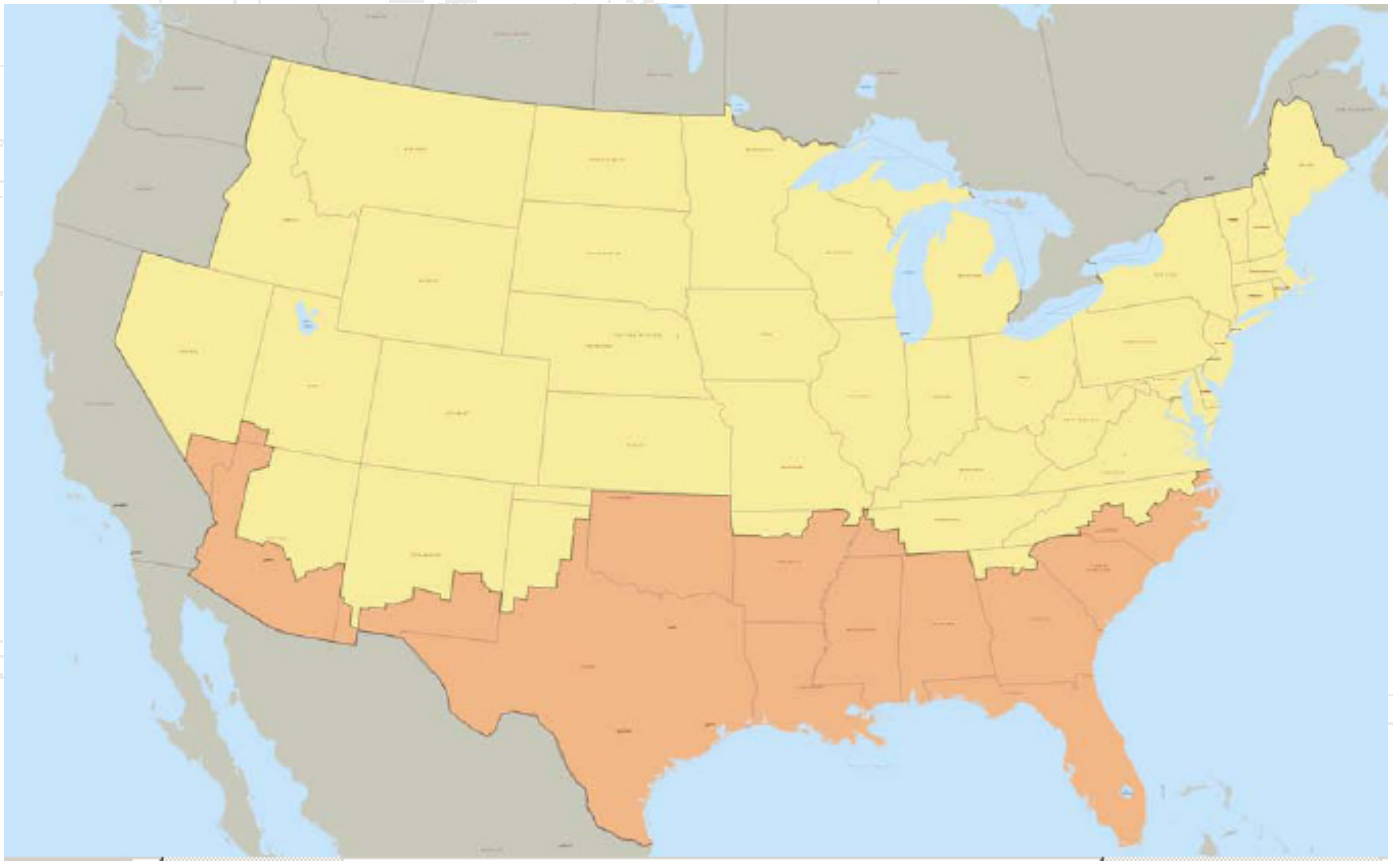
ATTIC EAVES

Baffles must go 2" above top of insulation

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

SLAB EDGE INSULATION

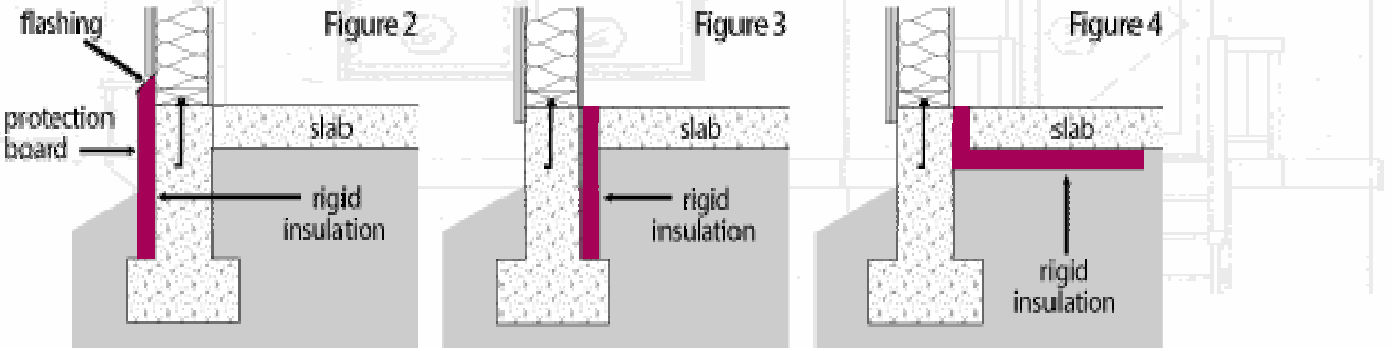
Climate Zones 4 and higher,
with exemption if exposed slab floor area <25%



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

SLAB EDGE INSULATION IECC CODE

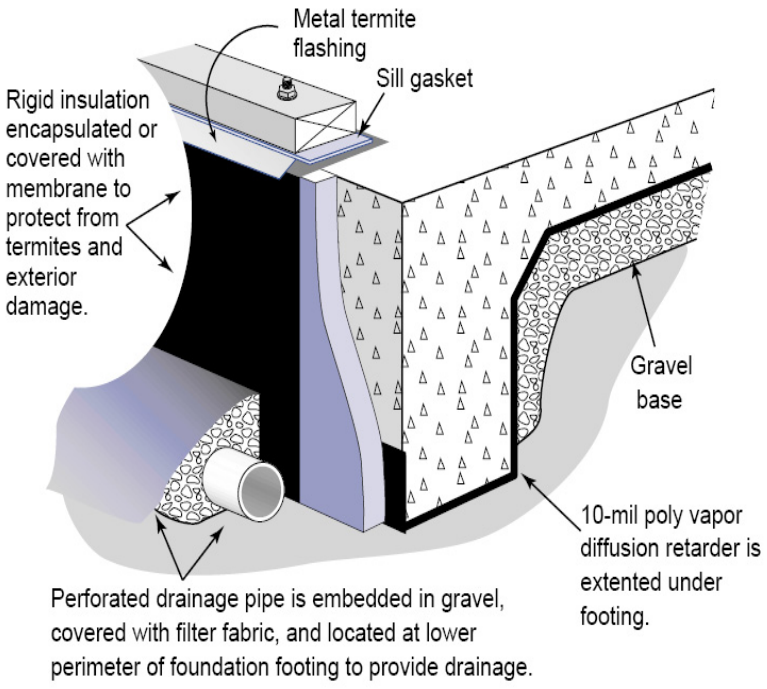
- *R-10 (typ. 2 in.) in Zones 4 and above*
- *Downward from top of slab:*
  - *minimum 24" (Zones 4 and 5)*
  - *minimum 48" (Zones 6, 7, and 8)*
- *Insulation can be run:*
  - *vertical*
  - *extend horizontally under the slab*
  - *extend out from building (must be under 10 inches of soil)*



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
SLAB EDGE INSULATION

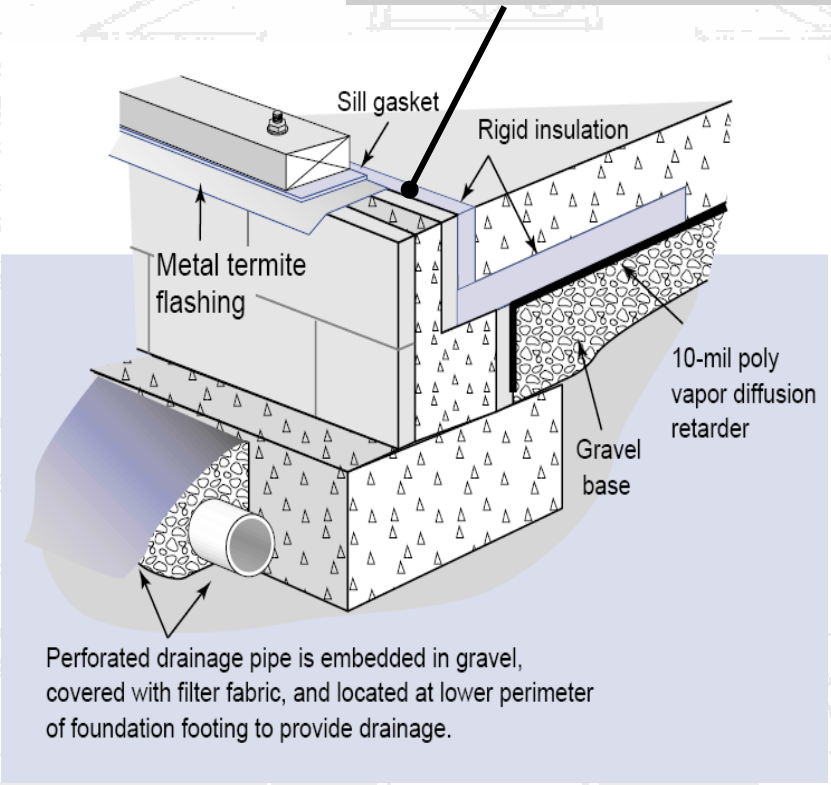
ENERGY STAR

Climate Zones 4 and higher



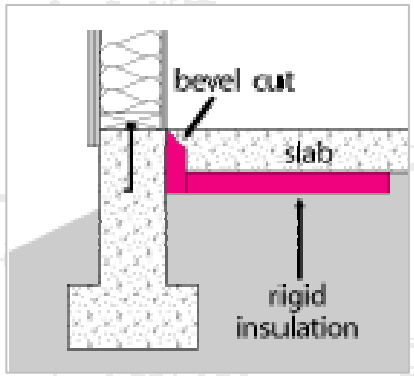
Exterior

Plan for Flooring!!!



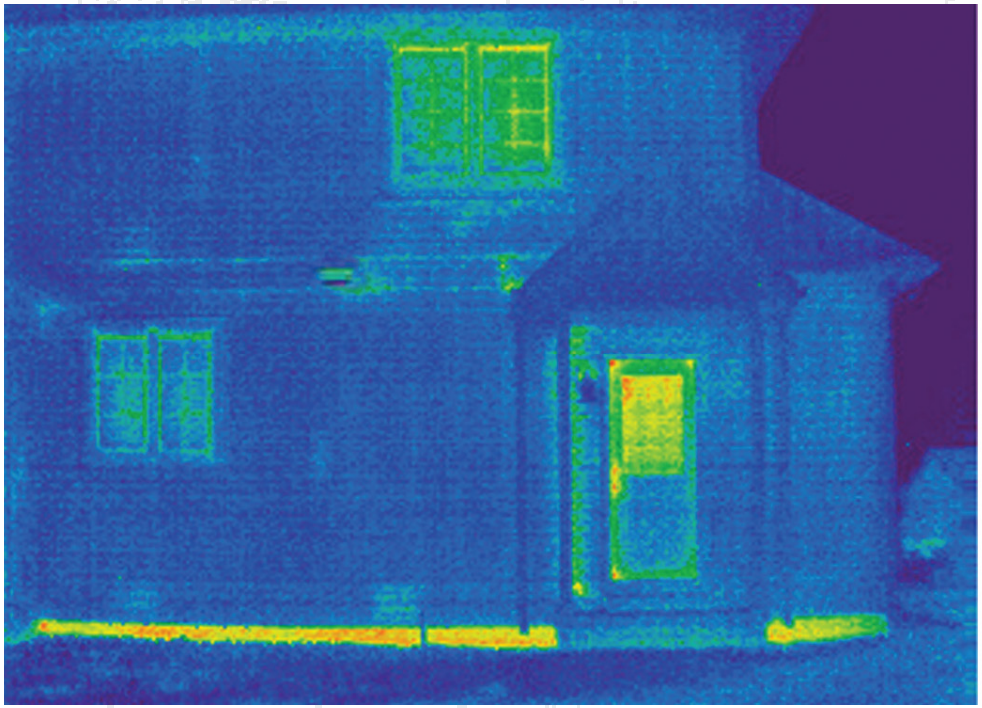
Interior

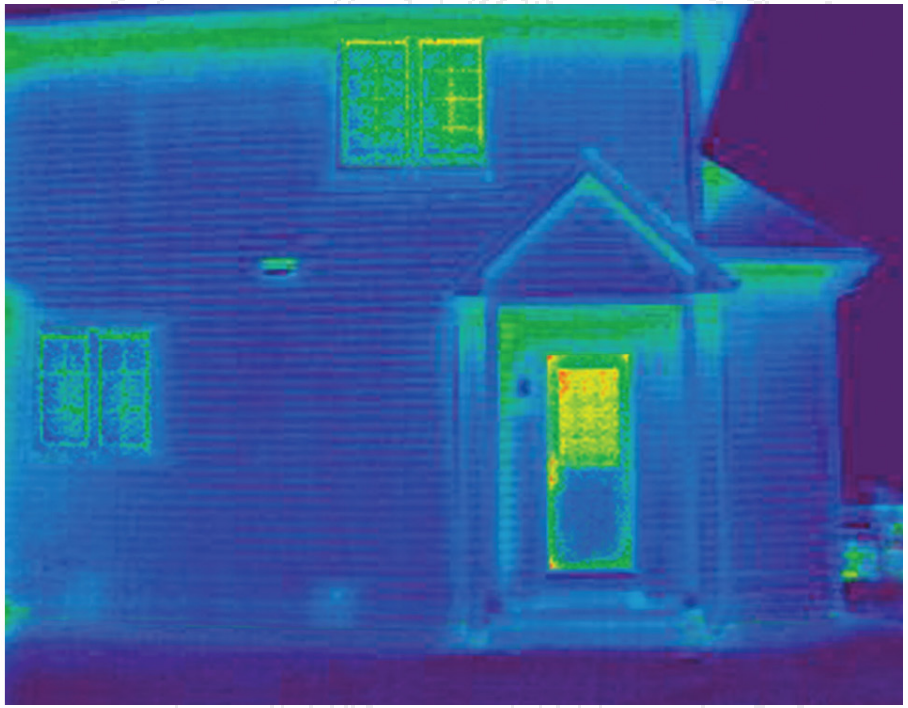
Slab Edge Insulation



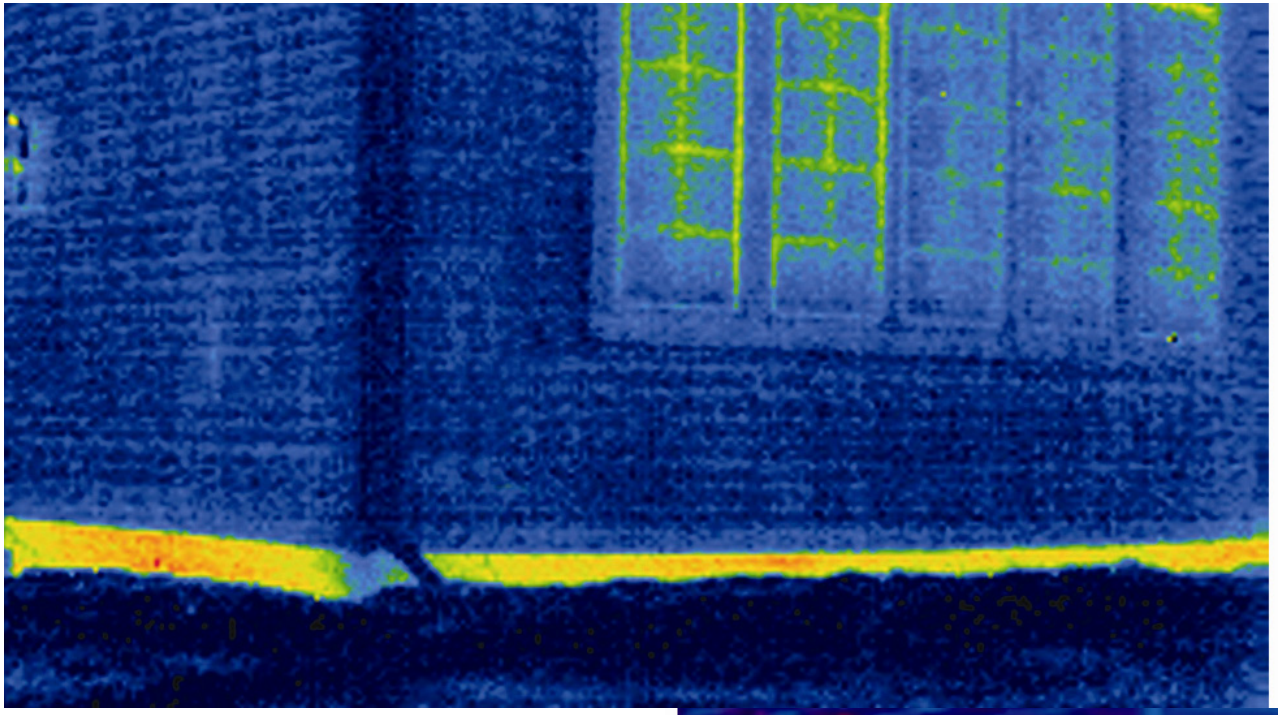
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

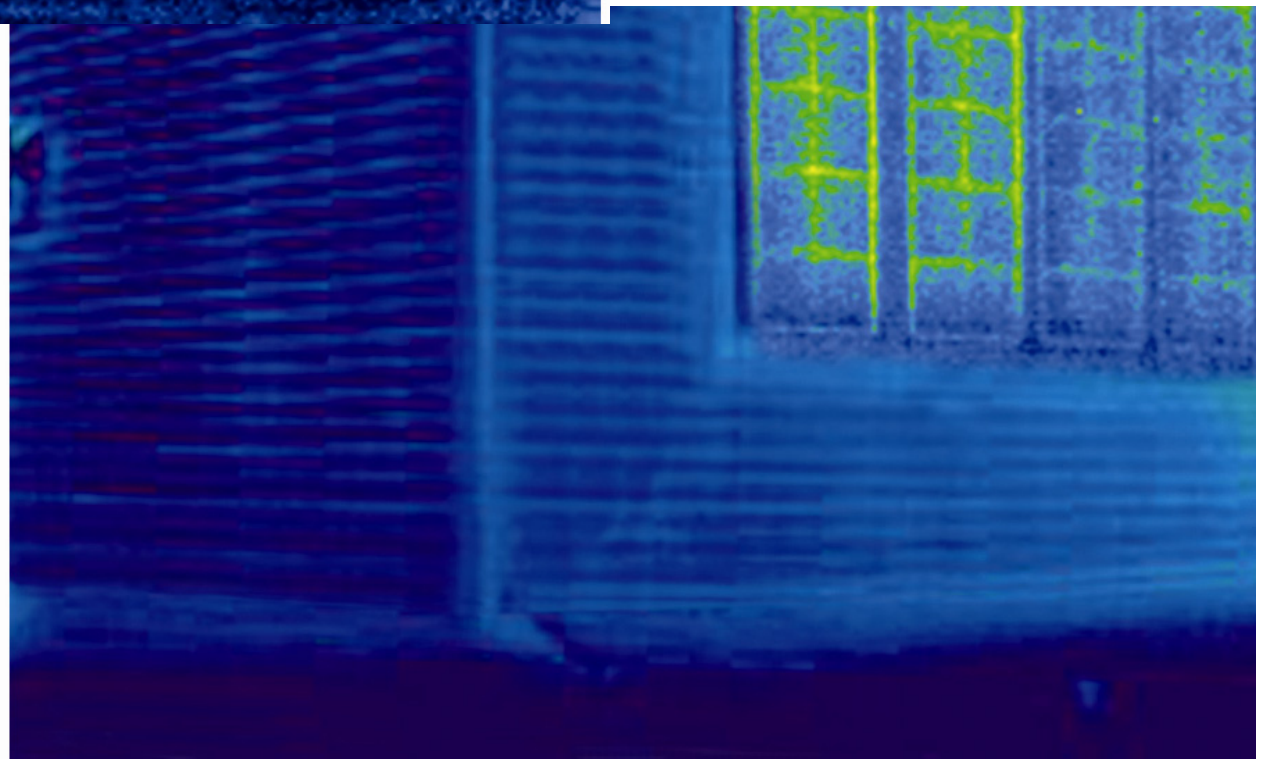
SLAB EDGE INSULATION





Courtesy: Tremco Barrier Solutions, Inc.





Courtesy:
Tremco Barrier Solutions, Inc.

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
BAND JOISTS

Highly encourage,

but don't require complete air barrier detail

except:

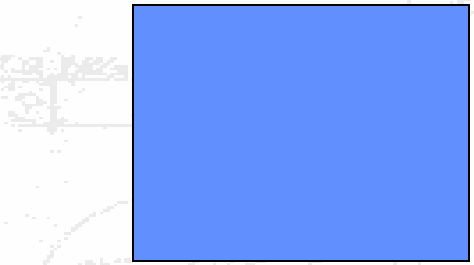
- *Garage/House Interface (Item #1)*
- *Porch Roof (Item #2)*
- *Cantilevered Floor (Optional Item #3)*

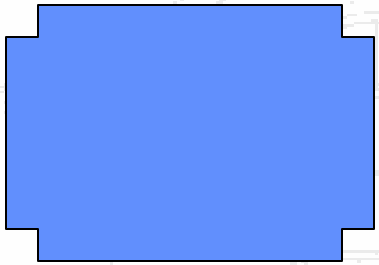
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

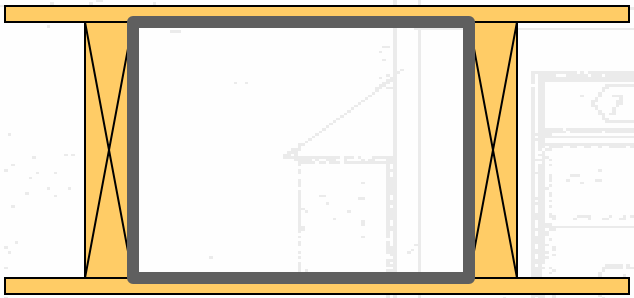
BAND JOIST PROBLEM

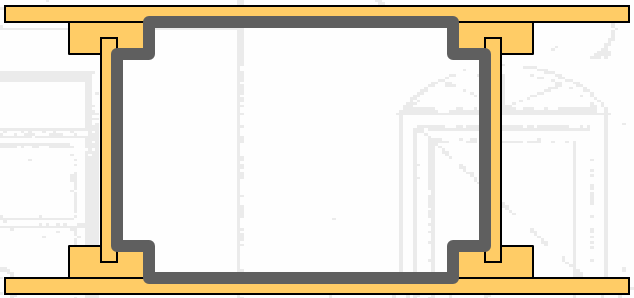
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

BAND JOIST PROBLEM





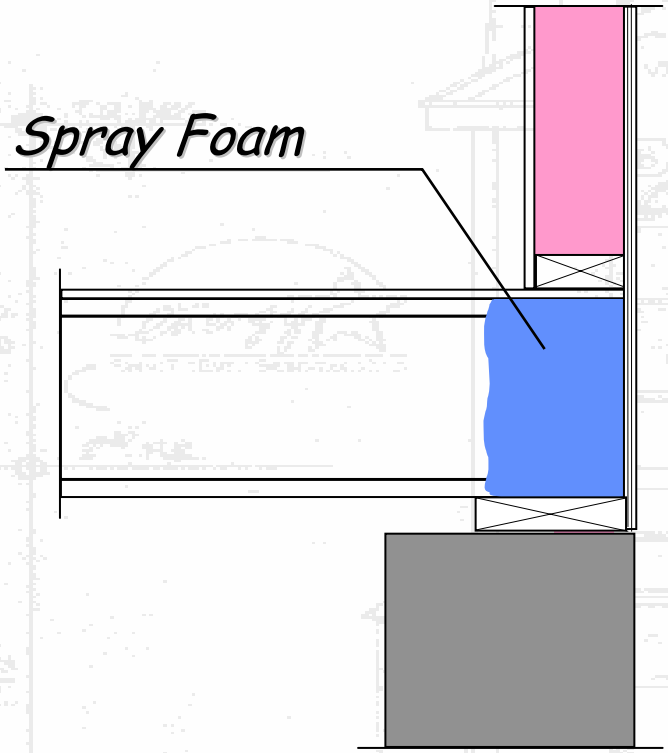




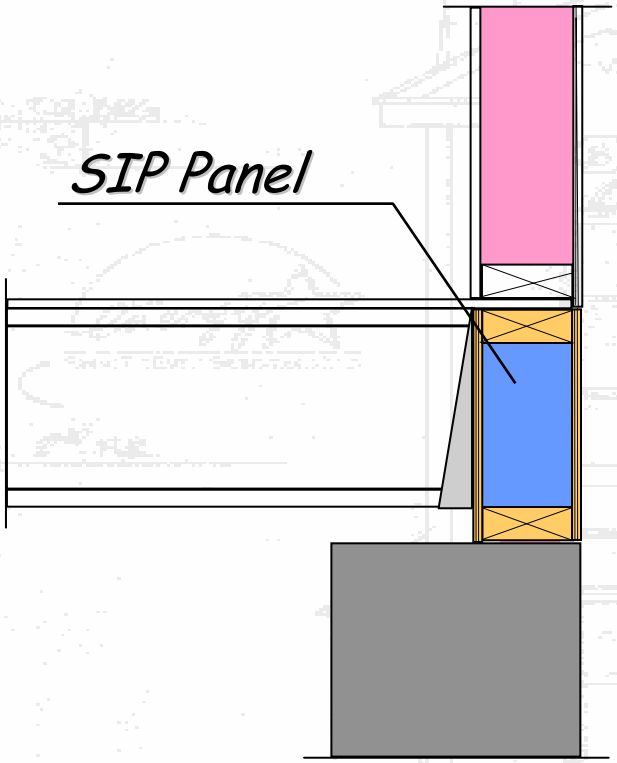
Band Joists

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

BAND JOIST BEST PRACTICES



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
BAND JOIST BEST PRACTICES



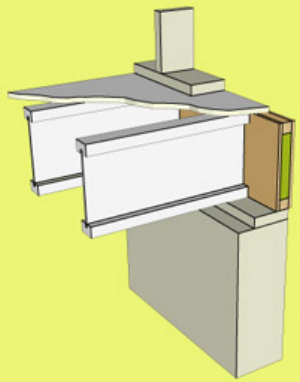
EMERCOR

Home | Contact | Professional Tools | Estimate Request

ABOUT US | PRODUCTS | EMERCOR HOMES | WARRANTY & SERVICES | KNOWLEDGE CENTRE

Floors

- ➤ Insulated Rimboard
  - Cantilever Soffit
  - Insulated Panels
- Exterior Walls
- Foundation & Basement Walls
- Cathedral Ceilings & Attics
- Bonus Rooms



Insulated Rimboard

The Quick & Easy Way To Insulate The Floor Perimeter

EMERCOR's Insulated Rimboard is an integral part in building a better home, delivering comfort, health and energy efficiency to homeowners. Accounting for up to 14 per cent of a homes total air infiltration, the Insulated Rimboard eliminates air leakage and enables proper workmanship during installation. Truly a time saving material, the Insulated Rimboard turns a three-step process into one easy and sure way to install insulation at the floor system.

Advantages
Load Table
Specifications

Brochure
Installation Guide

Advantages

Energy Efficient - R 14:
Up to 14 per cent of total home air leakage occurs around the rim joist. EMERCOR's Insulated Rimboard decreases air leakage by ensuring that continuous R-14 insulation is placed around the floor perimeter.

Easy Installation - 20% Faster Install:
EMERCOR's Insulated Rimboard has a unique joining detail and installs up to 20 per cent faster than regular Rimboard. It also eliminates the nightmare of trying to insulate and seal around every floor joist.

Moisture Resistant - Type 1 Vapor Barrier:
EMERCOR's Insulated Rimboard has a vapor permeance of less than one, making it a Type 1 vapor barrier. This barrier prevents moisture condensation in the building envelope which leads to rot, mold and eventually structural damage.

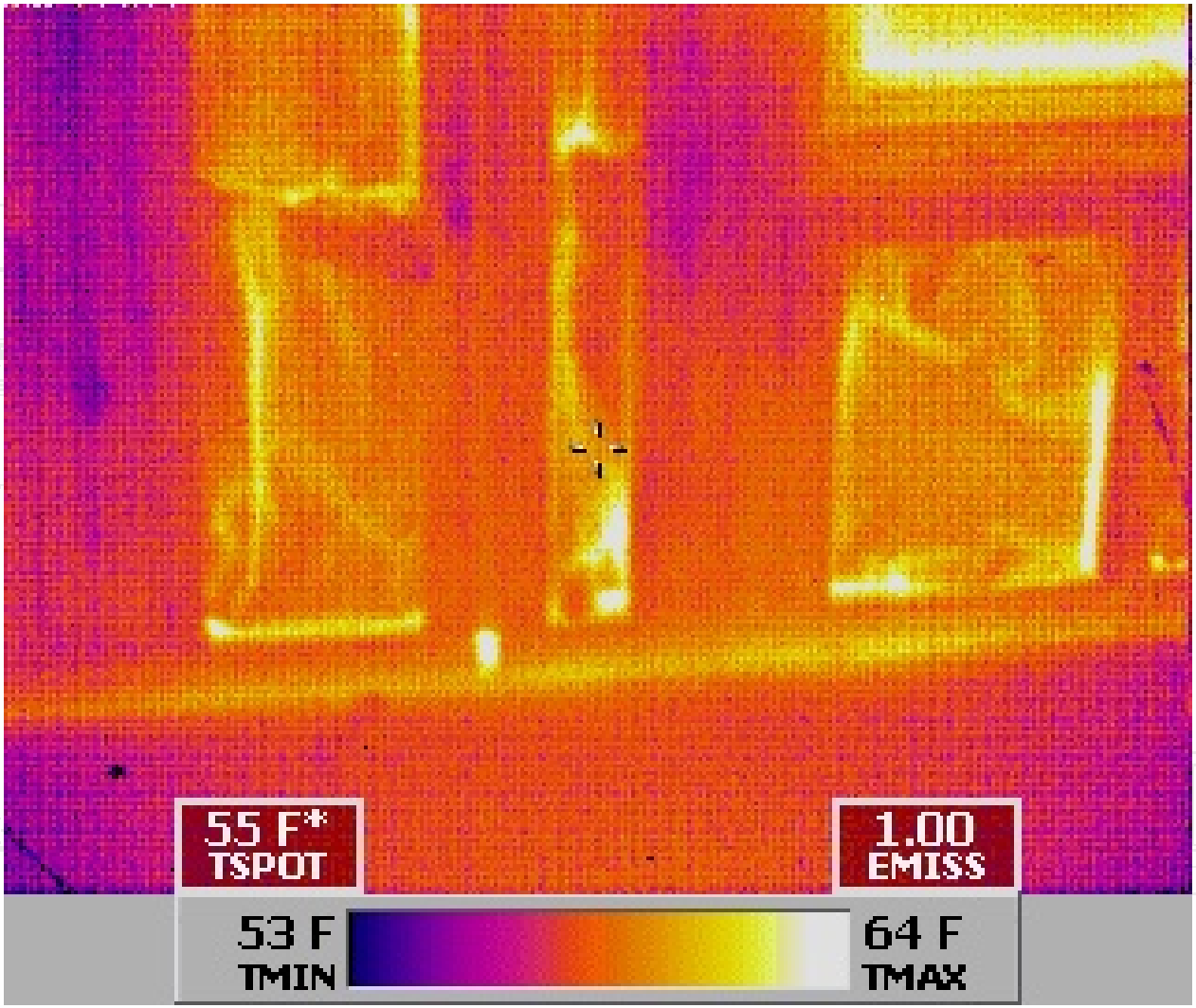
Environmental - Reduce job site waste:
EMERCOR's Insulated Rimboard is engineered with a unique joining detail. This joining detail allows traditionally discarded pieces to be reused along the floor perimeter. EMERCOR's commitment to sustainability is driven through the 'EMERGreen Program', with an internal focus on implementing lean in both their manufacturing and office facility.

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

FUTURE ISSUE: THERMAL BRIDGING

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

FUTURE ISSUE: THERMAL BRIDGING



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

FUTURE ISSUE: THERMAL BRIDGING

Where 4 is good;

5 must be better;

and 9 is Great!

Courtesy of Building Science Corp.


Thermo
ply
TOUGH PROTECTIVE SHEATHING
STRUCTURAL GRADE

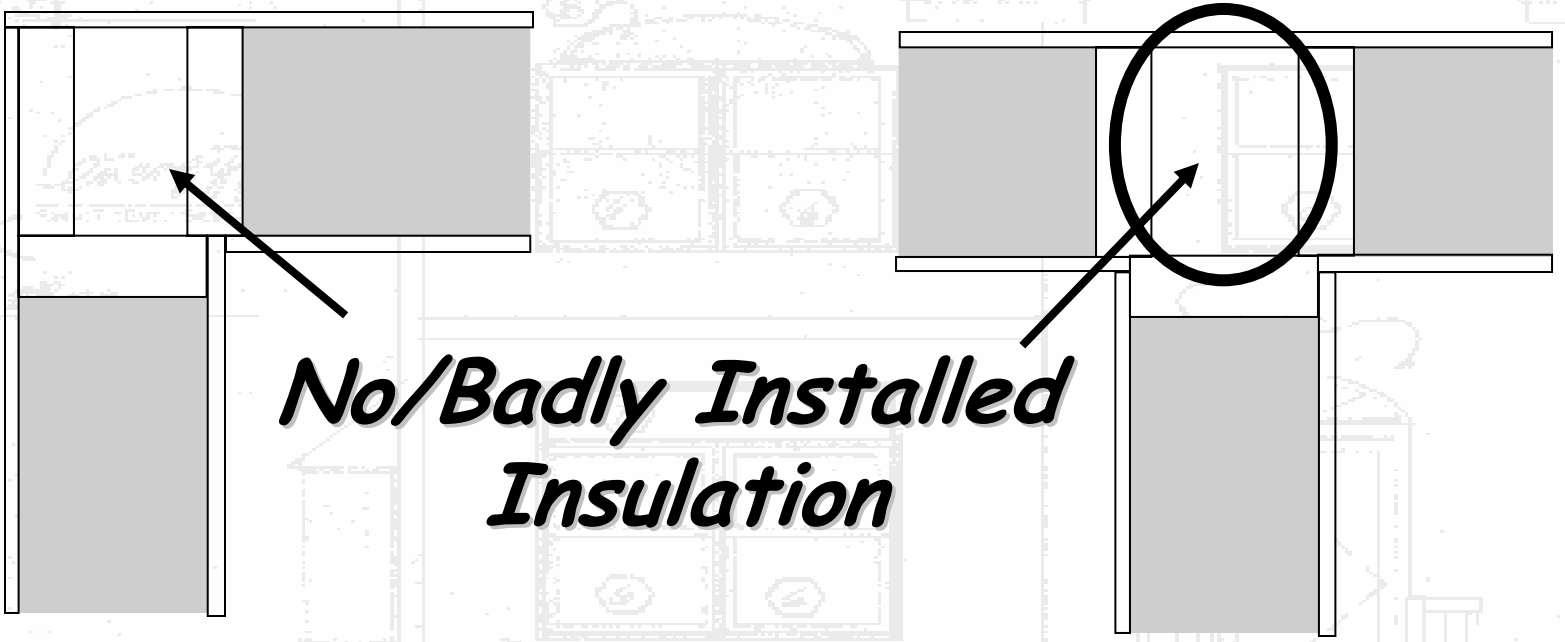

Maronda Inc.
Thermo ply

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

FUTURE ISSUE: THERMAL BRIDGING

uninsulated corner

uninsulated wall intersection



No/Badly Installed Insulation

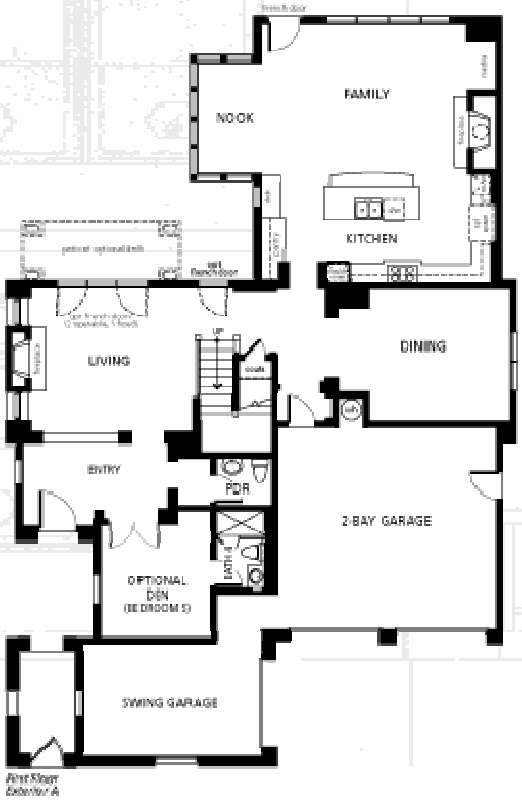
Uninsulated corners and walls in typical framed home added up to a large thermal hole!

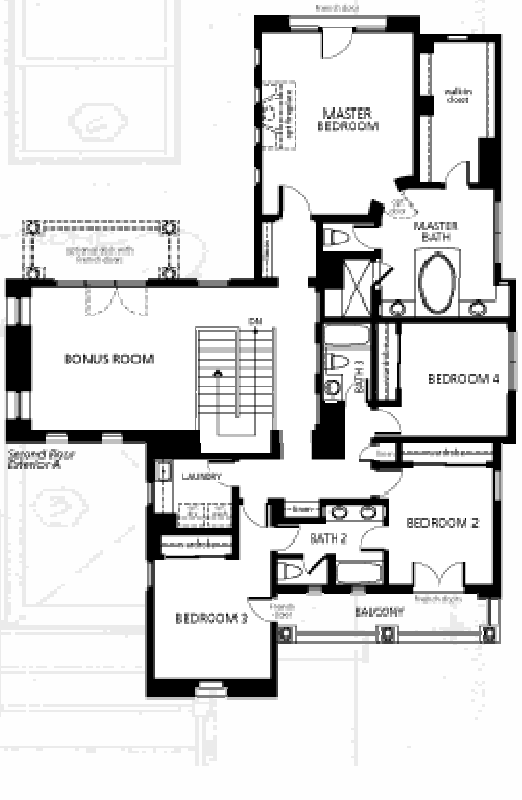
1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
FUTURE ISSUE: THERMAL BRIDGING

ENERGY STAR

~48 wall corners and intersections

= 12-90 feet uninsulated wall!





1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

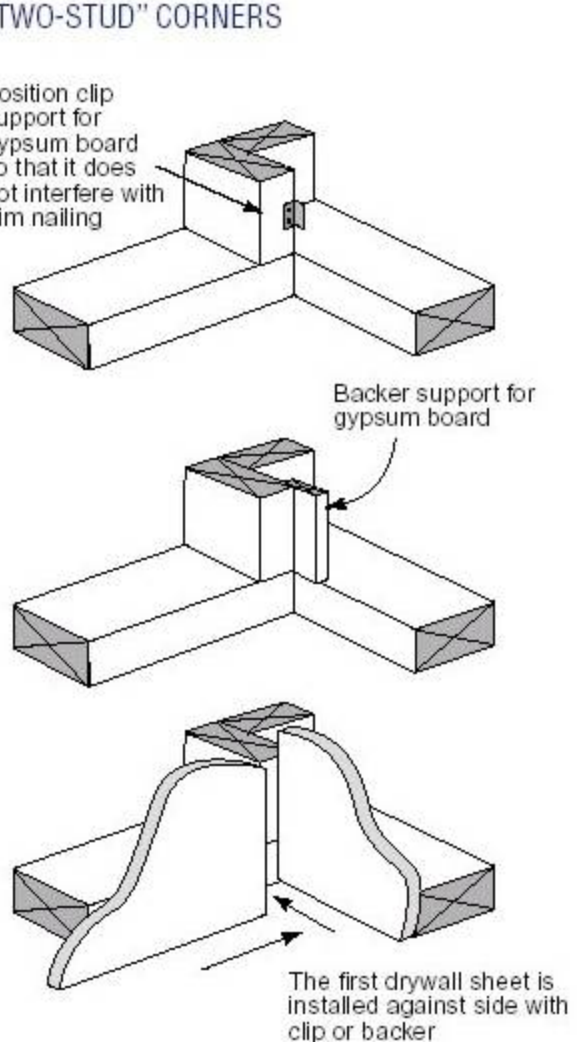
OVE FRAMING

Courtesy of Building Science Corp.

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:
OVE FRAMING

Courtesy of Building Science Corp.

Courtesy of Southface Institute



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

OVE FRAMING

Ladder T – Allows insulation in exterior wall cavity at wall intersections

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

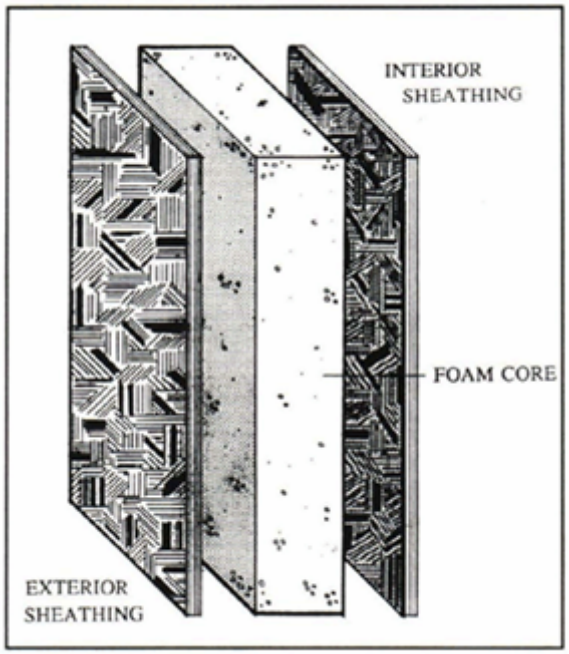
RIGID INSULATION SHEATHING

ENERGY STAR

1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

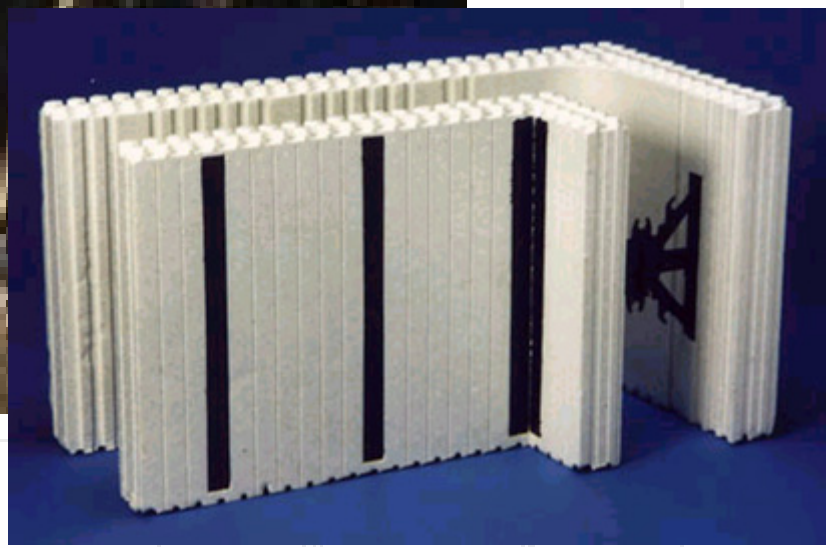
STRUCTURAL INSULATED PANELS (SIPs)

ENERGY STAR



1. OVERALL AIR BARRIER/THERMAL BARRIER ALIGNMENT:

INSULATED CONCRETE FORMS (ICFs)

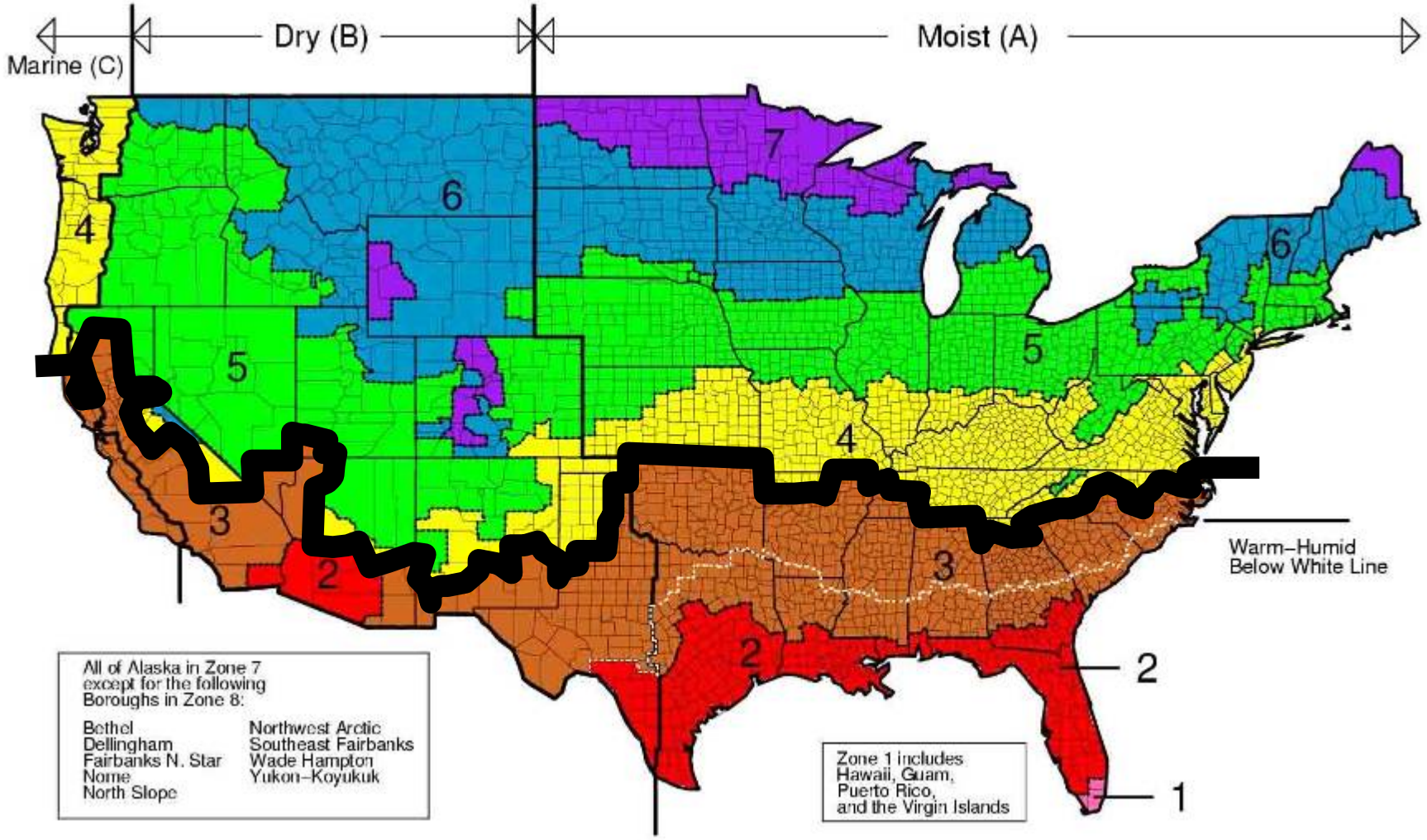


2.

WALLS ADJOINING EXTERIOR WALLS OR UNCONDITIONED SPACES

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

EXTERIOR WALL CZ 1-3 ALTERNATE



2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
EXTERIOR WALL CZ 1-3 ALTERNATE

Air-tight exterior air barrier

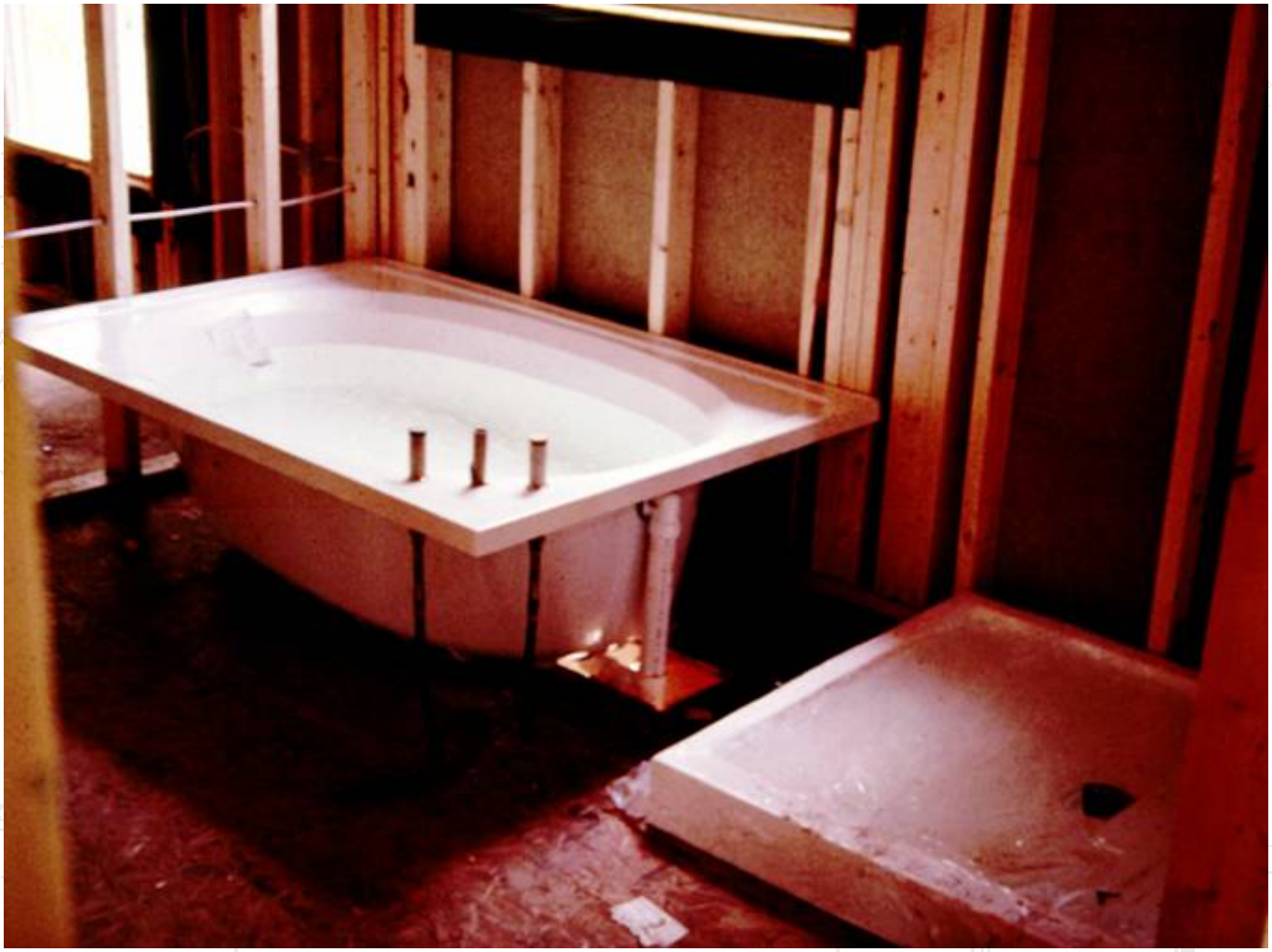
Grade 1 Insulation
Fully Supported

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

SHOWER/TUB AT EXTERIOR WALL

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

SHOWER/TUB AT EXTERIOR WALL

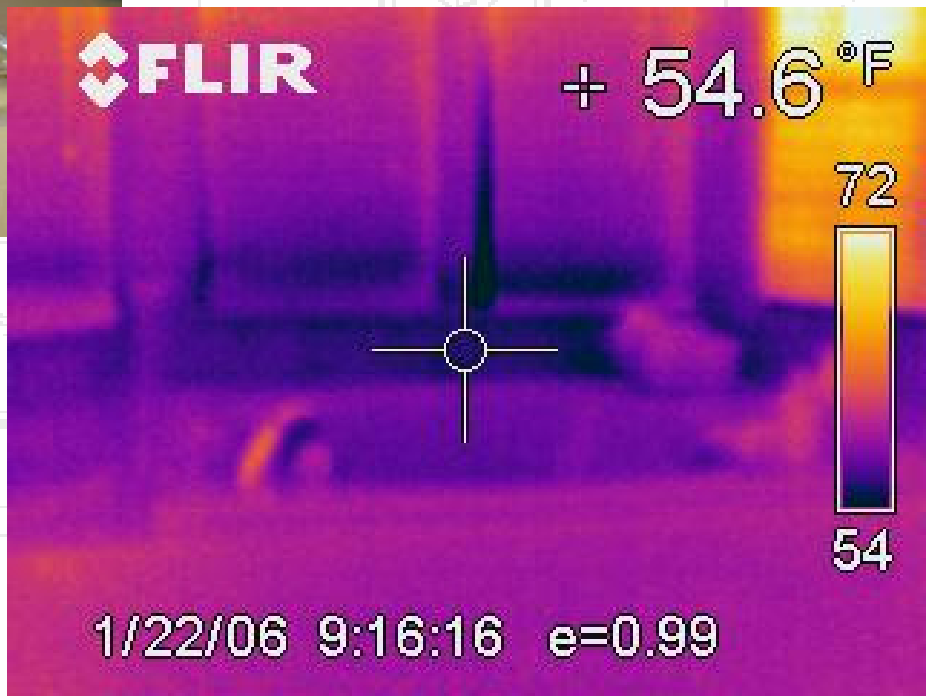


Courtesy of Building Science Corp.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

SHOWER/TUB AT EXTERIOR WALL

Bathtub on Exterior Wall w/o Air Barrier



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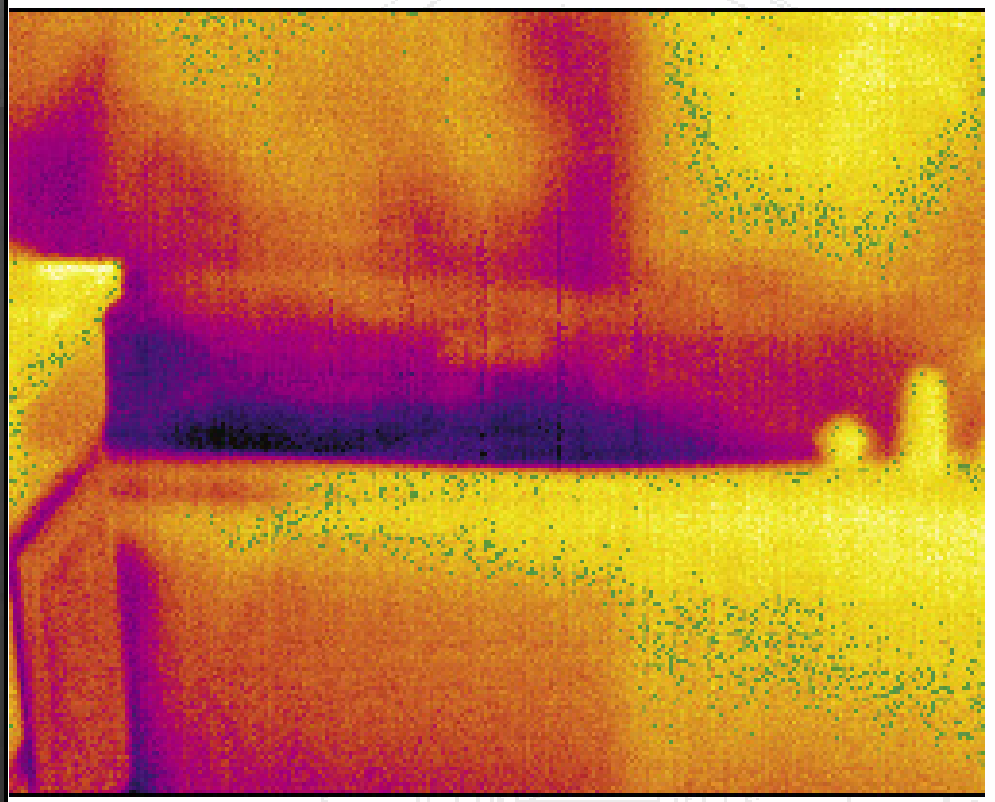
SHOWER/TUB AT EXTERIOR WALL



Courtesy of Fort Collins Utilities

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES :

SHOWER/TUB AT EXTERIOR WALL

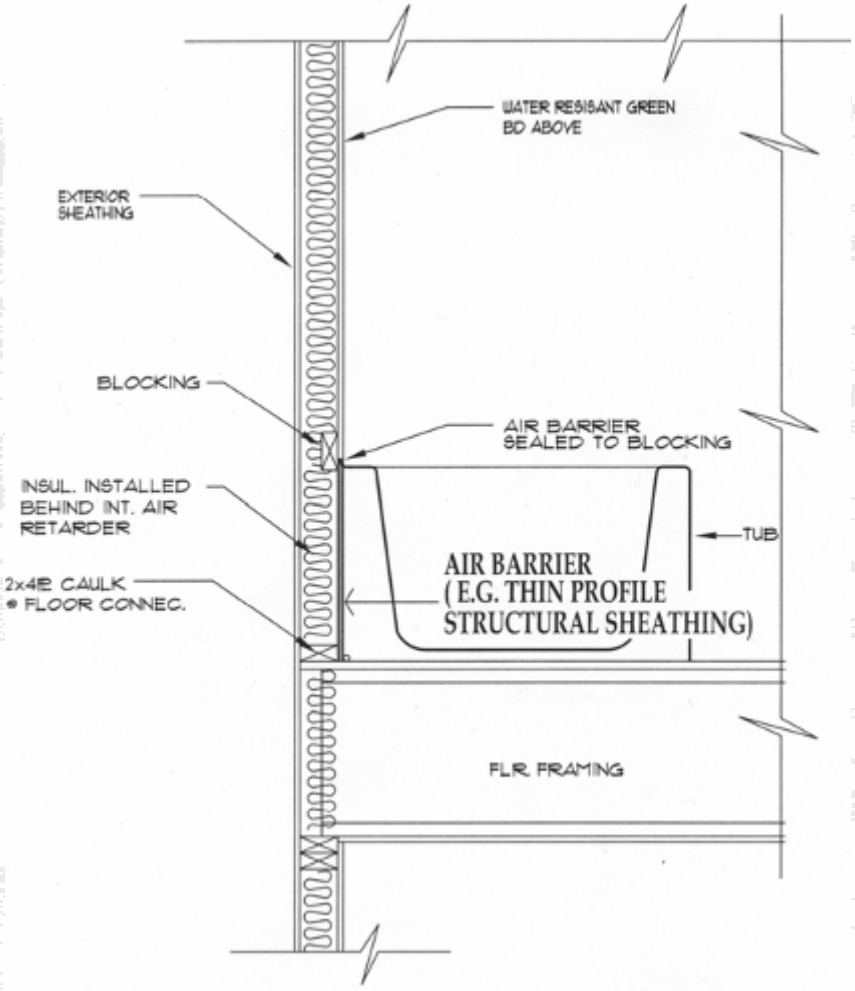


Diagram courtesy of MaGrann Associates

¼" strips added to make sheetrock line up with tub flange – ¼" slot at top of wall.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

SHOWER/TUB AT EXTERIOR WALL

Courtesy of Building Science Corp.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

SHOWER/TUB AT EXTERIOR WALL

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

SHOWER/TUB AT EXTERIOR WALL

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

FIREPLACE SHAFT WALL

Courtesy of EnergyLogic

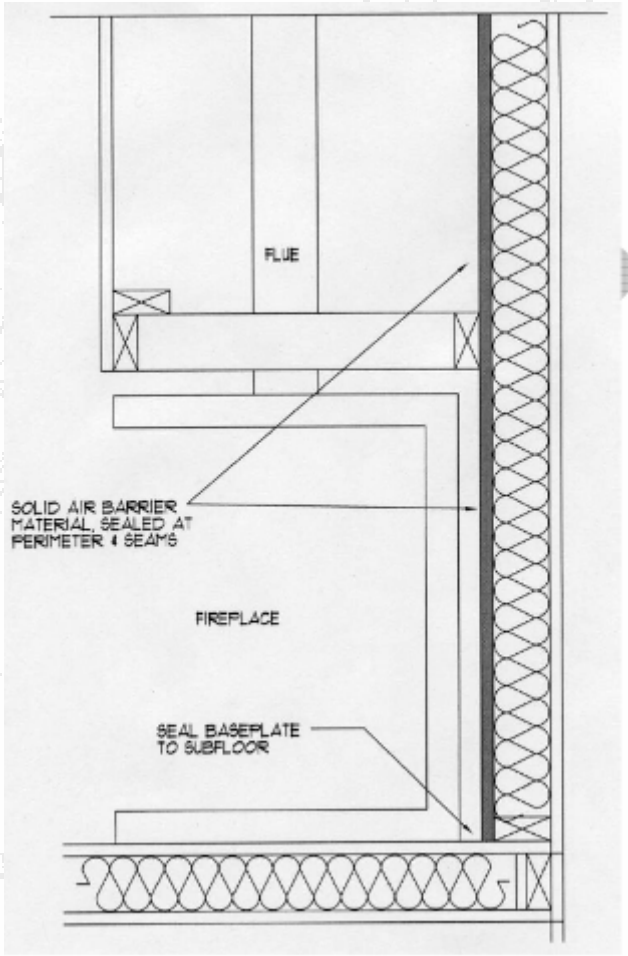
Fireplace not sealed, insulation in wrong place.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

FIREPLACE SHAFT WALL

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

FIREPLACE SHAFT WALL



Courtesy of MaGrann Associates

Courtesy of Building Science Corp.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

FIREPLACE SHAFT WALL

Image courtesy of EnergyLogic

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

FIREPLACE SHAFT WALL

Piece of thin sheathing, sheet metal, drywall, or other rigid material cut to fit, and installed with R-30 above.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

FIREPLACE SHAFT WALL

Seal the flange at framing.

Seal the flue to the flange.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
FIREPLACE SHAFT WALL

Wood burning fireplace – 3/4" furring strips open to attic above: need blocking

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
INSULATED ATTIC SLOPES/WALLS

- *Air barrier or spray foam required CZ 4 and higher*
- *2006 IECC Section 402.5 requires vapor retarder in CZ's 4C (marine), 5 and higher*
- *Recommend closed-cell spray foam in cold climates*

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

ATTIC KNEE WALLS

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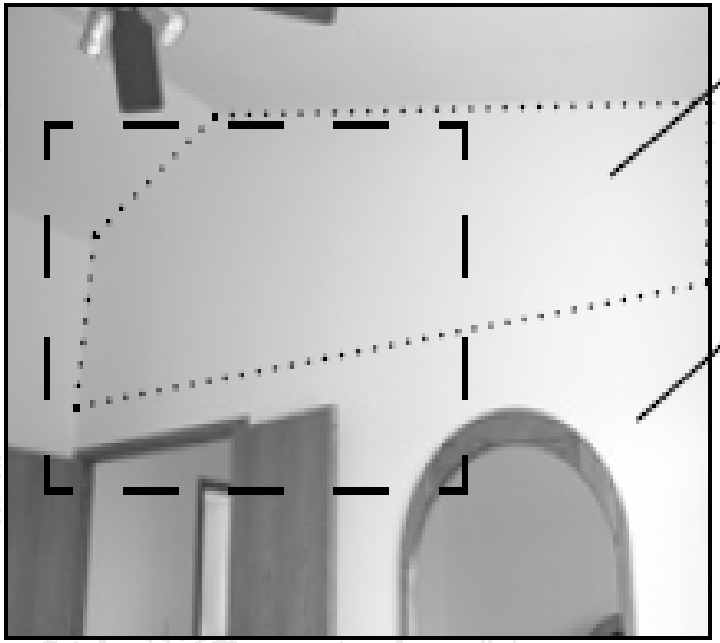
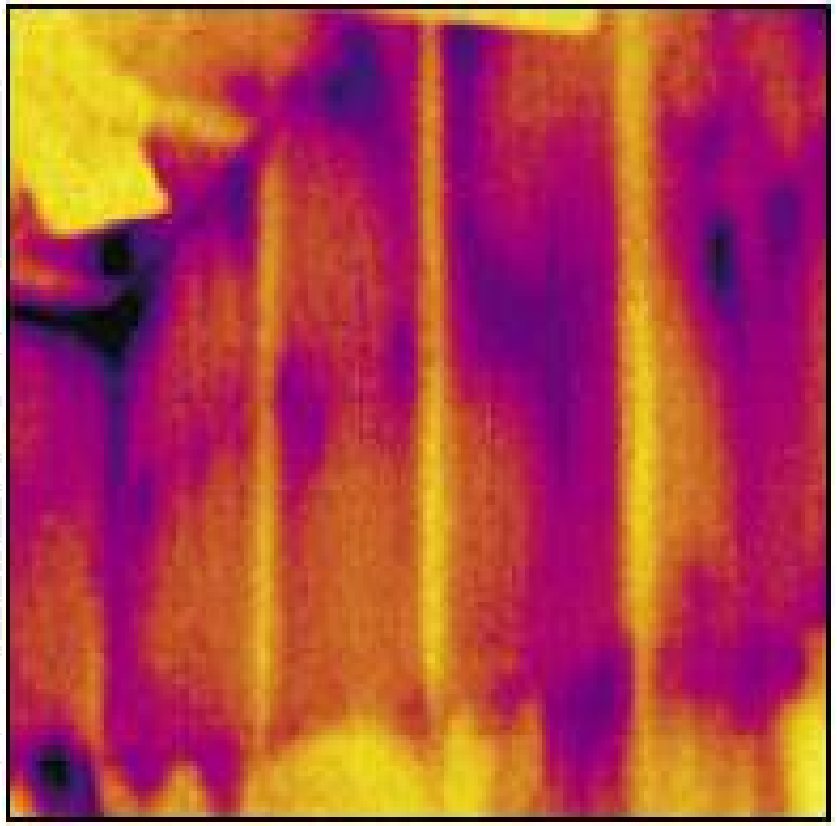
ATTIC KNEE WALLS





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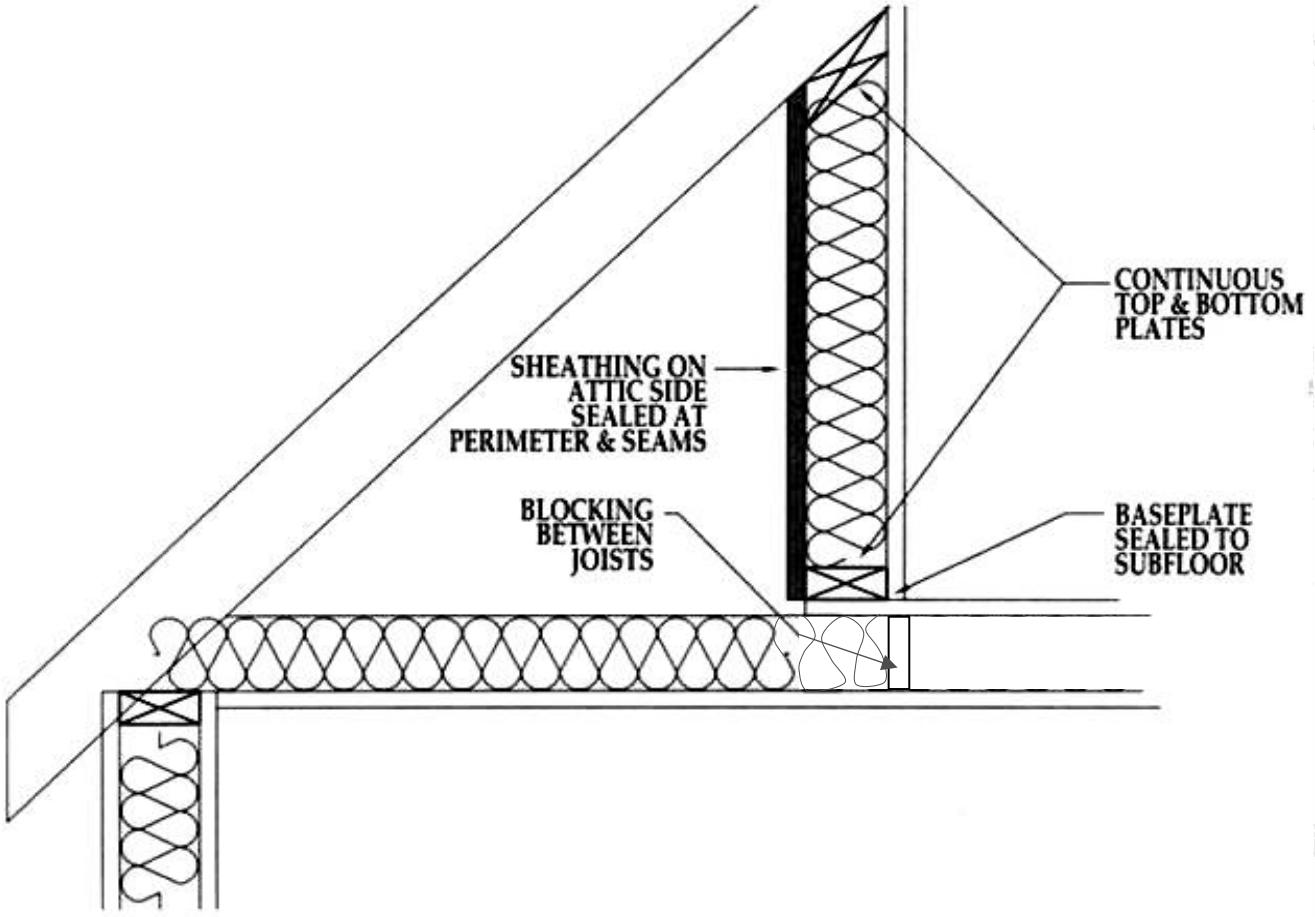


2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES :

ATTIC KNEE WALLS

Hot Wall

Courtesy of Building Science Corp.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES :

ATTIC KNEE WALLS

Courtesy of Advanced Energy Corp.

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

ATTIC KNEE WALLS

Images courtesy of Energy Services Group

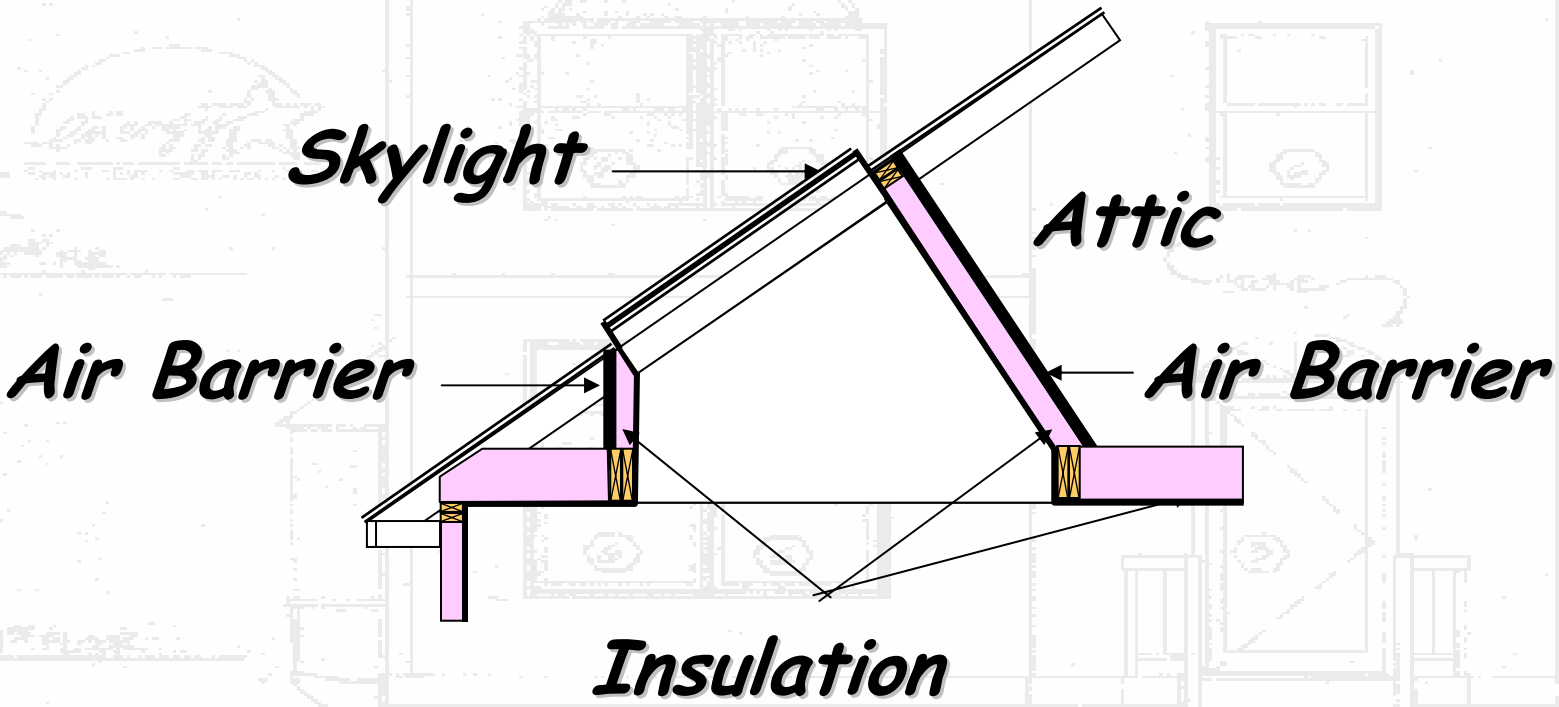
2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

ATTIC KNEE WALLS

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
ATTIC KNEE WALLS

Attic knee wall doors to unconditioned spaces shall meet IECC insulation requirements for exterior doors and include full weather-stripping.

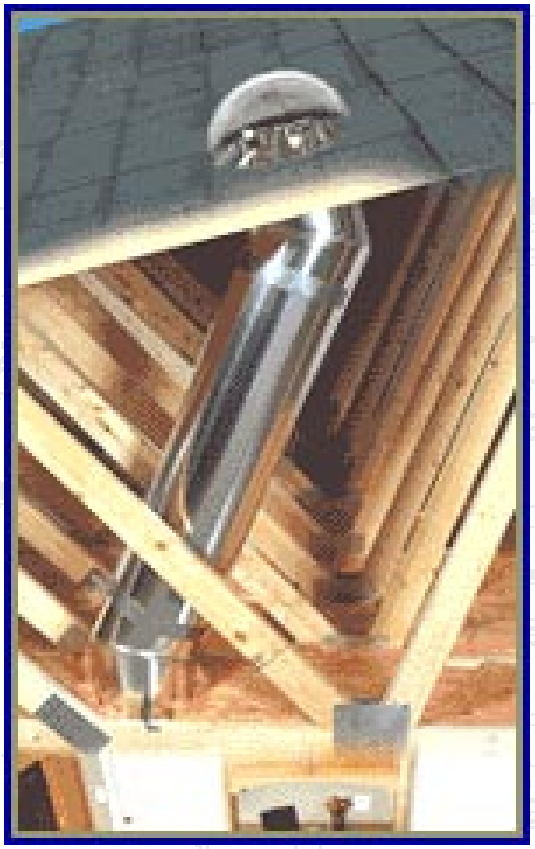
2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
SKYLIGHT SHAFT

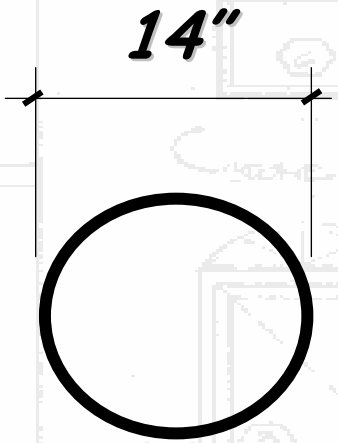


2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

SKYLIGHT SHAFT

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
TUBULAR SKYLIGHT





Exposed area = ~30 sq.ft.
Need insulation and air barrier

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

PORCH ROOF

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

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PORCH ROOF

Courtesy of Energy Services Group

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

PORCH ROOF

Courtesy of Energy Services Group

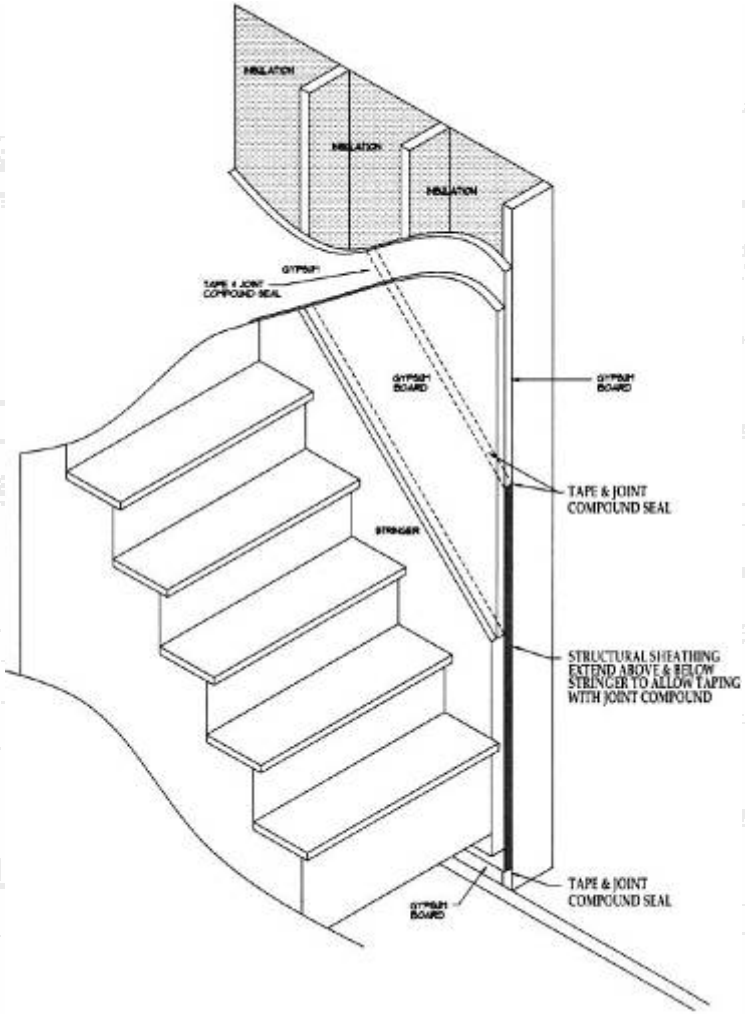
Courtesy of Environments for Living

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

PORCH ROOF

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

STAIRCASE FRAMING



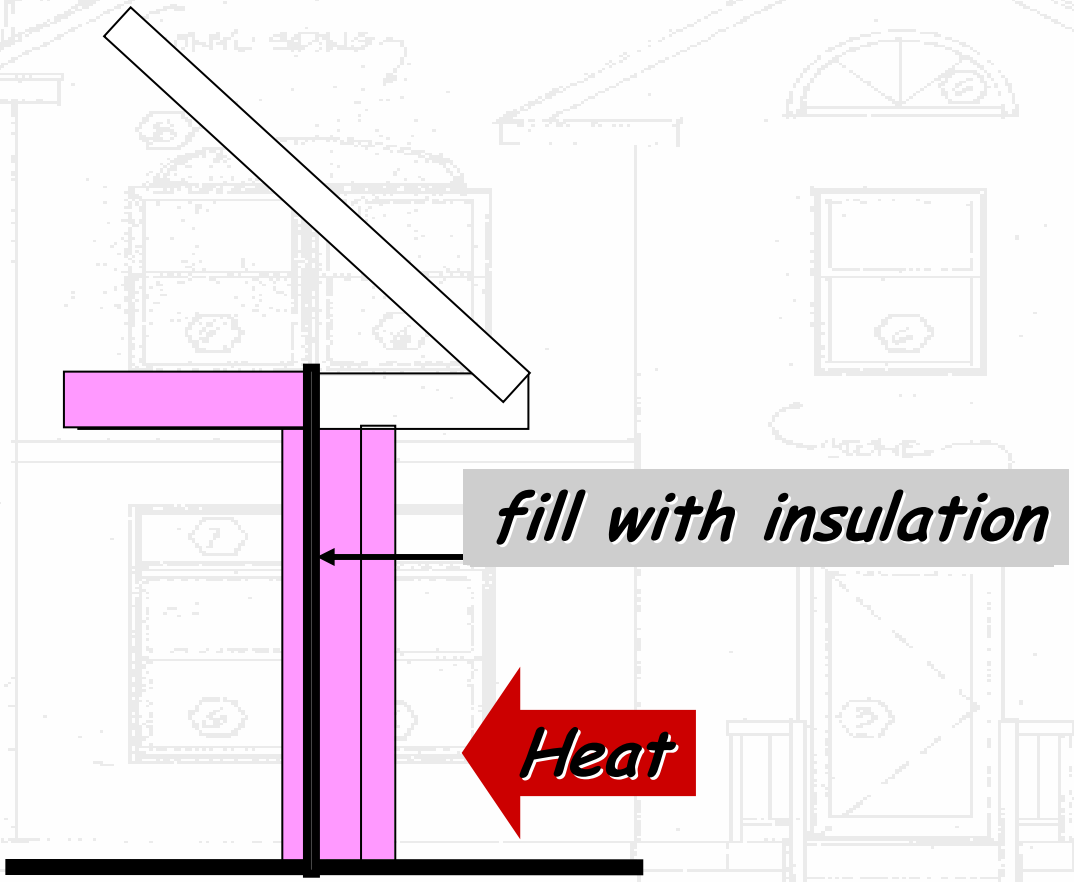
Courtesy of MaGrann Associates

Image courtesy of Energy Services Group

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
STAIRCASE FRAMING

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

DOUBLE WALLS



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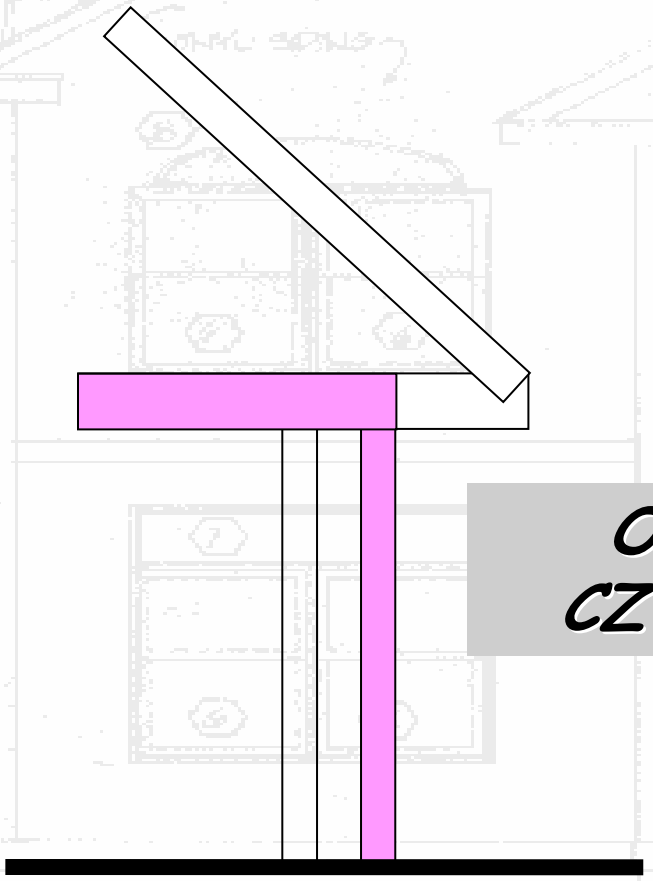
DOUBLE WALLS



Option for CZ's 1 thru 3

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

DOUBLE WALLS

Courtesy of Consol

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:

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Courtesy of Consol

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DOUBLE WALLS

Courtesy of Consol

2. WALLS ADJOINING EXT. WALLS/UNCONDITIONED SPACES:
TIPS AND BEST PRACTICES

ENERGY STAR

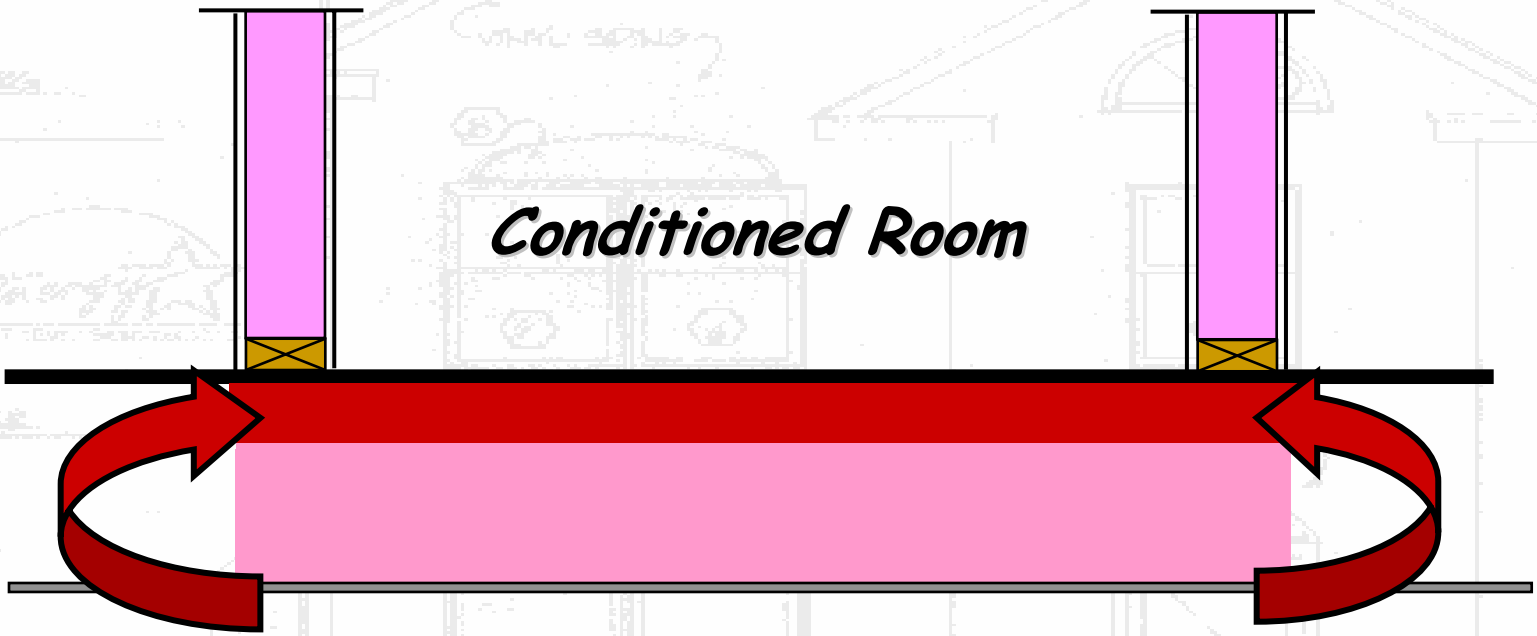
Acceptable Materials Vary
Check with Local Code Official:

- *Thin Sheathing*
- *OSB/Plywood*
- *Gypsum Board*
- *Rigid Insulation*
- *FSK Radiant Barrier Facing*

3.

FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES

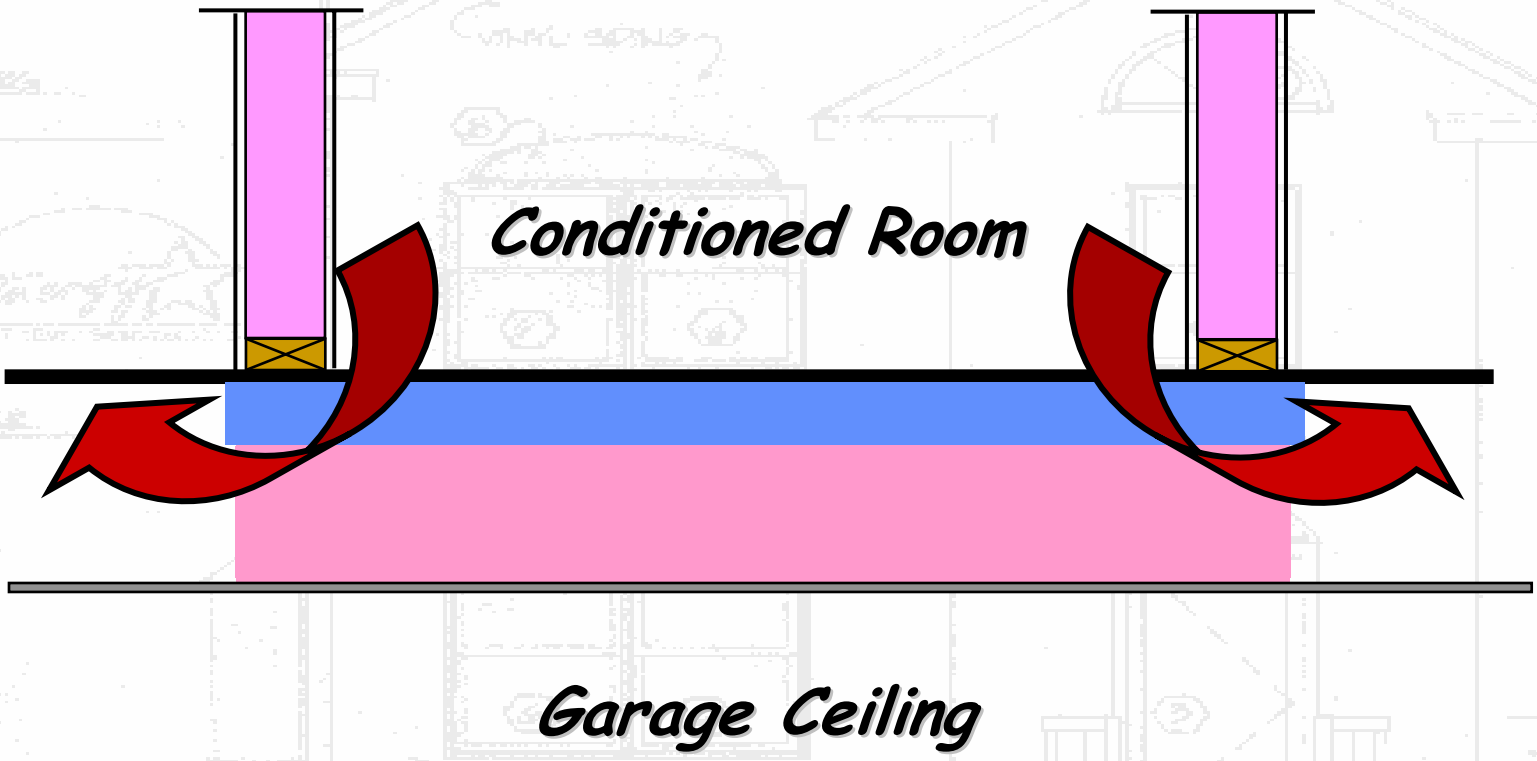
3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
INSULATED FLOOR OVER GARAGE



Summer

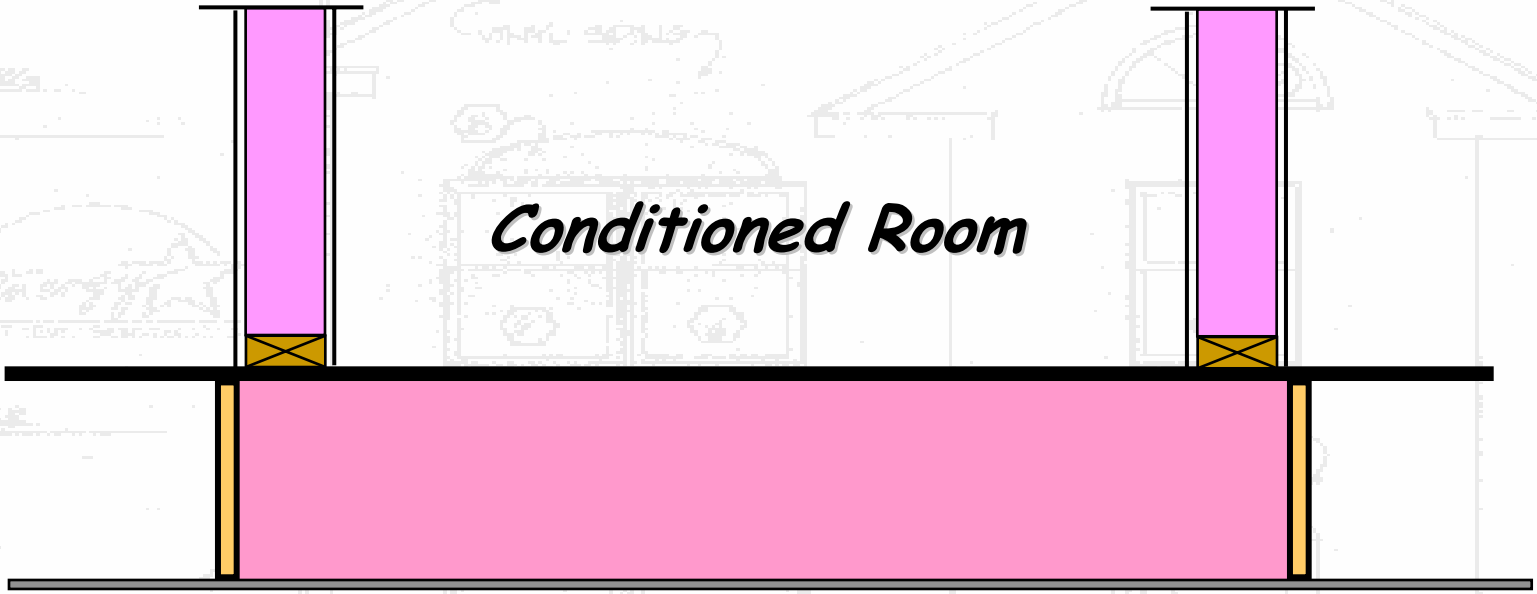
3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

INSULATED FLOOR OVER GARAGE



3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

INSULATED FLOOR OVER GARAGE

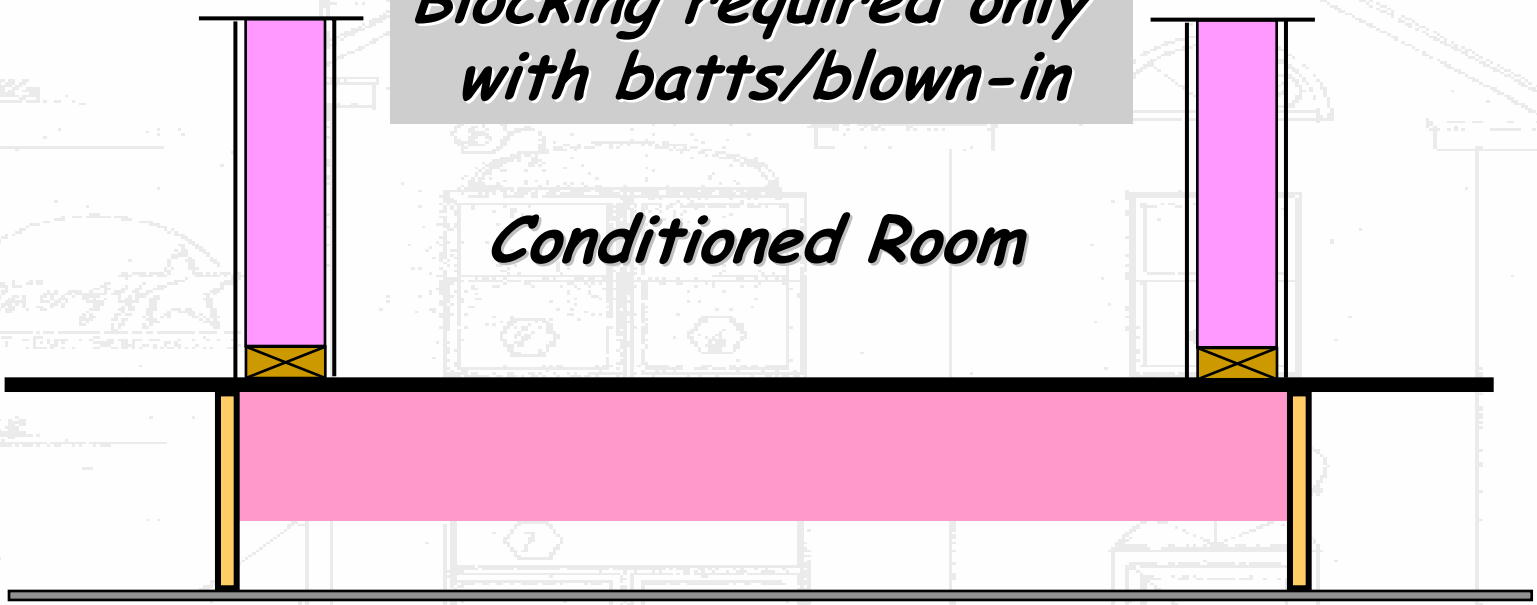


Option 1: Fill framing space with insulation and add blocking

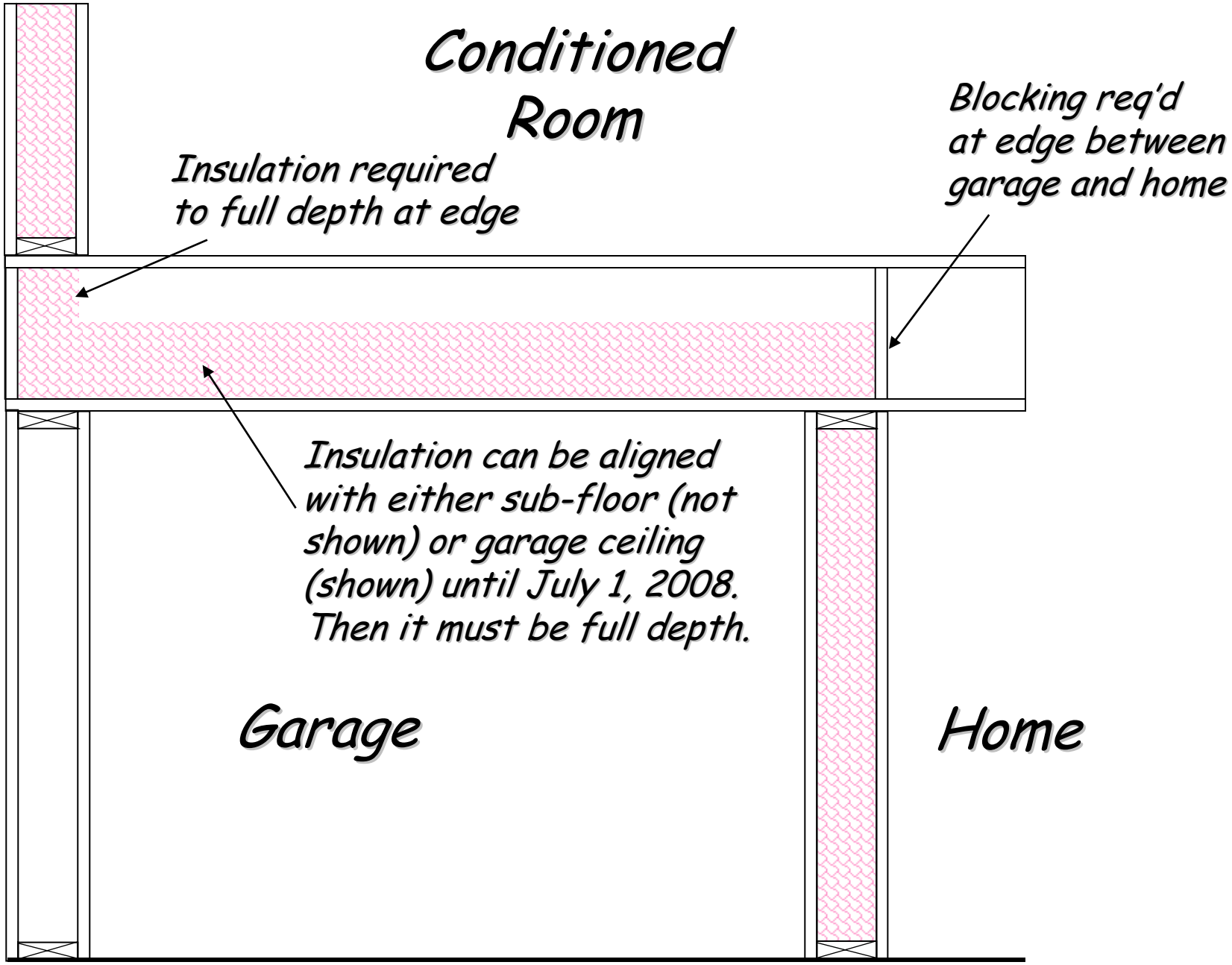
3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
INSULATED FLOOR OVER GARAGE

ENERGY STAR

Blocking required only with batts/blown-in



Option 2: Spray foam, or batts or blown-in insulation aligned with top or bottom acceptable until 7/1/08


Conditioned Room
Insulation required to full depth at edge
Blocking req'd at edge between garage and home
Insulation can be aligned with either sub-floor (not shown) or garage ceiling (shown) until July 1, 2008. Then it must be full depth.
Garage
Home

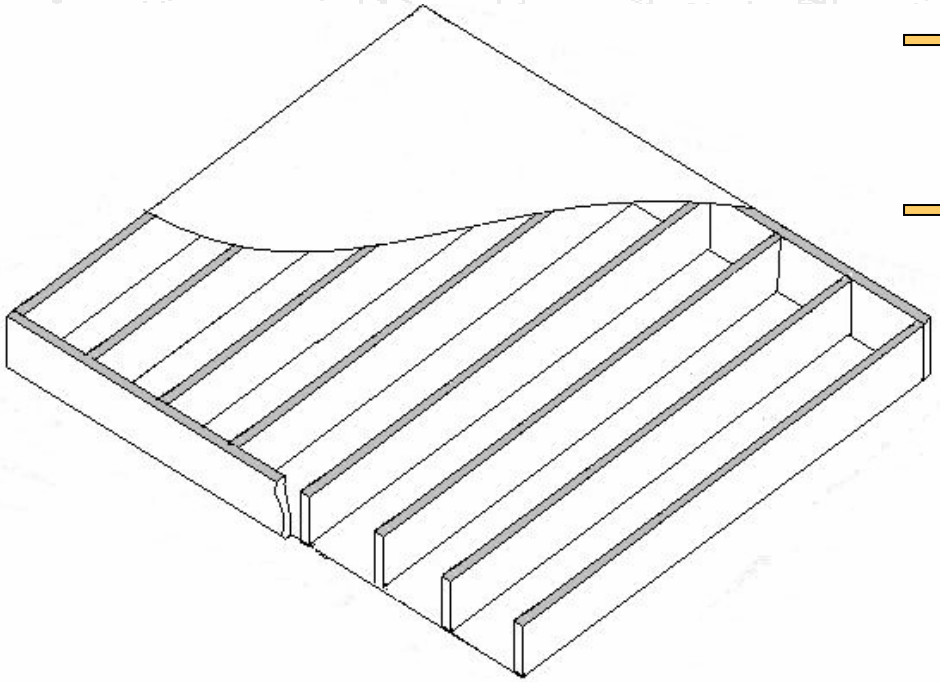
3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
INSULATED FLOOR OVER GARAGE

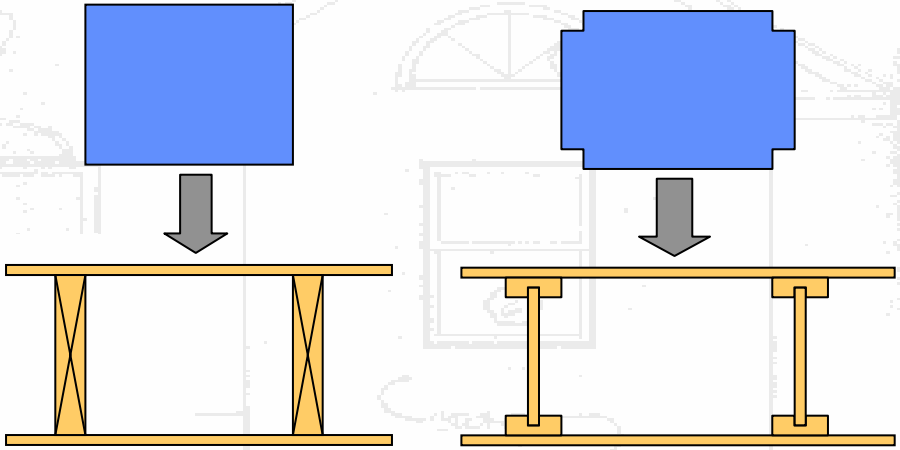
Improper insulation! It must touch the surface it is intended to insulate

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
INSULATED FLOOR OVER GARAGE

ENERGY STAR

Blocking at open ends of each joist bay





Dimensional Lumber

Engineered Lumber

Additional cutting of blocking required for engineered vs dimensional lumber.

Diagram courtesy of McGrann Associates, Inc.

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

INSULATED FLOOR OVER GARAGE

When rooms above don't line up with ends of open web truss; spray foam is probably the only solution… blocking is too expensive.

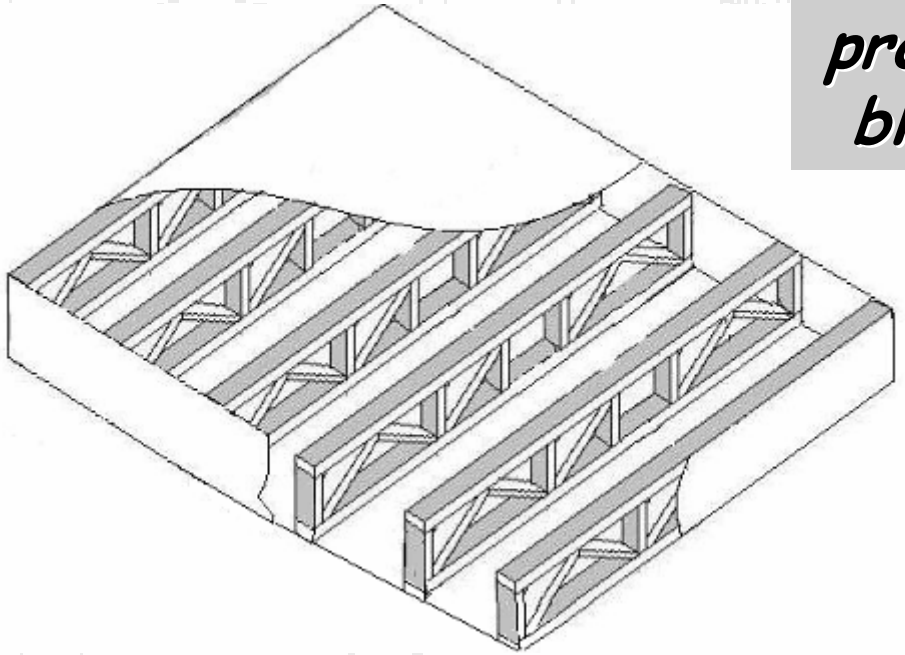


Diagram courtesy of McGrann Associates, Inc.

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
INSULATED FLOOR OVER GARAGE

Air dams at both ends of open joists under room

Air dams under exterior wall of room

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

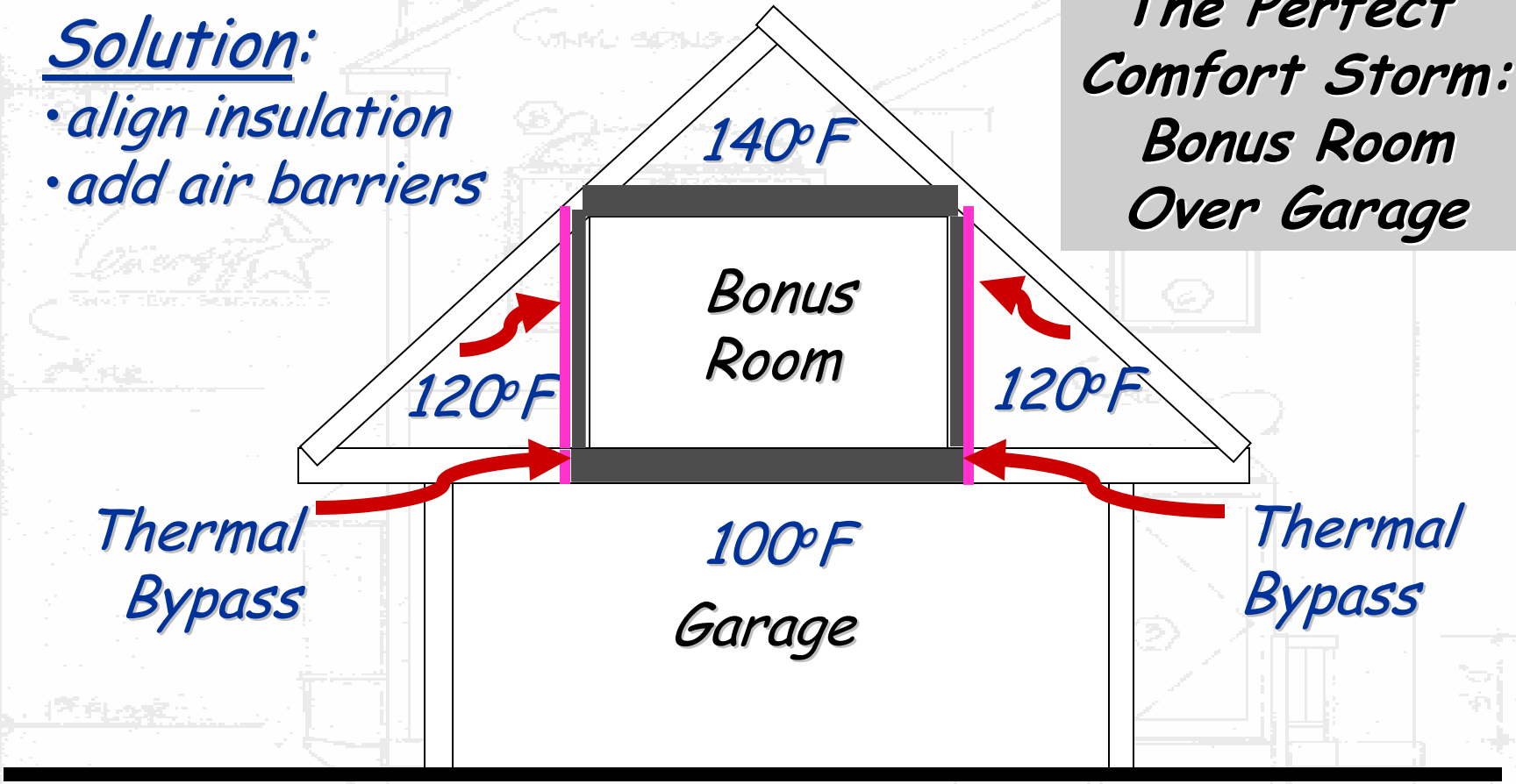
INSULATED FLOOR OVER GARAGE


Insulation gap with subfloor

3. INSULATED FLOOR OVER GARAGE
4. WALLS ADJOINING UNCOND. SPACES

Solution:
- align insulation
- add air barriers

The Perfect Comfort Storm: Bonus Room Over Garage



3. INSULATED FLOOR OVER GARAGE
4. WALLS ADJOINING UNCOND. SPACES

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
CANTILEVERED FLOOR

ENERGY STAR

How Many?

Three bay windows and a rear overhang.

Two bay windows, a fireplace and rear overhang.

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

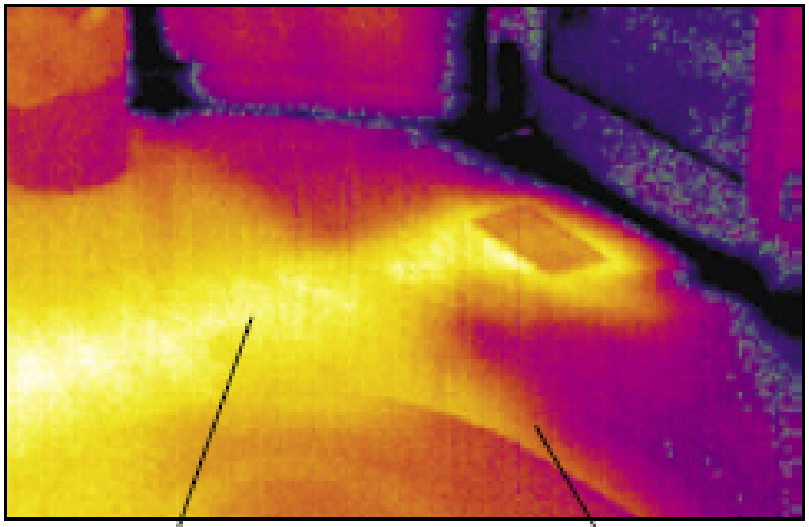
CANTILEVERED FLOOR

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

CANTILEVERED FLOOR

Exterior soffit appeared to be tightly fit

As the infrared photo (right) shows, this dining room cantilever was cold due to ineffective insulation and air leakage. (Infrared photo taken with blower door operating.)



Residual warmth from heat run

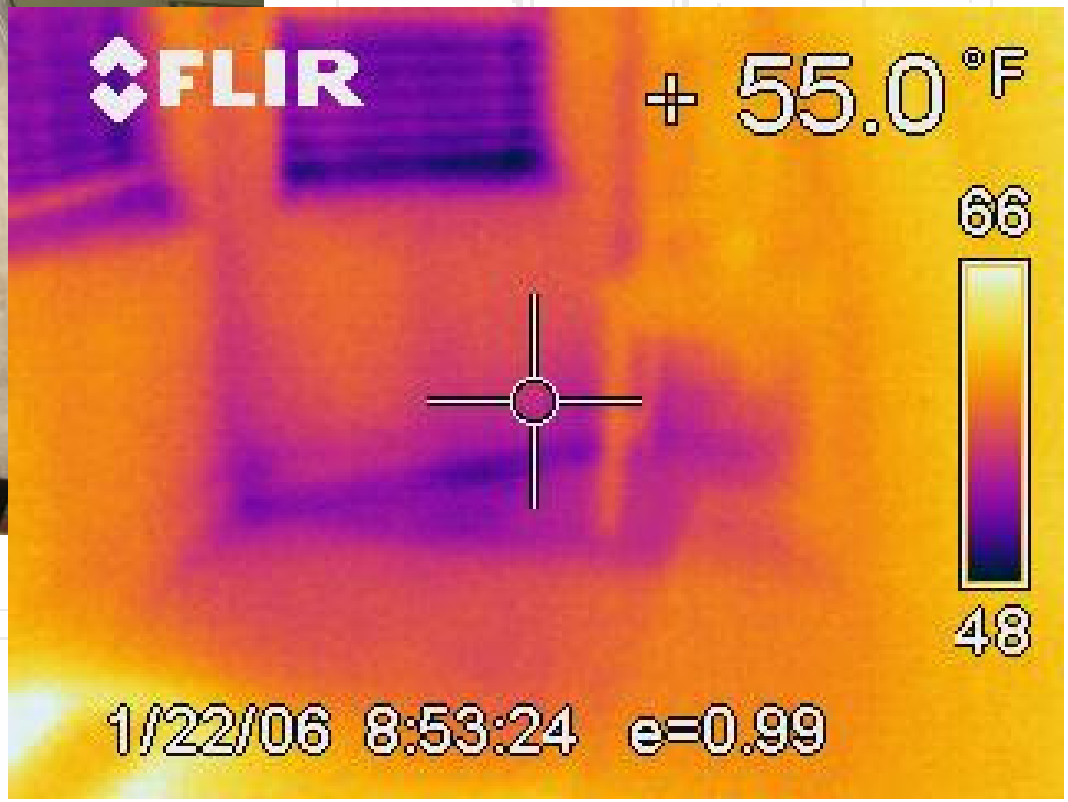
Cantilever boundary clearly visible

Courtesy of Fort Collins Utilities

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

CANTILEVERED FLOOR

ENERGY STAR



3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

CANTILEVERED FLOOR

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CANTILEVERED FLOOR

ENERGY STAR

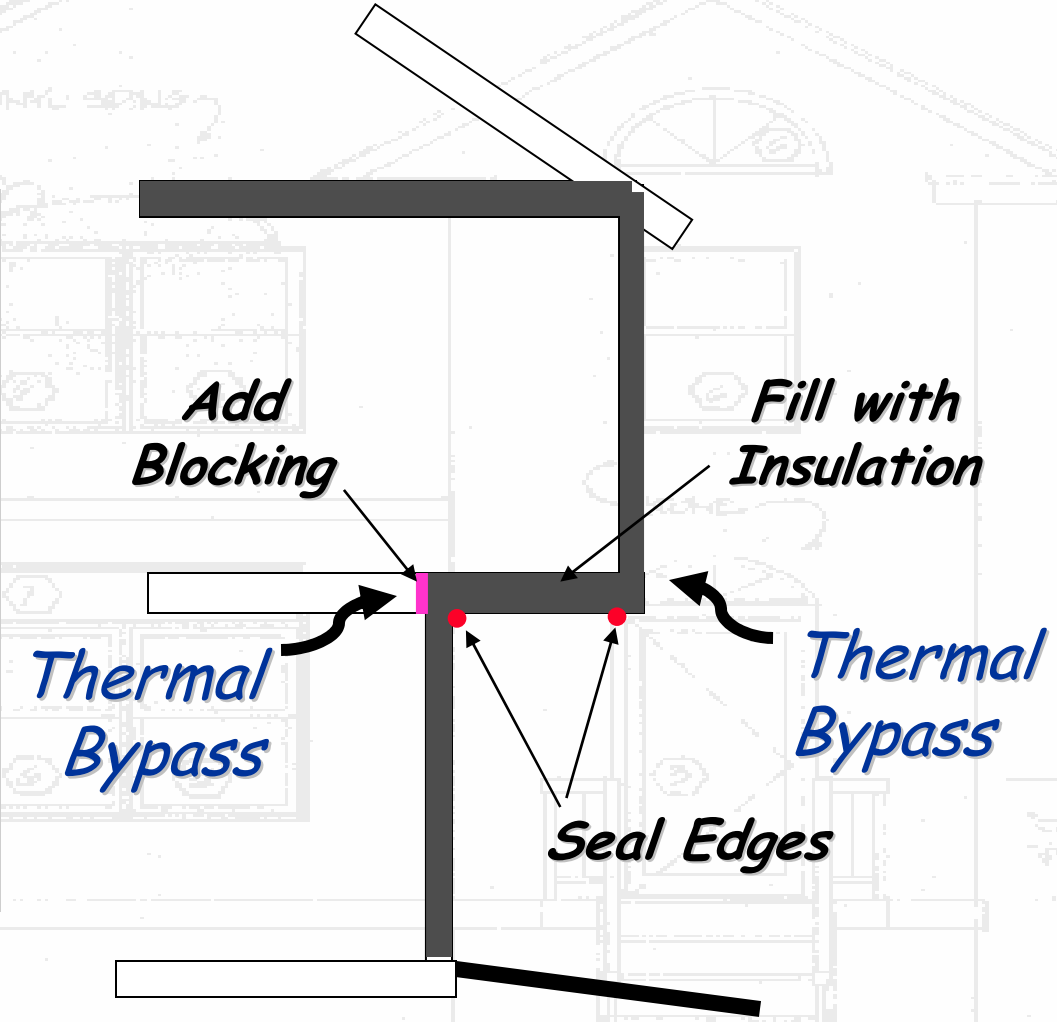
3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

CANTILEVERED FLOOR

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
CANTILEVERED FLOOR

ENERGY STAR

Tip:
Consider spray foam insulation installed to desired thickness because it can serve as both insulation and an air barrier.



3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
CANTILEVERED FLOOR

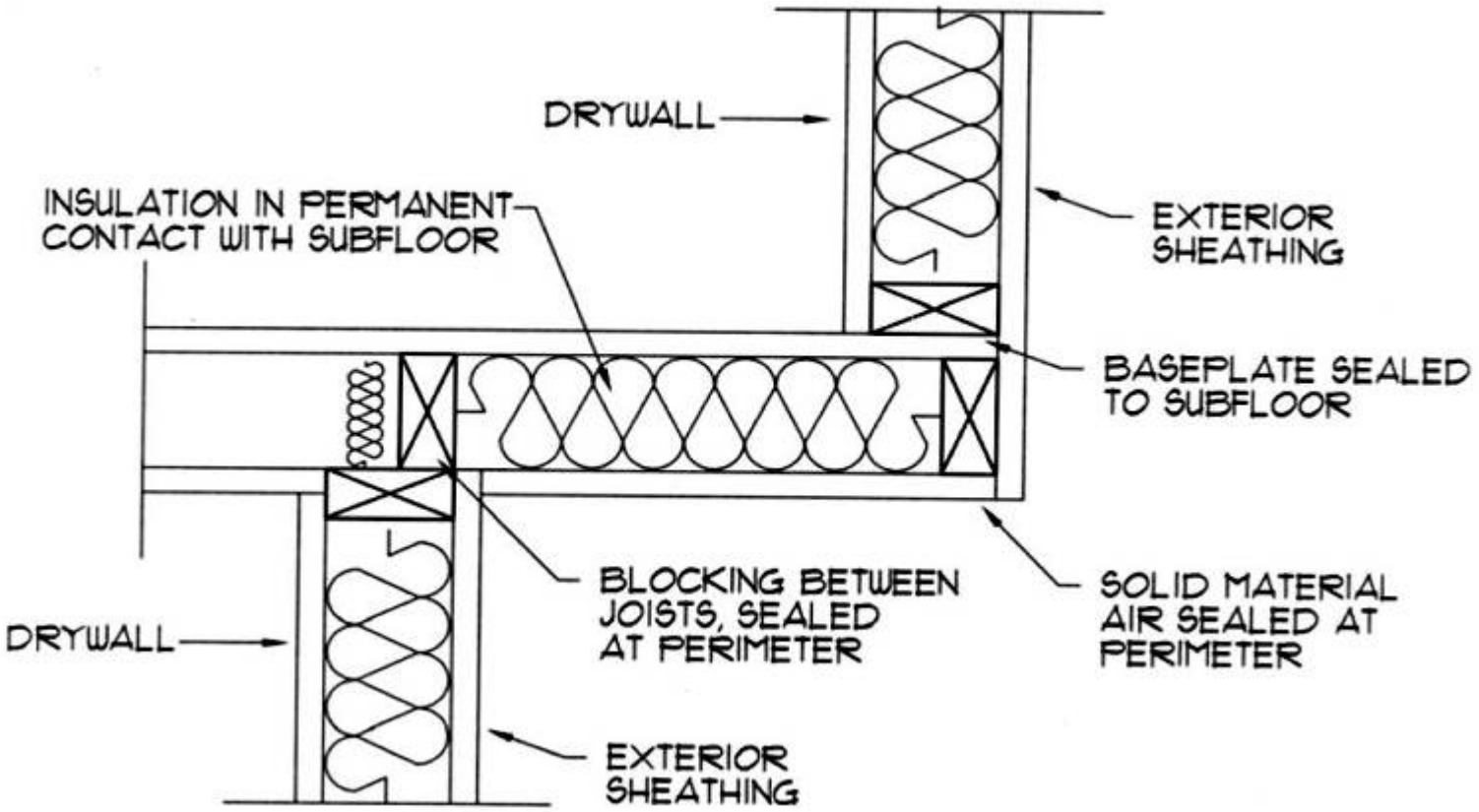


Diagram courtesy of MaGrann Associates

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

CANTILEVERED FLOOR

Courtesy of Fort Collins Utilities

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:

CANTILEVERED FLOOR

Images courtesy of MaGrann Associates

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
CANTILEVERED FLOOR

ENERGY STAR

EMERCOR

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Floors

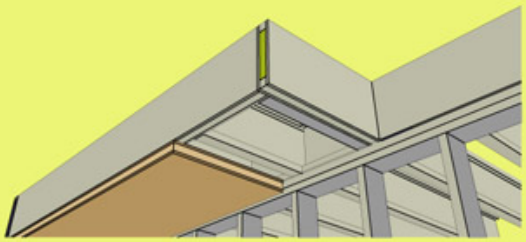
- Insulated Rimboard
- **Cantilever Soffit Insulated Panels**

Exterior Walls

Foundation & Basement Walls

Cathedral Ceilings & Attics

Bonus Rooms



Cantilever Soffit Insulated Panels

Warm Floors with EMERCOR

Properly sealing this area of the floor system is often overlooked and can become an easy path for air leakage into your home. By applying the Cantilever insulated panels where a heated living space occurs above an unheated space, your home's floor will remain warm all year round.

Advantages

Energy Efficient - R=14:
Up to 14 per cent of total home air leakage occurs around the rim joist. EMERCOR's Insulated Rimboard decreases air leakage by ensuring that continuous R-14 insulation is placed around the floor perimeter.

Specifications

Thickness:	2½", 4½", 6½"
Widths:	12", 18", 24"
Length:	8' Panels
Thermal Resistance:	R14, R28, R44
Vapor Resistance:	Effective Type 1 vapor barrier
Exterior Finish:	OSB

3. FLOORS BETWEEN CONDITIONED AND EXTERIOR SPACES:
TIPS AND BEST PRACTICES

- ***Completely filling floor cavity:***
  Ensure weight not excessive and confirm netting installed with blown-in insulation supports extra weight.
- ***Spray foam:***
  Best option to avoid completely filling thick framing space and installing edge blocking.
- ***Open web trusses or truss joists:***
  Consider supporting framing on wall and bolting on boxed out cantilever section for short overhangs.

4.
SHAFTS

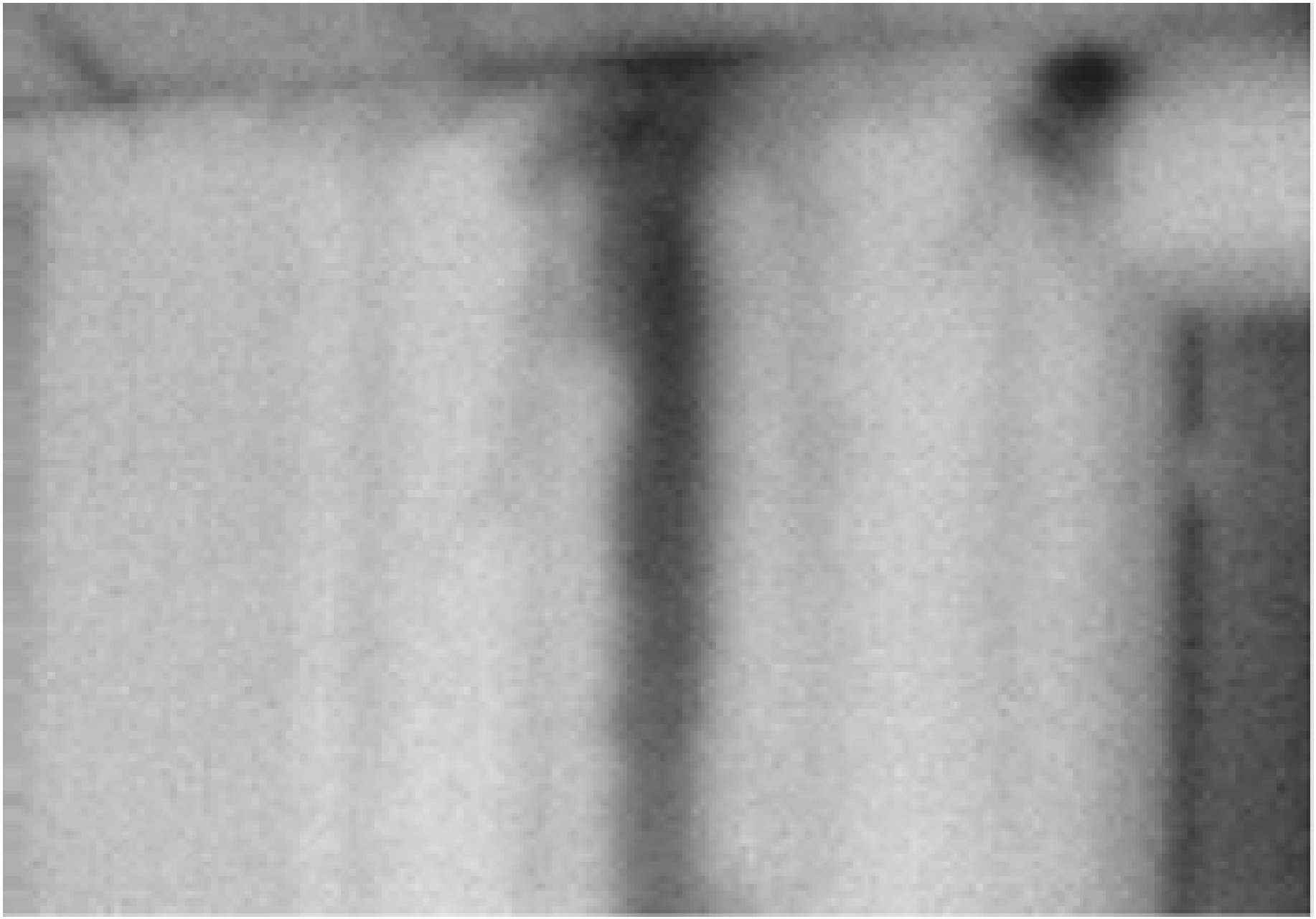
4. SHAFTS:
DUCT SHAFT

Courtesy of Advanced Energy Corporation

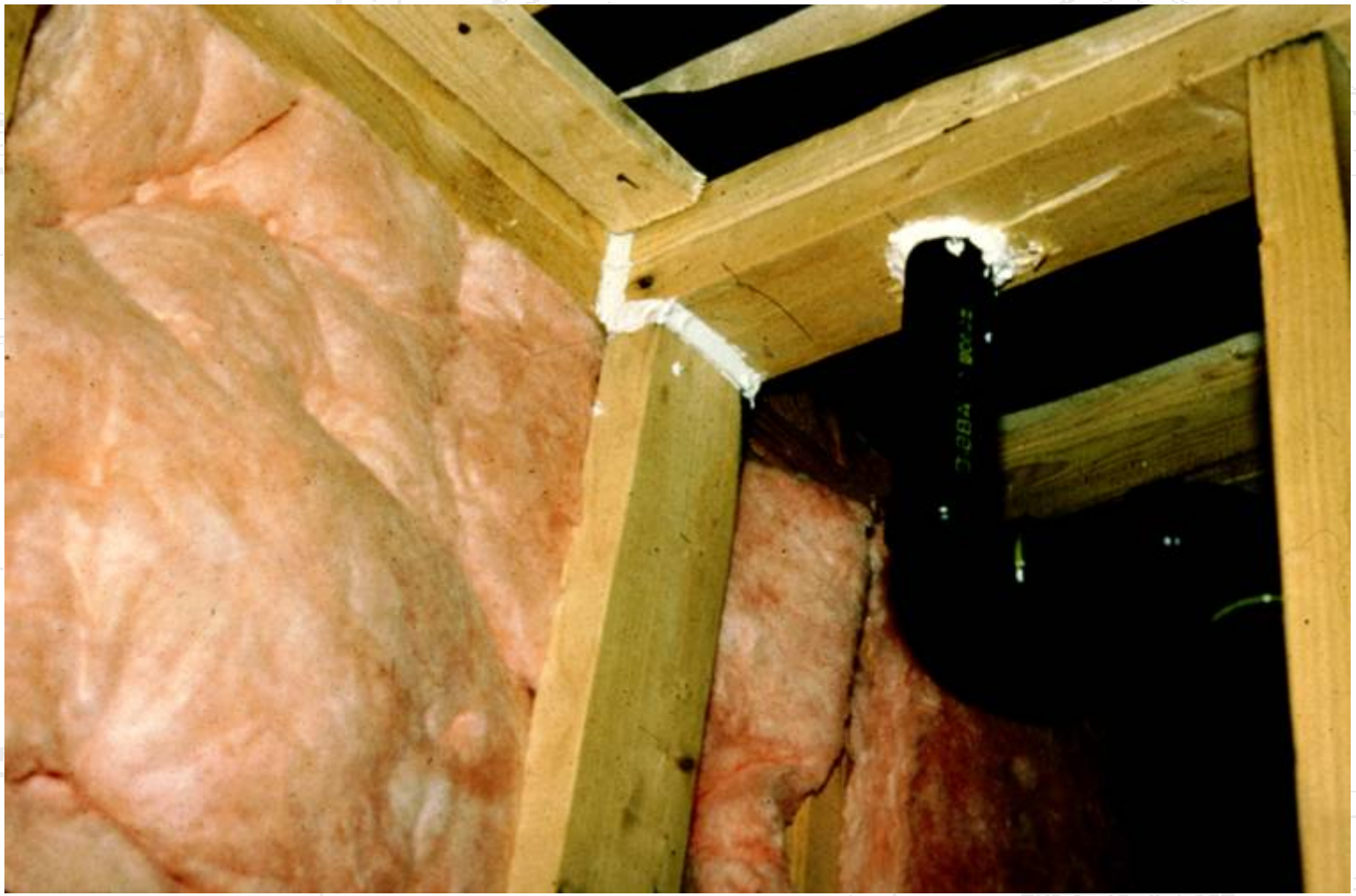
Airtight foam on pervious rock wool will not work.

4. SHAFTS:

PIPING SHAFT/PENETRATIONS



4. SHAFTS:
PIPING SHAFT/PENETRATIONS



Courtesy of Building Science Corp.

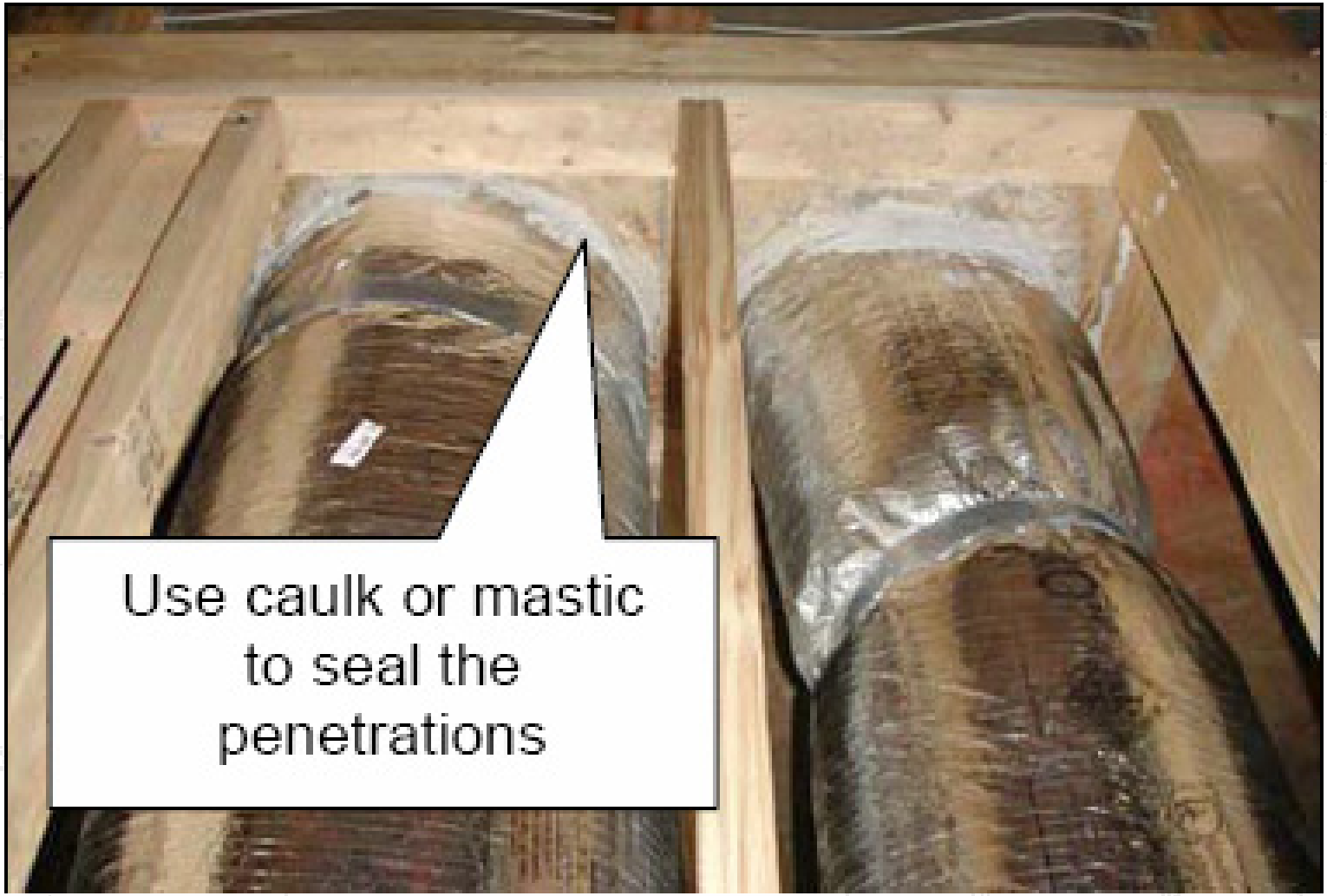
4. SHAFTS:
FLUE SHAFT

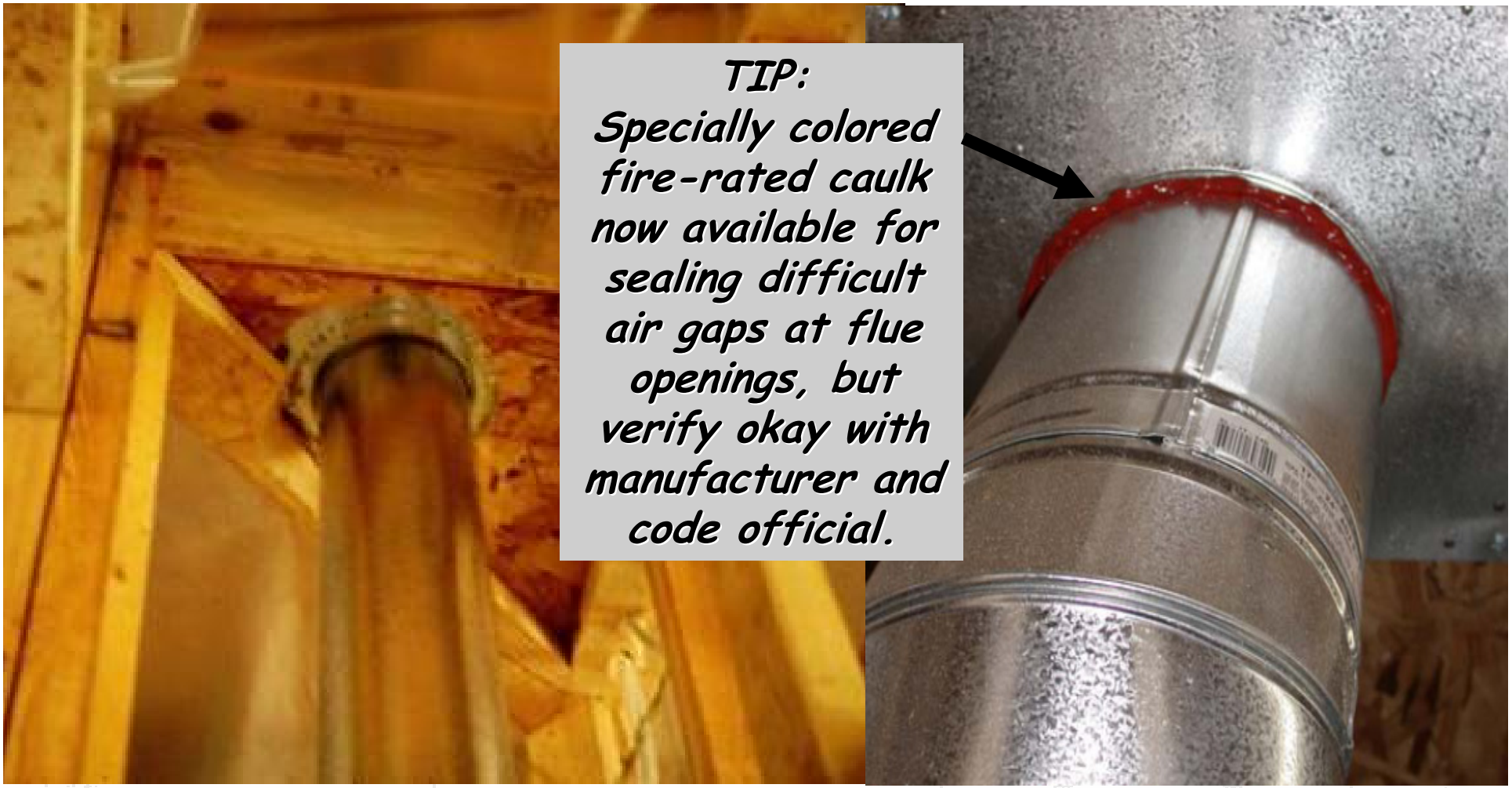
Courtesy of Building Science Corp.

Batt insulation does not stop air flow

Image courtesy of EnergyLogic

4. SHAFTS:
FLUE SHAFT





TIP:
Specially colored fire-rated caulk now available for sealing difficult air gaps at flue openings, but verify okay with manufacturer and code official.

4. SHAFTS:
FLUE SHAFT

4. SHAFTS:
DUCT/PIPING/FLUE COMB. SHAFT

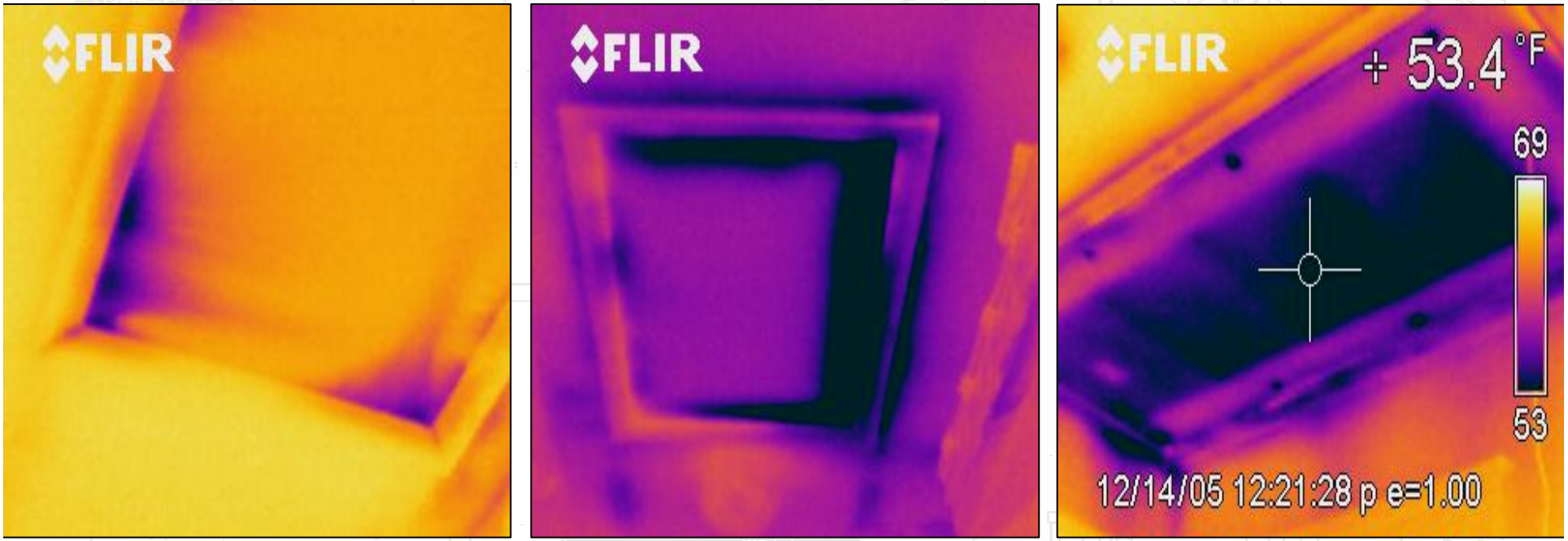
Courtesy of Energy Services Group

5.

ATTIC/CEILING INTERFACE

5. ATTIC/CEILING INTERFACE:

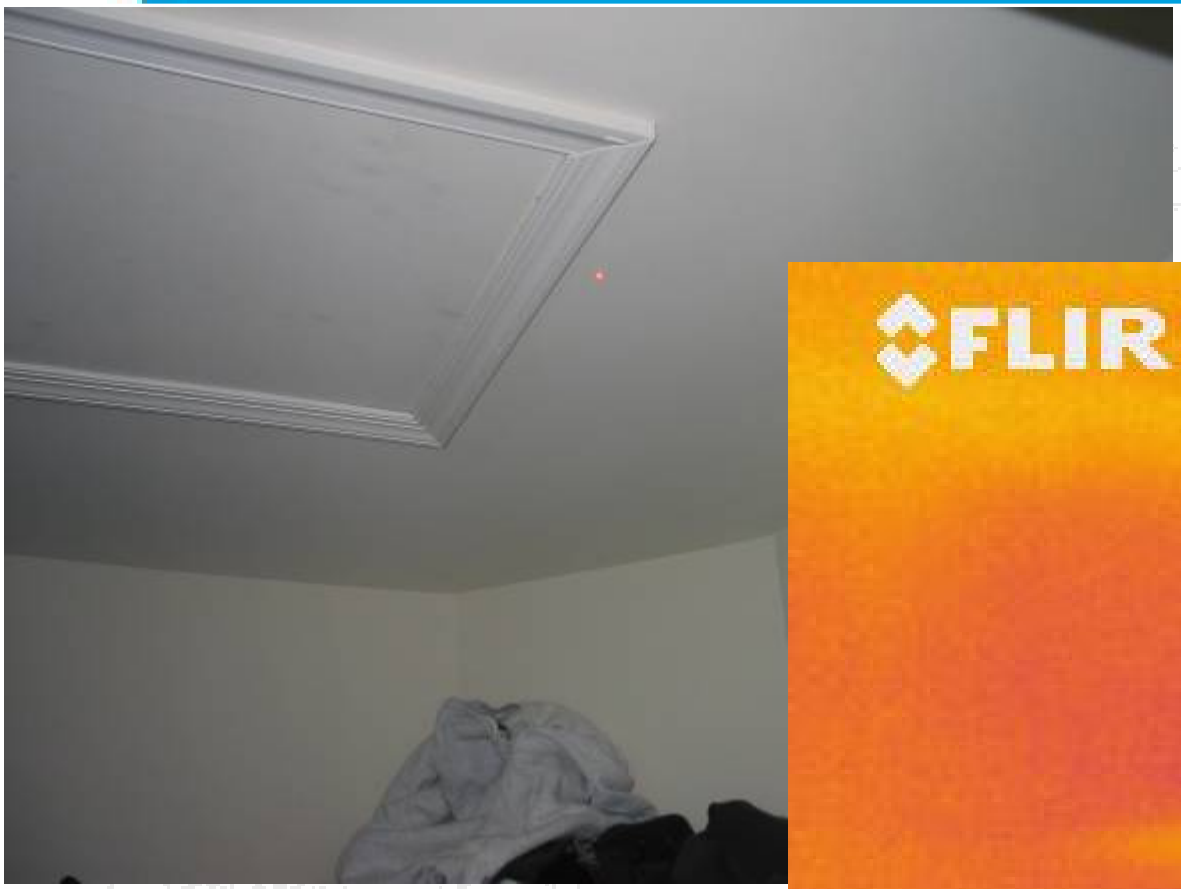
ATTIC ACCESS PANEL/STAIRS



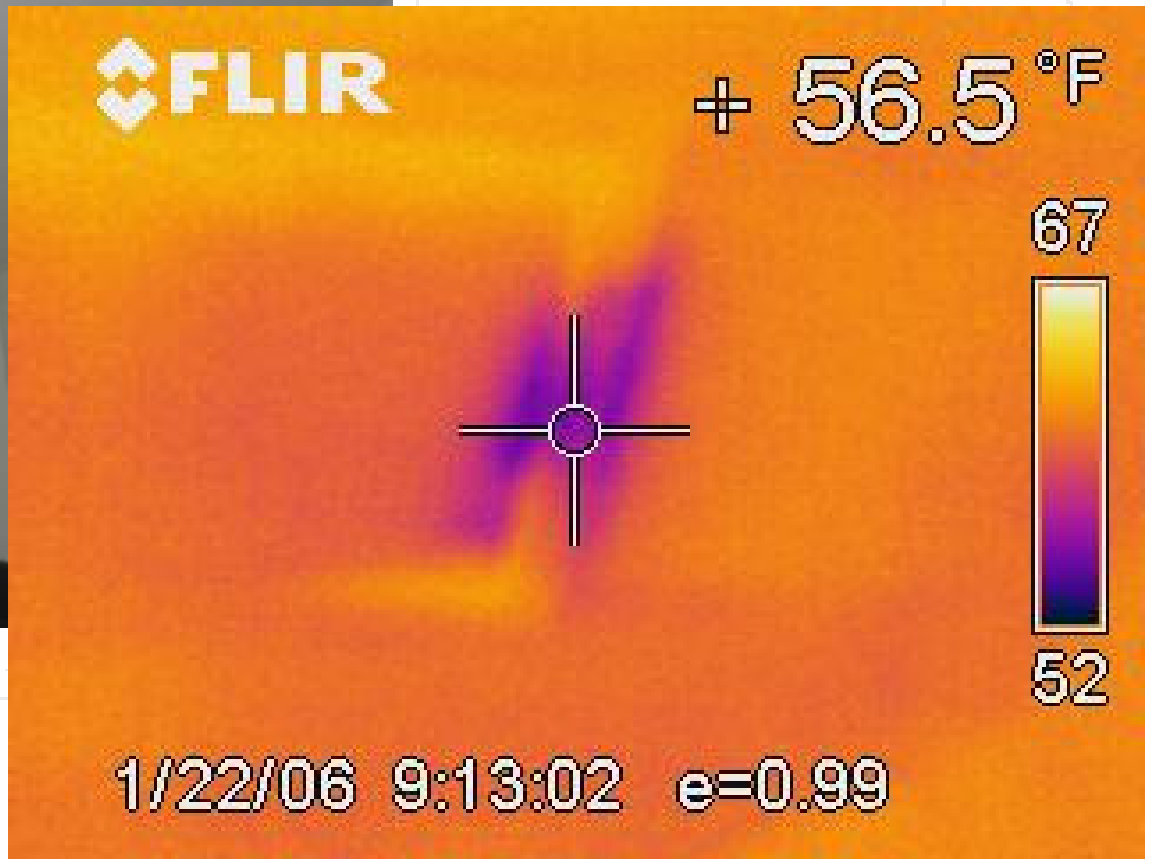
Images courtesy of Energy Services Group

5. ATTIC/CEILING INTERFACE:

ATTIC ACCESS PANEL



damaged weather stripping



Wrong

5. ATTIC/CEILING INTERFACE:

ATTIC ACCESS PANEL

Snug-fit insulation plus self-stick gasket material.

Right

Wrong

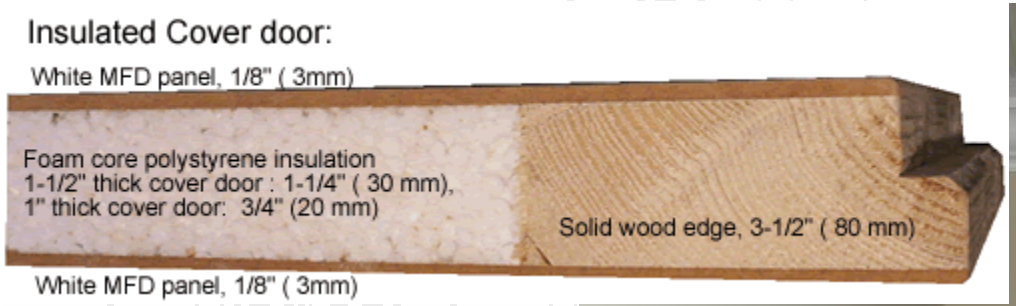
5. ATTIC/CEILING INTERFACE:

ATTIC ACCESS STAIRS

Okay

5. ATTIC/CEILING INTERFACE:

ATTIC ACCESS STAIRS



Factory-installed R-6 ¾" thick, rigid, aluminum foil faced poly-iso insulation panel

Best

5. ATTIC/CEILING INTERFACE:

DROPPED CEILINGS

Courtesy of Maryland Energy Administration

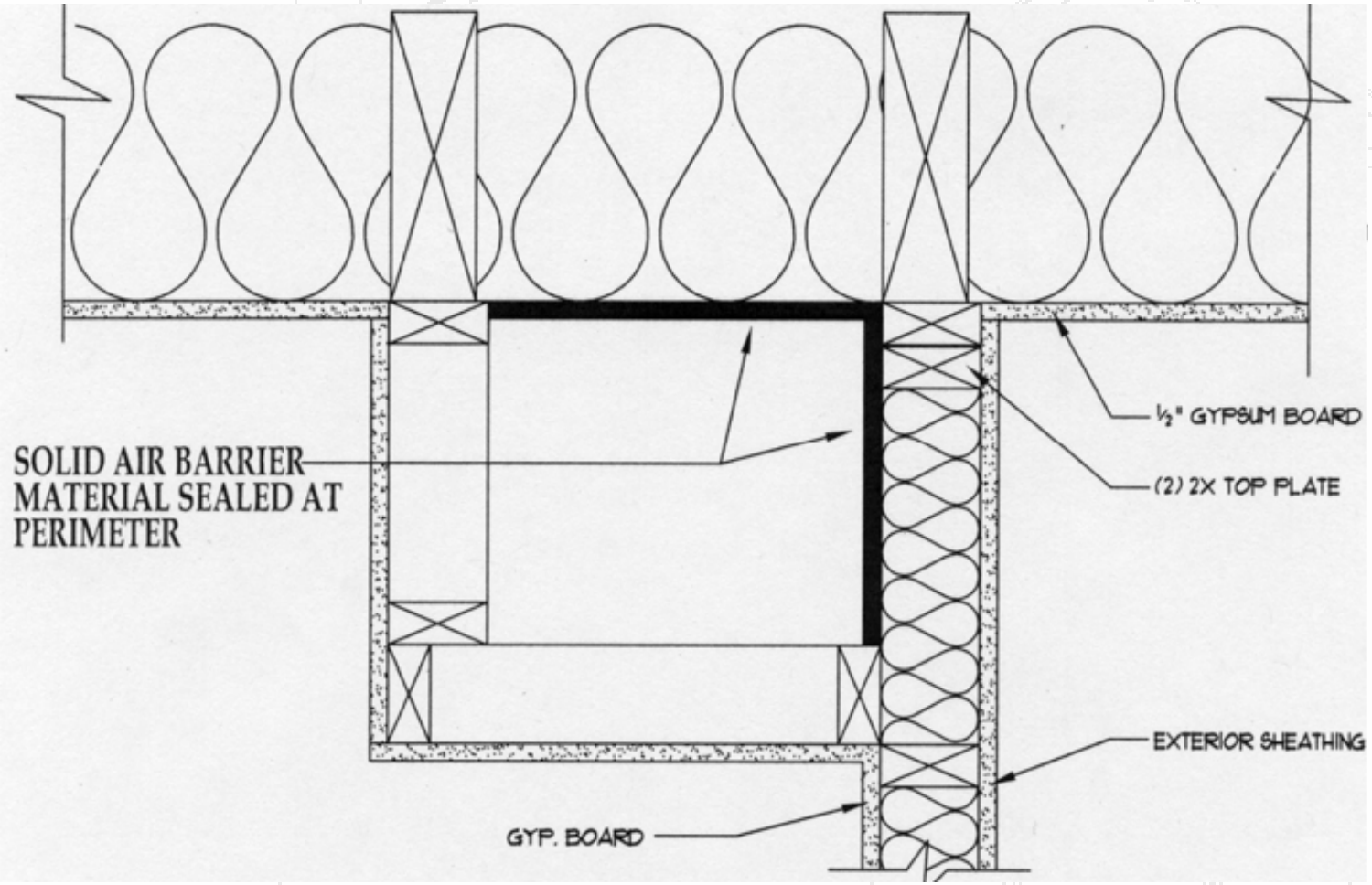

Dropped ceiling
insulated incorrectly

5. ATTIC/CEILING INTERFACE:
DROPPED CEILINGS

Courtesy of Building Science Corp.

5. ATTIC/CEILING INTERFACE:

DROPPED CEILINGS



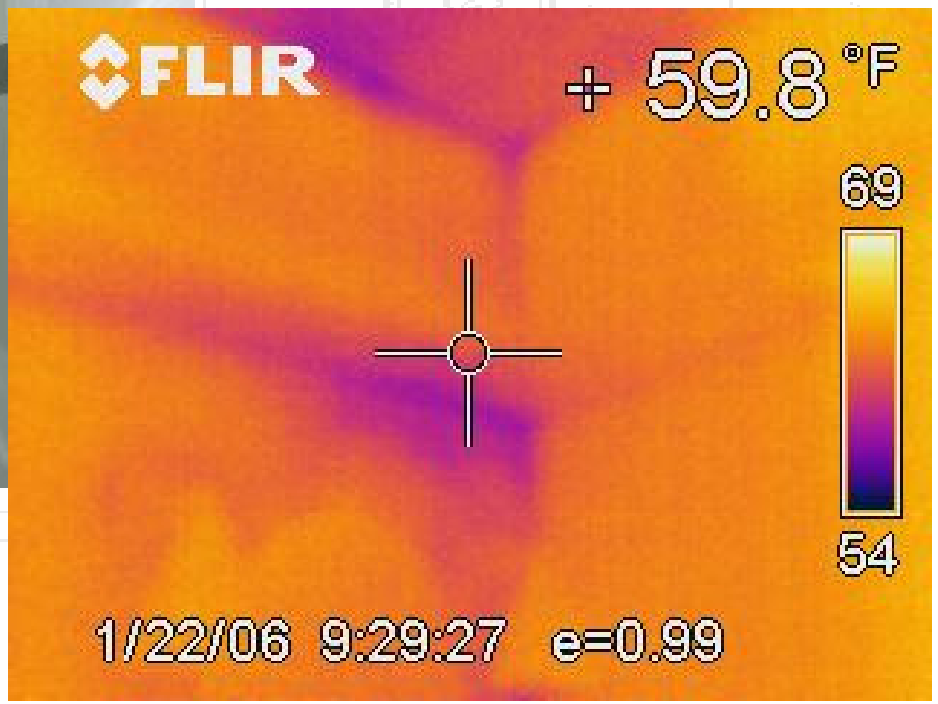
5. ATTIC/CEILING INTERFACE:

DROPPED CEILINGS

5. ATTIC/CEILING INTERFACE:

DROPPED CEILINGS

Soffit on Exterior Wall



5. ATTIC/CEILING INTERFACE:
DROPPED CEILINGS

Courtesy of Building Science Corp.

5. ATTIC/CEILING INTERFACE:

DROPPED CEILINGS

Courtesy of Energy Services Group

5. ATTIC/CEILING INTERFACE:

DROPPED CEILINGS

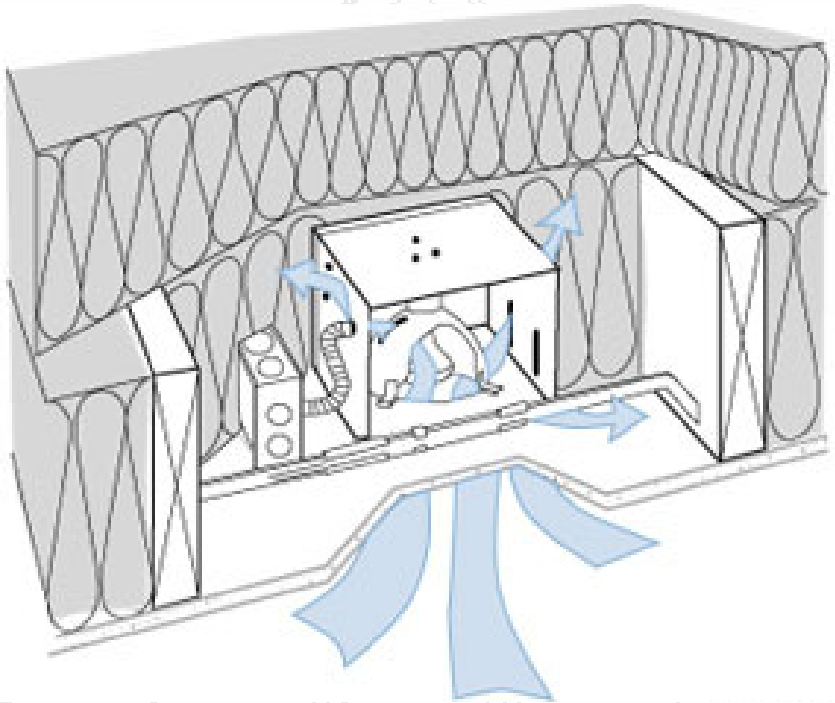
5. ATTIC/CEILING INTERFACE:

DROPPED CEILINGS

Dropped Sloped Ceiling

Missing Blocking

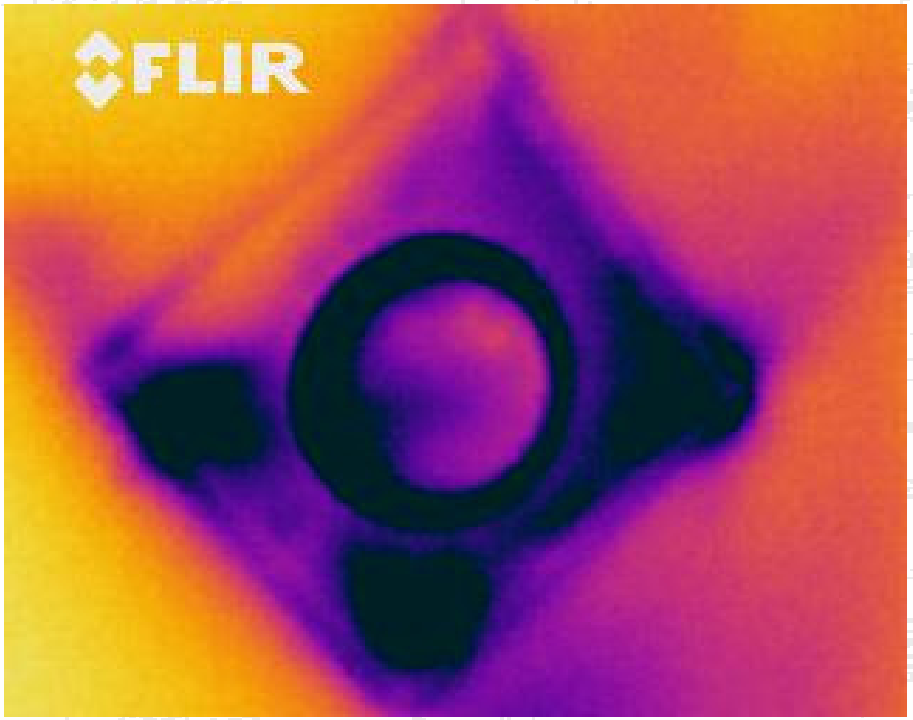
5. ATTIC/CEILING INTERFACE:
RECESSED LIGHTING

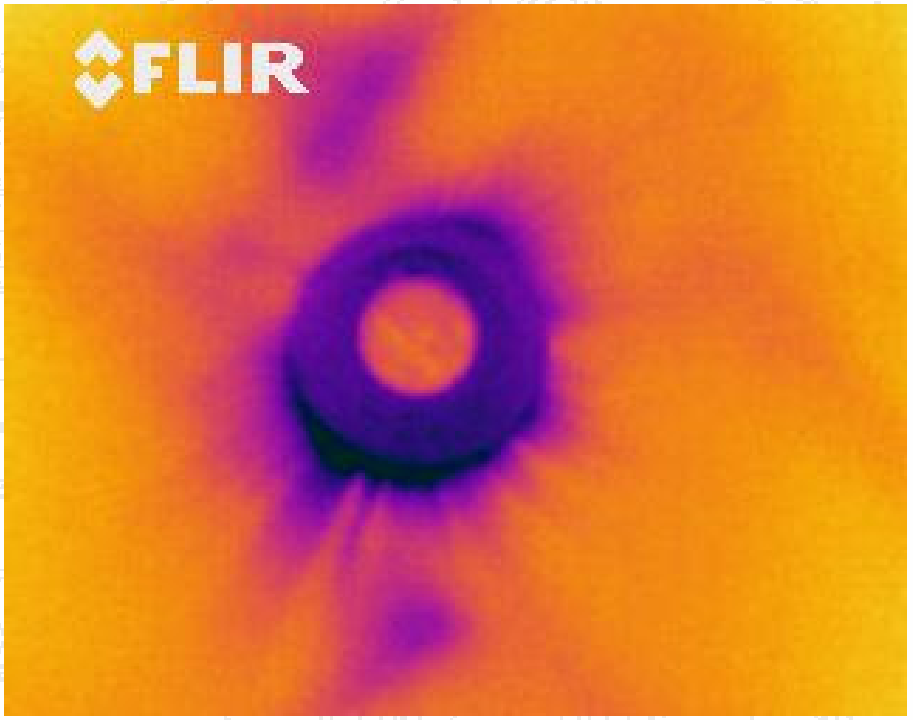


Even when covered with insulation recessed lights pump conditioned air out of the house.

5. ATTIC/CEILING INTERFACE:

RECESSED LIGHTING

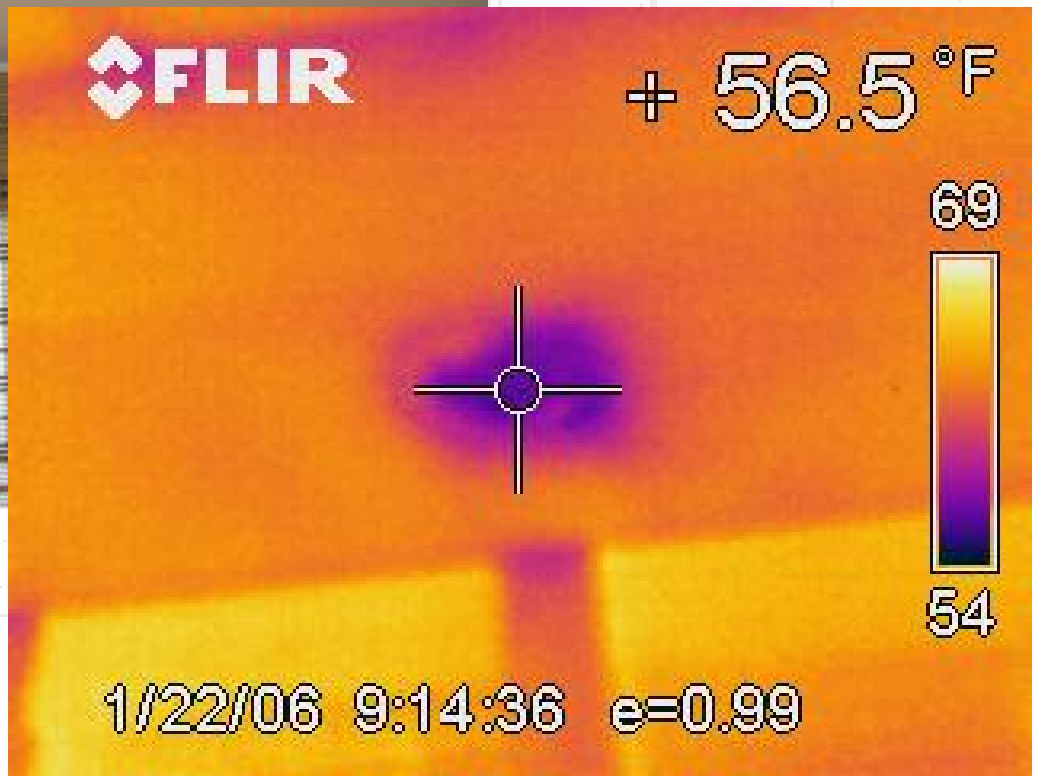




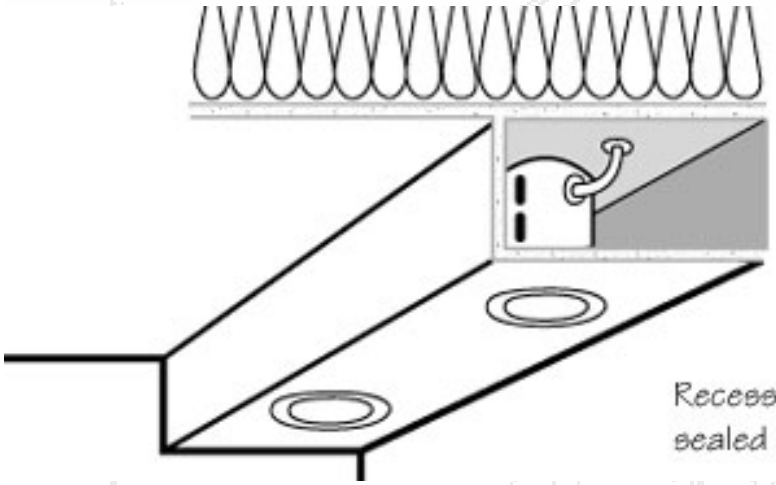
Courtesy of Energy Services Group

5. ATTIC/CEILING INTERFACE:
RECESSED LIGHTING

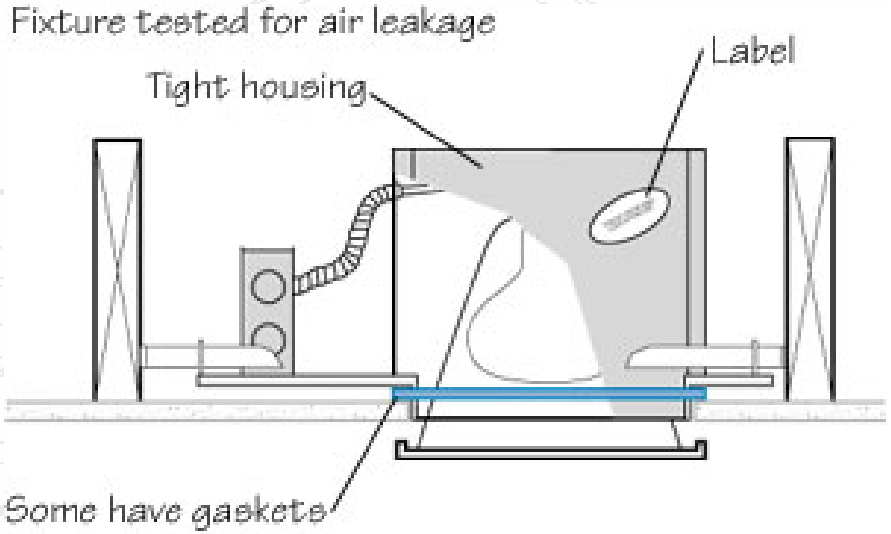
IC Rated but Not ICAT



5. ATTIC/CEILING INTERFACE:
RECESSED LIGHTING

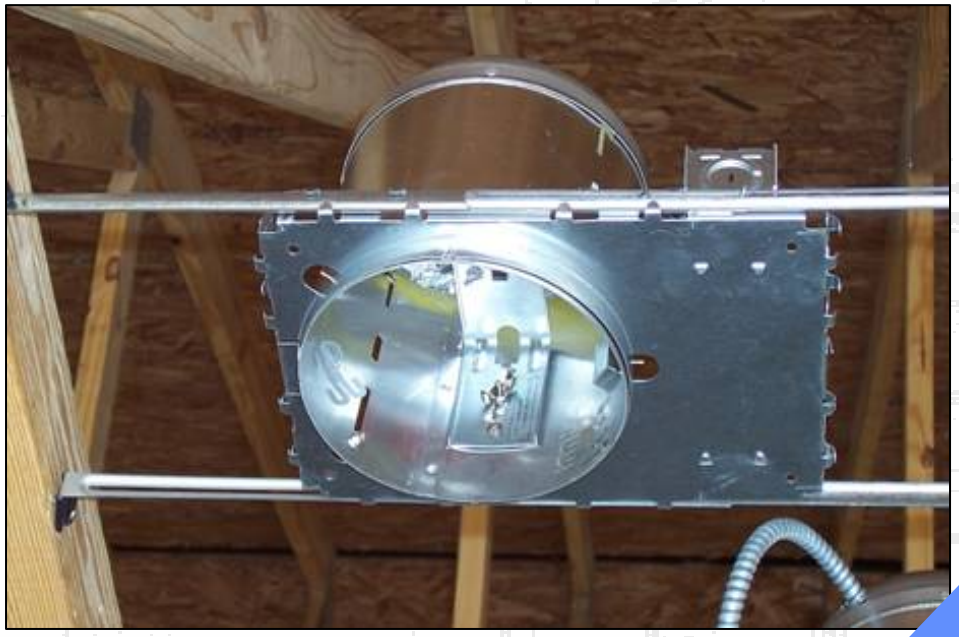


Recessed fixture in a sealed soffit



Eliminate this air leakage by locating fixtures inside the insulated envelope or using insulated can, air-tight (ICAT) fixtures.

5. ATTIC/CEILING INTERFACE:
RECESSED LIGHTING



Unacceptable. Does not meet most codes because of multiple holes.

Washington State Energy Code Approved. Still need to gasket or caulk at drywall.

5. ATTIC/CEILING INTERFACE:

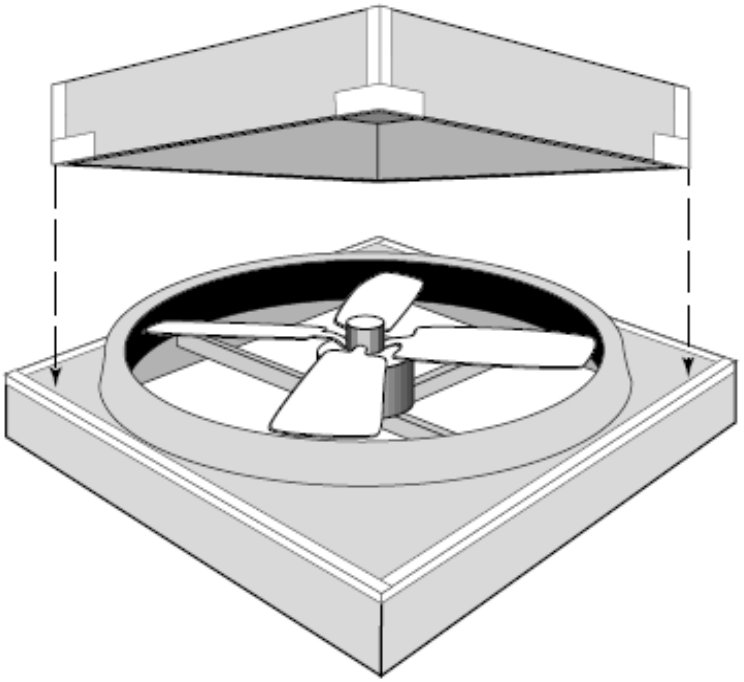
RECESSED LIGHTING TIPS

- ***ICAT with built-in gasket seals***
- ***Develop system for storing gaskets*** *provided by manufacturer to seal trim after initial installation of recessed cans.*
- ***Follow manufacturer recommendations*** *for sealing since light fixtures get very hot.*

Problem: Whole-house fan is equivalent to a ~10 sq. ft. thermal hole

5. ATTIC/CEILING INTERFACE:

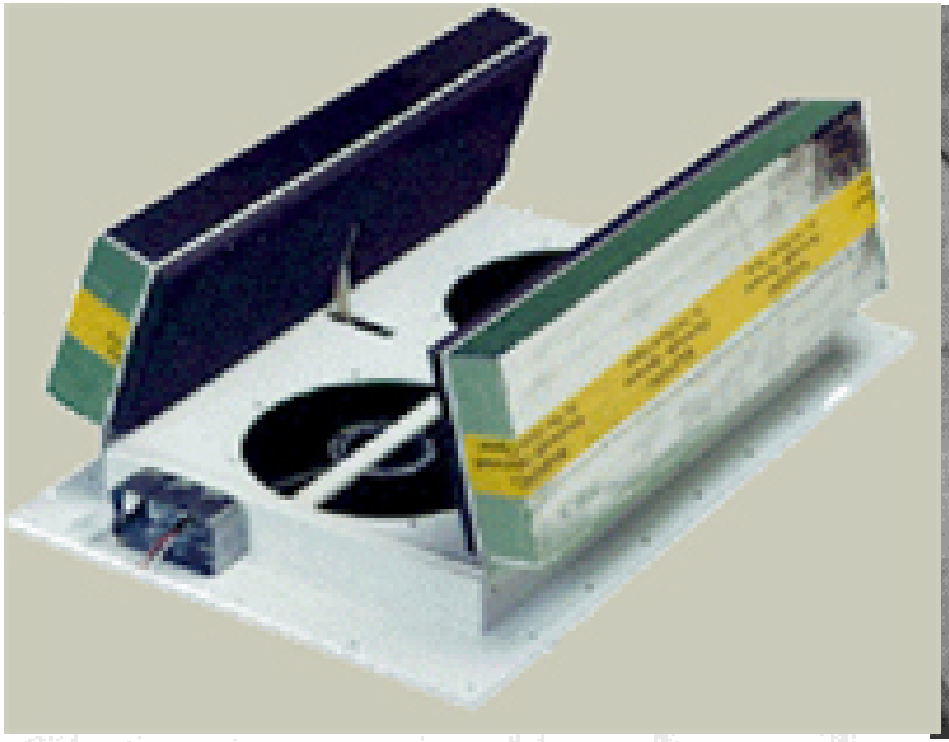
WHOLE-HOUSE FAN

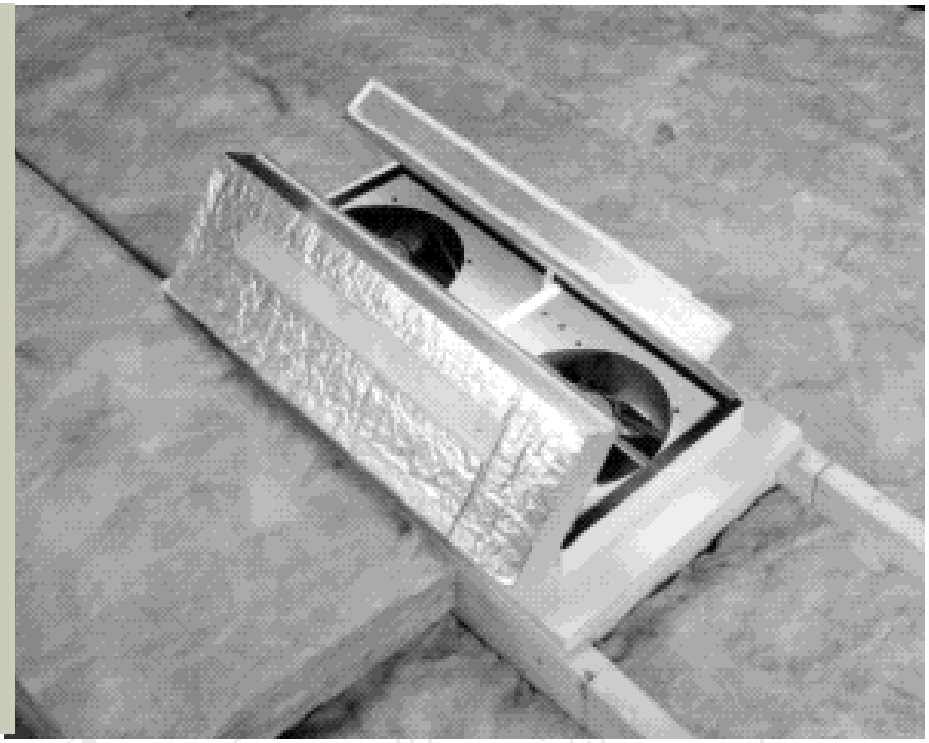


Cover (min. R-5) shall open either automatically or with a simple mechanism that does not require the homeowner to climb into the attic

5. ATTIC/CEILING INTERFACE:

WHOLE-HOUSE FAN BEST PRACTICE





Use whole-house fans with insulated covers that are fully gasketed and automatically lift when turned on.

6.

COMMON WALLS BETWEEN DWELLING UNITS

6. COMMON WALLS BETWEEN DWELLING UNITS:

COMMON WALLS

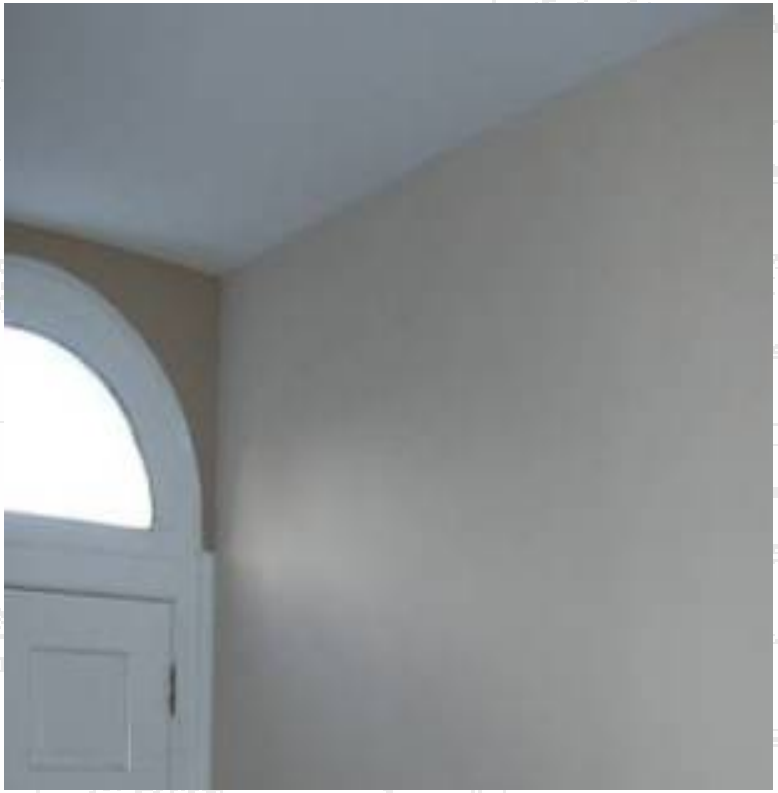
6. COMMON WALLS BETWEEN DWELLING UNITS:

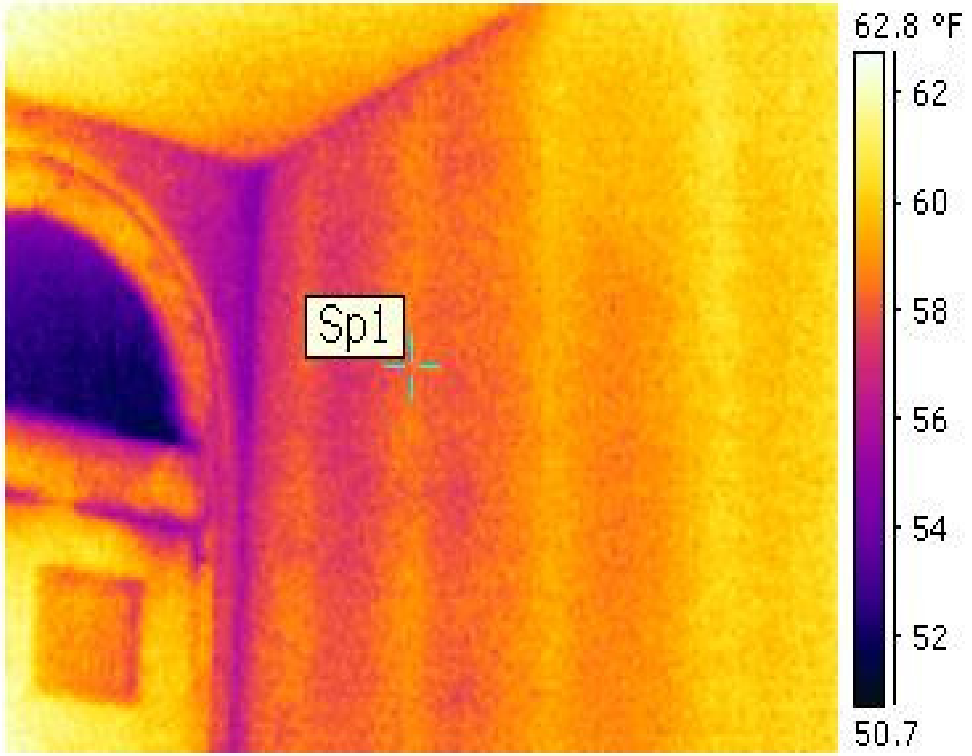
COMMON WALLS

Courtesy of Energy Services Group

6. COMMON WALLS BETWEEN DWELLING UNITS:

COMMON WALLS

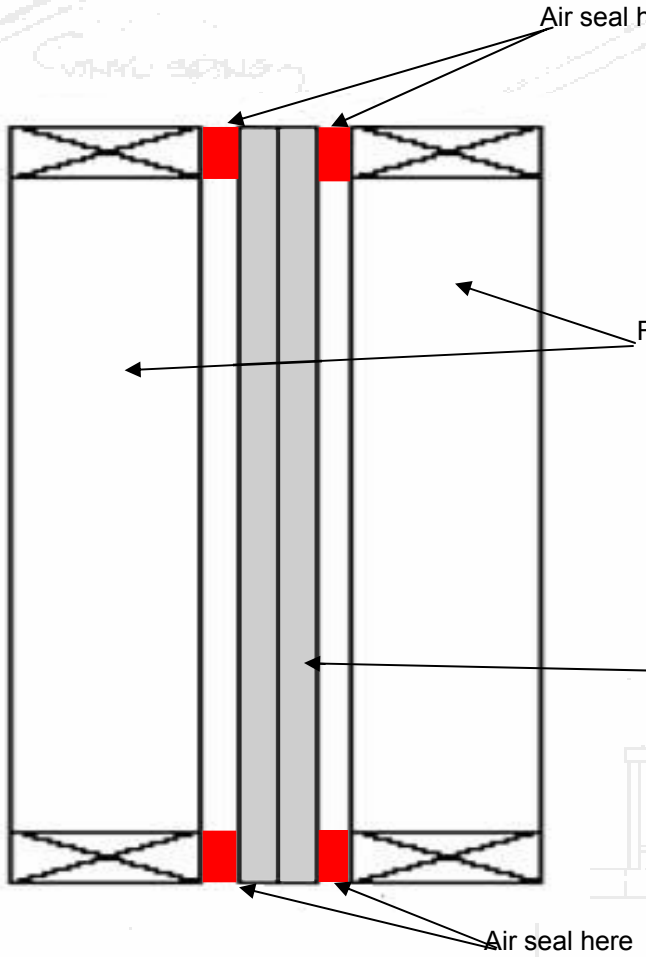




Courtesy of Energy Services Group

6. COMMON WALLS BETWEEN DWELLING UNITS:

COMMON WALLS



Courtesy of EnergyLogic

6. COMMON WALLS BETWEEN DWELLING UNITS:

COMMON WALLS

Courtesy of Energy Services Group

6. COMMON WALLS BETWEEN DWELLING UNITS:

COMMON WALLS BEST PRACTICES

- *Confirm preferred material acceptable to local code official.*
- *Fireproof spray caulk with special color now available.*

Courtesy of MaGrann Associates

How Builders Partner with ENERGY STAR

STEP ONE: SELECT A HERS RATER

About ENERGY STAR | News Room | FAQs | Search | Go

A NEW ENERGY STAR® QUALIFIED HOME IMPROVES OUR ENVIRONMENT

U.S. Environmental Protection Agency

Products | Home Improvement | New Homes | Buildings & Plants | Partner Resources

Qualified New Homes

- **Find an ENERGY STAR Builder**
- ENERGY STAR New Home Features
- Benefits for Homeowners
- For Residential Professionals

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Home > New Homes > **Partner Locator**

Find an ENERGY STAR Partner

Find home builders and developers that build ENERGY STAR qualified new homes, lenders that offer energy efficient mortgages, utilities that offer special incentives to buyers, builders and developers of ENERGY STAR qualified new homes, and home energy raters that can verify the energy efficiency of a home.

Find a

- ○ **Site-Built Home Builders and Developers** constructing traditional or systems-built (Modular, ICF, SIP) homes on site
- ○ **Manufactured Home Builders** providing factory-built, HUD code-based homes
- ◉ **Home Energy Raters** verifying the performance of ENERGY STAR qualified new homes
- ○ **Utilities/Sponsors** providing assistance to ENERGY STAR home buyers and builders
- ○ **Lenders** offering special financing for ENERGY STAR qualified new homes

State

Virginia

Search

New Homes Partner Results in Virginia

Printable: Results 1 - 10

To qualify for the ENERGY STAR label, the energy performance of traditionally-built and systems-built (modular, ICF, SIP) homes must be independently verified by a home energy verification organization. This is done either through a Home Energy Rating System (HERS) rating or an ENERGY STAR-approved Builder Option Package (BOP). The following is a list of ENERGY STAR home energy verification partners who have qualified at least one ENERGY STAR qualified new home in the last 12 months. Home energy verification partners that have recently joined and have not yet qualified an ENERGY STAR qualified new home are listed as 'new partners.' Where applicable, certified HERS raters and BOP inspectors are displayed below their associated accredited HERS and/or BOP provider. The number of homes qualified represents partner activity across all service areas. The partner's main phone number is displayed where a service area-specific phone number is not available.

Incentives Available in Virginia

Select another partner type: Home Energy Raters

Select another location: Virginia Go

Results **1** - **10** of 10

All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Name	Service Area/Phone		Partner Since	Homes Labeled (Apr 2006-Mar 2007)*	Homes Labeled (Grand Total)*	Homes Labeled (State Total)*
Advanced Building Science, Inc.	Richmond, VA	804-427-7777	2003	5	5	0
Building Science Corporation	VA	978-589-5100	1997	10	7907	6
EAM Associates Inc. EXIT	VA	732-556-9190	2000	2221	7564	0
EIC Inc. / Comfort Home Corporation	Norfolk, VA Richmond, VA Ashland, VA	717-581-8848 717-581-8848 804-798-4775	1996	3095	19394	0
Energy Services Group EXIT	VA	800-908-7000	1997	1236	8090	0
Environments for Living/Masco	VA	866-912-7233	2002	17920	42607	0
MaGrann Associates	VA	856-722-9799	1996	4095	25618	0
NSpects Ltd. Associated Rater(s):	VA	703-574-4365	2001	1284	2998	1316
→ Airflow Diagnostic	Charlottesville, VA	434-817-1133	2001	17	27	27

STEP TWO: BENCHMARK

- *HERS Rating Plan Analysis*
- *ENERGY STAR Qualified Homes BOP*
  - *National*
  - *County*

ENERGY STAR

ENERGY STAR HOME REPORT

Date:	July 23, 2007	Rating No.:	
Building Name:		Rating Org.:	EPA
Owner's Name:	M. Smith	Phone No.:	202 3439784
Property	1234 Main St.	Rater's Name:	G. Chinery
Address:	Lexington, KY	Rater's No:	
Builder's Name:	Quality Homes		
Weather Cite:	Lexington, KY	Rating Type:	Based on plans
File Name:	LexBSbig	Rating Date:	7/2007

Normalized, Modified End-Use Loads (MMBtu/year)

	Energy Star	As Designed
Heating:	33.2	25.5
Cooling:	20.1	20.7
Water heating:	9.5	10.4
Lighting & Appliances:	23.8	28.0
Total:	86.6	84.7
HERS Index:	86	83

This home MEETS the energy efficiency requirements for designation as an EPA Energy Star Home.

Pollution Prevented through Energy Star Home Upgrades

Type of Emissions	Reduction (lb/year)
Carbon Dioxide (CO2)	3049.3
Sulfur Dioxide (SO2)	4.6
Nitrogen Oxides (NOx)	5.9

Energy Cost Savings ($/year)

Heating:	$ 10+
Cooling:	$2+
Water Heating:	$5
Lights & Appliances:	$0
Total:	$212

The energy ratings and pollution prevented are calculated by comparing the As Designed home to the Energy Efficient Reference Home as defined in the "National Home Energy Rating Technical Guidelines", prepared by the HERS Council, as amended and approved September 19, 1999 by the National Association of State Energy Officials. In accordance with these guidelines, building inputs affecting set points, infiltration rates, window shading and the existence of mechanical systems may have been changed prior to calculating loads.

ENERGY STAR

ENERGY STAR HOME VERIFICATION SUMMARY

Date:	July 23, 2007	Rating No.:	
Building Name:		Rating Org.:	EPA
Owner's Name:	M. Smith	Phone No.:	202 3439784
Property	1234 Main St.	Rater's Name:	G. Chinery
Address:	Lexington, KY	Rater's No:	
Builder's Name:	Quality Homes		
Weather Cite:	Lexington, KY	Rating Type:	Based on plans
File Name:	LexBSbig	Rating Date:	7/2007

Building Information

Conditioned Area (sq ft):	2200	Housing Type:	Single-family detached
Conditioned Volume (cubic ft):	18700	Foundation Type:	Open crawl space
Included Shell Area (sq ft):	[illegible]	HERS Index:	[illegible]
Number of Bedrooms:	3		

Building Shell

Ceiling w/Attic:	R-38 Blown, Attic U=0.026	Window/Wall Ratio:	0.17
Vaulted Ceiling:	None	Window Type:	U0.4/SHGC0.55
Above Grade Walls:	R-13 U=0.085	Window U-Value:	0.400
Found. Walls (Cond):	None	Window SHGC:	0.550
Found. Walls (Uncond):	None	Infiltration:	Htg: 0.35 Clg: 0.35 ACH nat
Frame Floors:	R-19 U=0.049	Duct Leakage:	58.05 CFM per 100 ft2
Slab Floors:	None		

Mechanical Systems

Heating:	Fuel-fired air dist Furnace, 80.0 kBtuh, 90.0 AFUE
Cooling:	Air conditioner, [illegible]
Water Heating:	Conventional, Gas, 0.61 EF.
Programmable Thermostat:	Heat=Yes; Cool=Yes

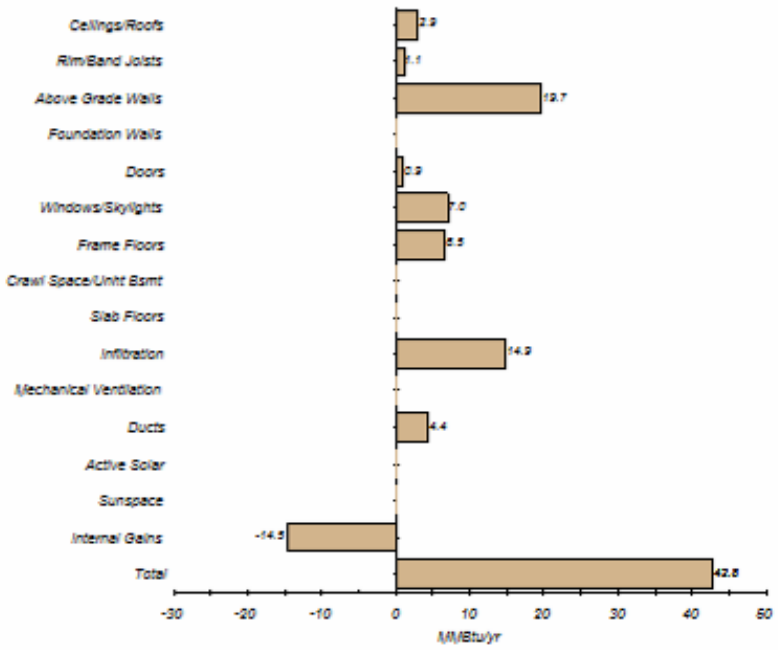
Note: Where feature level varies in home, the dominant value is shown.

This home MEETS the EPA's requirements for an Energy Star Home.

COMPONENT CONSUMPTION SUMMARY

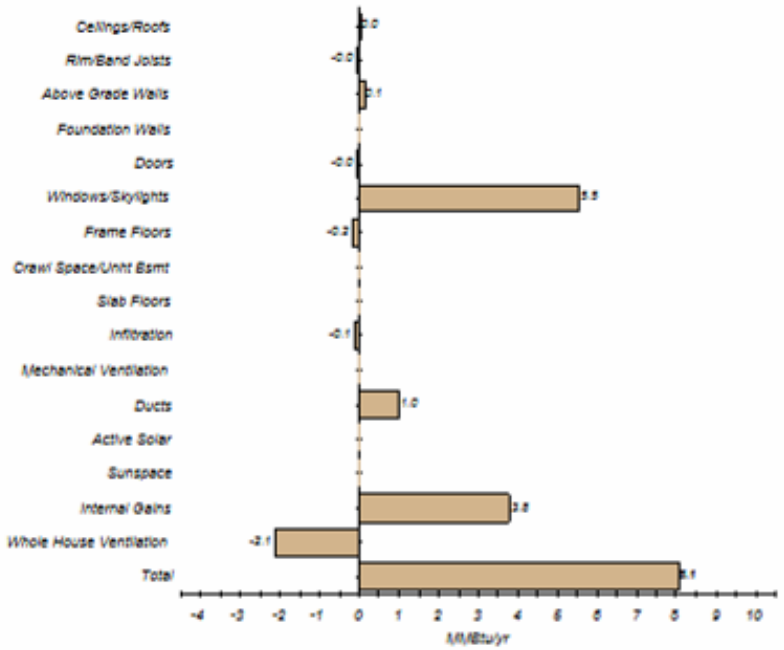
Date:	July 23, 2007	Rating No.:	
Building Name:		Rating Org.:	EPA
Owner's Name:	M. Smith	Phone No.:	202 3439784
Property:	1234 Main St.	Rater's Name:	G. Chinery
Address:	Lexington, KY	Rater's No.:	
Builder's Name:	Quality Homes		
Weather Site:	Lexington, KY	Rating Type:	Based on plans
File Name:	LexESb.tg	Rating Date:	7/2007

Heating Season



COMPONENT CONSUMPTION SUMMARY

Cooling Season



REM/Rate - Residential Energy Analysis and Rating Software v12.0
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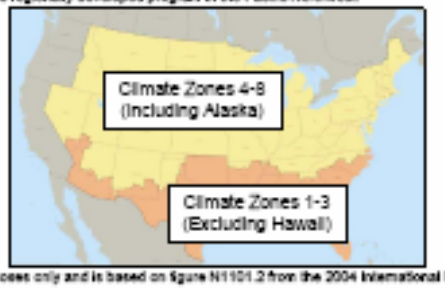
ENERGY STAR Qualified Homes
National Builder Option Package

The requirements for the ENERGY STAR Builder Option Package (BOP) are specified in the table below.

To qualify as ENERGY STAR using this BOP, a home must meet the requirements specified, be verified and field-tested in accordance with the HERS Standards by a RESNET-accredited Provider, and meet all applicable codes.

	Hot Climates [1] (2004 IRC Climate Zones 1,2,3)	**Mixed and Cold Climates** [1] (2004 IRC Climate Zones 4,5,6,7,8)
Cooling Equipment (Where Provided)	Right-Sized [2]: • ENERGY STAR qualified A/C *(14 SEER / 11.5 EER)*; OR • ENERGY STAR qualified heat pump [3] *(14 SEER / 11.5 EER / 8.2 HSPF)*	Right-Sized [2]: • 13 SEER A/C; OR • ENERGY STAR qualified heat pump [3] *(14 SEER / 11.5 EER / 8.5 HSPF)*
Heating Equipment	• 80 AFUE gas furnace; OR • ENERGY STAR qualified heat pump [2, 3] *(14 SEER / 11.5 EER / 8.2 HSPF)*; OR • 80 AFUE boiler; OR • 80 AFUE oil furnace	• ENERGY STAR qualified gas furnace *(90 AFUE)*; OR • ENERGY STAR qualified heat pump [2, 3] *(See Note 3 for specifications)*; OR • ENERGY STAR qualified boiler *(85 AFUE)*; OR • ENERGY STAR qualified oil furnace *(85 AFUE)*
Thermostat [3]	ENERGY STAR qualified thermostat (except for zones with radiant heat)	
Duct work	Leakage [4]: ≤ 4 cfm to outdoors / 100 sq. ft.; AND R-6 min. insulation on ducts in unconditioned spaces [5]	
Envelope	• Infiltration [6,7] (ACH50): 7 in CZ's 1-2 | 6 in CZ's 3-4 | 5 in CZ's 5-7 | 4 in CZ 8; AND • Insulation levels that meet or exceed the 2004 IRC [8]; AND • Completed Thermal Bypass Inspection Checklist [9]	
Windows	ENERGY STAR qualified windows or better (additional requirements for CZ2 and CZ4) [10, 11, 12]	
Water Heater [13]	Gas (EF): 40 Gal = 0.61 | 50 Gal = 0.57 | 80 Gal = 0.53 Electric (EF): 40 Gal = 0.93 | 50 Gal = 0.92 | 80 Gal = 0.89 Oil or Gas [14]: Integrated with space heating boiler	
Lighting and Appliances [15, 16]	Five or more ENERGY STAR qualified appliances, light fixtures, ceiling fans equipped with lighting fixtures, and/or ventilation fans	

Note: Due to the unique nature of some state codes and/or climates, EPA has agreed to allow regionally-developed definitions of ENERGY STAR in California, Hawaii, and the Pacific Northwest to continue to define program requirements. The States of Montana and Idaho may use either the requirements of the national program or the regionally-developed program in the Pacific Northwest.



Map is for illustrative purposes only and is based on figure N1101.2 from the 2004 International Residential Code (IRC).

ENERGY STAR Qualified Homes
Builder Option Package Notes

2004/2006 IECC Climate Zone[1] – 4	ENERGY STAR Window Zone[10] – All

The requirements for the ENERGY STAR Builder Option Package (BOP) are specified in the table below.
To qualify as ENERGY STAR using this BOP, a home must meet the requirements specified, be verified and field-tested in accordance with the HERS Standards by a RESNET-accredited Provider, and meet all applicable codes.

Cooling Equipment (Where Provided)	Right-sized[2] ≥13 SEER A/C; OR Right-sized[2] ≥14 SEER/ 11.5 EER/ 8.5 HSPF ENERGY STAR qualified heat pump [3]	
Heating Equipment	≥90 AFUE ENERGY STAR qualified gas furnace; OR ≥14 SEER/ 11.5 EER/ 8.5 HSPF ENERGY STAR qualified heat pump [2, 3] ; OR ≥90 AFUE ENERGY STAR qualified boiler; OR ≥85 AFUE ENERGY STAR qualified oil furnace	
Thermostat [3]	ENERGY STAR qualified thermostat (except for zones with mass radiant heat)	
Ductwork	Leakage [4] : ≤ 4 cfm to outdoors / 100 sq. ft.; AND Insulation [5] : ≥ R-6 insulation on ducts in unconditioned spaces	
Envelope	≤ 6 ACH50	Infiltration [6,7]
	≤ Reference UA ≥ 38 R-Value ≥ 30 R-Value ≥ 13 R-Value ≥ 19 R-Value ≥ 10 R-Value ≥ 13 R-Value ≥ 10 R-Value ≥ 13 R-Value ≥ 10 R-Value	UA Alternative Approach [8]; OR Ceiling Insulation [8]; AND (if applicable) Cathedral Ceiling Insulation [8]; AND (if applicable) Wood Frame Wall Insulation [8]; AND (if applicable) Floor Over Unconditioned Space Insulation [8]; AND (if applicable) Crawlspace Wall Insulation Continuous [8]; OR (if applicable) Crawlspace Wall Insulation Framed [8]; AND (if applicable) Basement Wall Insulation Continuous [8]; OR (if applicable) Basement Wall Insulation Framed [8]; AND (if applicable) Slab Insulation at 2 feet Depth [8]; AND
	Completed Thermal Bypass Inspection Checklist [9]	
Windows [10,11,12]	≤ 0.40 U-Value ≤ 0.45 SHGC	
Water Heater [13]	Gas (EF): 40 Gal = 0.61 | 50 Gal = 0.57 | 80 Gal = 0.53 Electric (EF): 40 Gal = 0.93 | 50 Gal = 0.92 | 80 Gal = 0.89 Oil or Gas [14]: Integrated with space heating boiler	
Lighting and Appliances [15,16]	Five or more ENERGY STAR qualified appliances, light fixtures, ceiling fans equipped with lighting fixtures, and/or ventilation fans	
Energy Savings Values and associated average monthly savings are provided at the end of this document for the purpose of applying for an energy efficient mortgage. [17]		

STEP THREE: JOIN IF FITS BUSINESS

ENERGY STAR

ONLINE PARTNERSHIP AGREEMENT
HOME BUILDER

ENERGY STAR

Contact ENERGY STAR | Exit Application

STEP 1: Preparation | STEP 2: Select Partner Types | STEP 3: Enter Organization Information | STEP 4: Add Contacts | STEP 5: Enter Home Builder Details | STEP 6: Review Agreement | STEP 7: Sign and Submit

Thank you for your interest in becoming an ENERGY STAR Partner.

Step 1: Prepare by doing the following:

1. **Review the qualifications for Partnership** - To qualify for partnership as a homebuilder, you must be responsible for the building or installing of whole homes, either on-site or in plant environment. Each unique entity (office, plant, division or subsidiary) should submit its own partnership application.

2. **Review ENERGY STAR's commitments, terms, and disclaimers** - Review the commitments made between ENERGY STAR and Partners associated with this Partnership Agreement, as well as general terms and disclaimers for the Partnership Agreement.

3. **Determine a Signatory** - Ensure that your organization has the contact information for a signatory or company representative authorized to bind your organization to the terms of this Agreement.

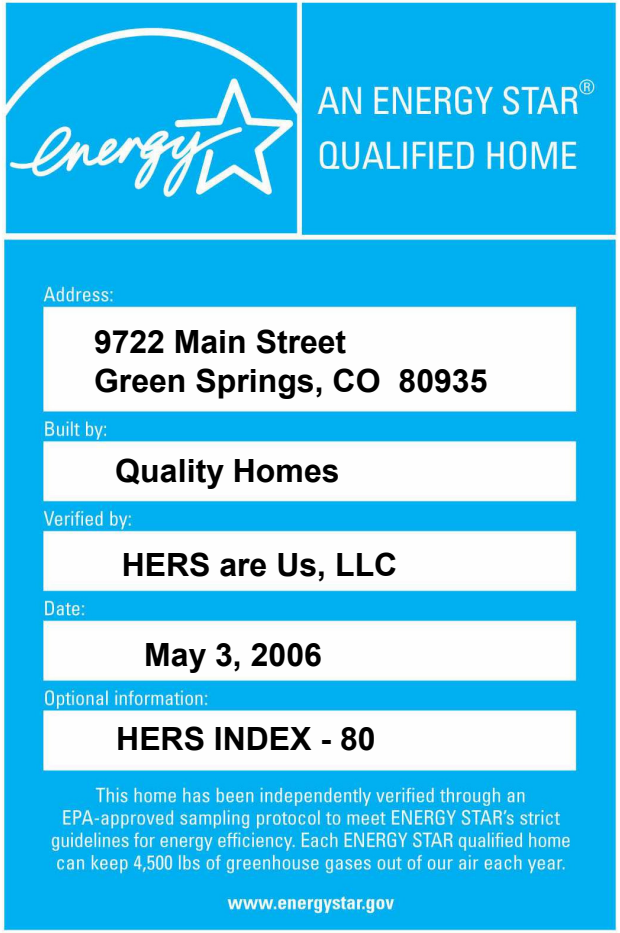
4. **Gather information** - Ensure that you have all the necessary information to fill out the Agreement. Review a summary of the information that you will be asked to provide.

5. **Continue** - If your organization qualifies for Partnership and agrees to the commitments, please Continue.

Continue

STEP FOUR: PARTICIPATE

- *Build Homes*
- *Label Homes*
- *Sell Benefits*



HOW TO GET MORE INFORMATION

On the Web at:

http://www.energystar.gov/homes