

NORTHERN VIRGINIA BIA
DECEMBER 18, 2007



ENERGY STAR Qualified Homes Training

What, Why and 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

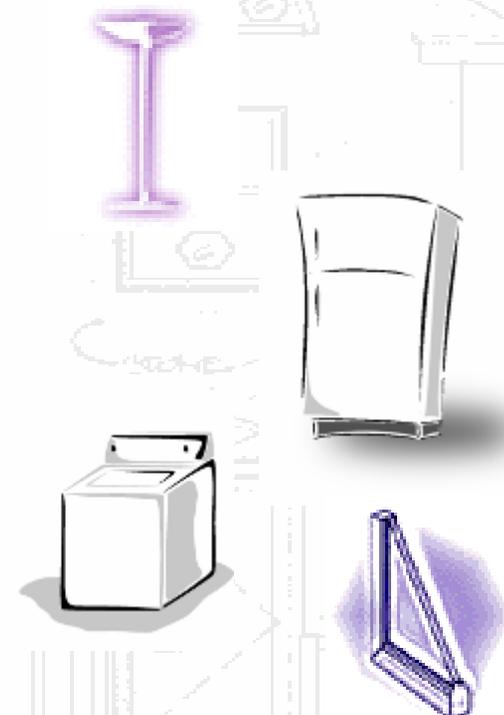
70%+ households would recommend

95% likely to buy again in future

ENERGY STAR PRODUCTS FOR HOMES



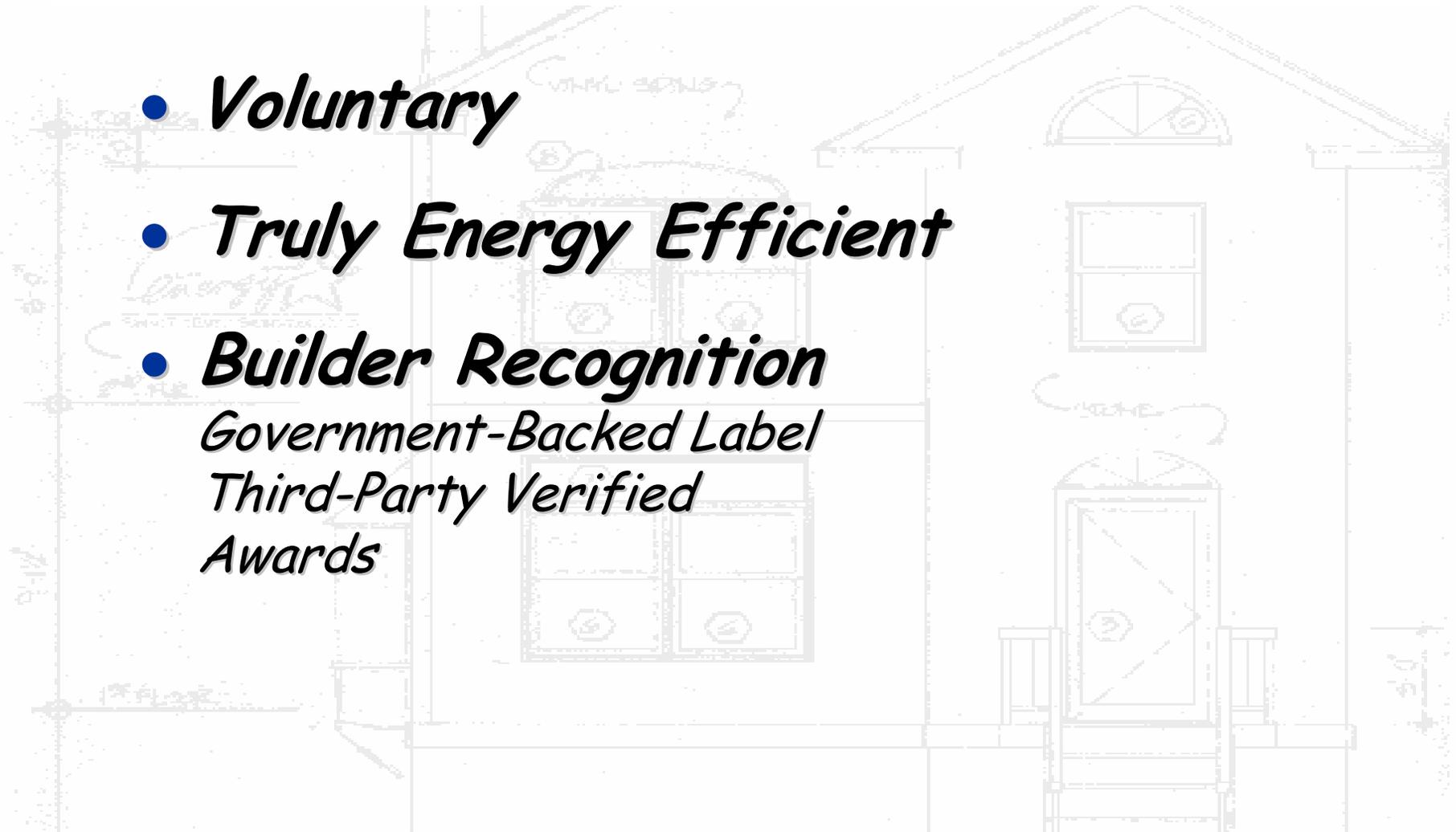
- *Heating/Cooling Equipment*
- *Lighting*
- *Appliances*
 - *Clothes Washer*
 - *Refrigerator*
 - *Dishwasher*
 - *Dehumidifiers*
- *Windows (by Climate)*
- *Thermostats*
- *Ventilation Fans*



WHAT IS ENERGY STAR FOR HOMES?



- ***Voluntary***
- ***Truly Energy Efficient***
- ***Builder Recognition***
Government-Backed Label
Third-Party Verified
Awards



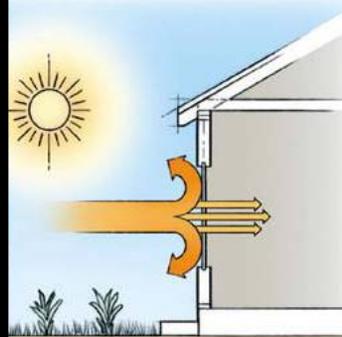
TRULY ENERGY EFFICIENT ENERGY STAR FOR HOMES OLD SPEC



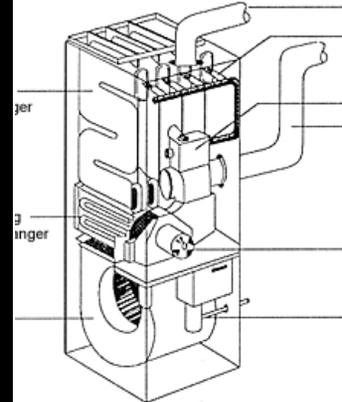
Tight
Ducts



Air
Sealing



Advanced
Windows



Efficient
Equipment

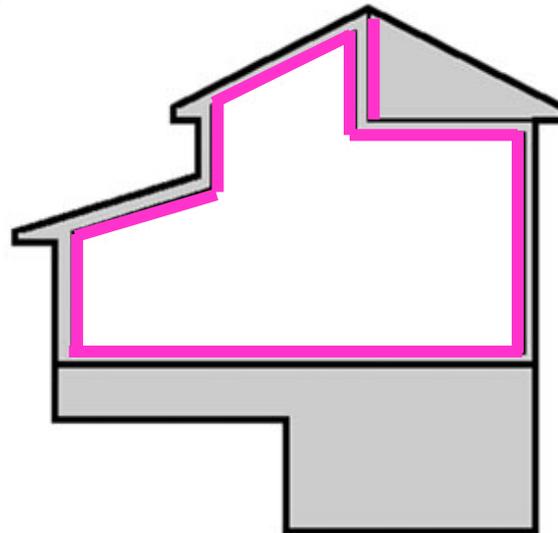


Field
Verified

TRULY ENERGY EFFICIENT ENERGY STAR FOR HOMES NEW SPEC



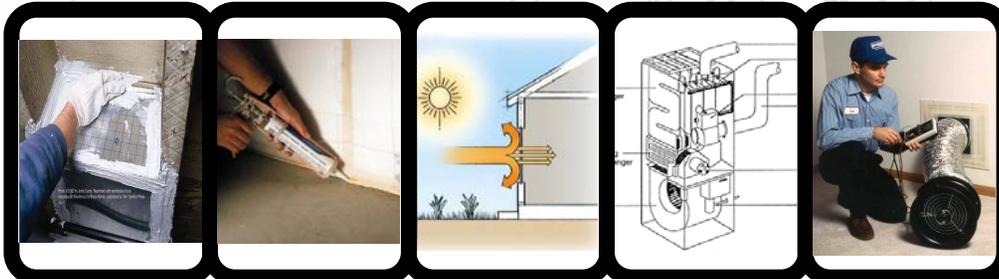
Insulation
Installation



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*

16%
**ENERGY
STAR**

33%
*Guar.
Perform.*

Energy Savings Compared to Baseline

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

BUILDER RECOGNITION: WEB SITE LOCATOR TOOL




A NEW ENERGY STAR® QUALIFIED HOME IMPROVES OUR ENVIRONMENT
U.S. Environmental Protection Agency

About ENERGY STAR · News Room · FAQs

Search

ENERGY STAR [Products](#) [Home Improvement](#) [New Homes](#) [Buildings & Plants](#) [Partner Resources](#)

ENERGY STAR Web Site: 4 Million Visitors/Year

 **100%** Denotes home builders or developers who have made a commitment to building 100% of their homes to ENERGY STAR performance guidelines and have built at least two ENERGY STAR qualified new homes.

 Denotes home builders or developers offering an optional ENERGY STAR Advanced Lighting Package (ALP)

 Denotes home builders or developers offering an optional ENERGY STAR Indoor Air Package (IAP).

[Incentives Available in Virginia](#)

Select another partner type:
 Select another location:

Results 1 - 50 of 142 [Next](#) | [View All](#) 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 (Oct 2006-Sep 2007)*	Homes Labeled (Grand Total)*	Homes Labeled (State Total)*

Name ▼	Service Area/Phone	Partner Since	Homes Labeled (Oct 2006-Sep 2007)*	Homes Labeled (Grand Total)*	Homes Labeled (State Total)*	
Blue Sky Builders of Virginia, LLC	Albemarle, Fluvanna, Greene, Louisa, Orange Counties, VA Charlottesville, VA	434-970-2583 434-970-2583	2007	New Partner	New Partner	0
Botso General Contractor, LLC	DC Metro, VA	919-403-8878	2006	New Partner	New Partner	0
Bozzuto Homes, Inc. ☆100%	Northern Virginia, VA	301-446-2209	2005	161	288	0
Breakell Inc. General Contractors	VA	540-345-7309	2007	New Partner	New Partner	0
Buckner's General Contracting Services	Manassas, VA Northern Virginia, VA	703-946-4589 703-946-4589	2007	New Partner	New Partner	0
C.L. Fitchett Construction, Inc.	Ashland, Petersburg, Richmond, VA	804-283-2319	2007	New Partner	New Partner	0
Calvert Homes, Inc.	Washington, D.C., VA	703-643-5001	2007	New Partner	New Partner	0
Camberley Homes EXIT →	Northern Virginia, VA	301-803-4800	2005	21	22	22
Carter Custom Homes	Williamsburg, VA Williamsburg, VA	757-565-6183 757-565-6183	2007	New Partner	New Partner	0
Caruana Construction Inc.	Virginia Beach, Suffolk, Chesapeake, VA	757-717-2233	2007	New Partner	New Partner	0
Central Valley Habitat for Humanity	Bridgewater, Rockingham County, VA	540-828-6288	2007	New Partner	New Partner	0
Ceva Green Development, LLC	VA	601-212-2030	2007	New Partner	New Partner	0
Church Hill Homes	Charlottesville, VA	434-975-0085	2007	New Partner	New Partner	0
Clark Pinnacle Family Communities ☆100%	Fort Belvoir, VA	703-781-2008	2007	340	836	836
Courthouse Construction, Inc.	Gloucester, VA Greater Richmond	804-693-6750 804-693-6750	2007	New Partner	New Partner	0

BUILDER RECOGNITION: LABEL



 AN ENERGY STAR[®]
QUALIFIED HOME

Address:
**9722 Main Street
Green Springs, CO 80935**

Built by:
Smaller Homes

Verified by:
Energy Wise, LLC

Date:
May 3, 2006

Optional information:
HERS INDEX - 80

This home has been independently verified through an EPA-approved sampling protocol to meet ENERGY STAR's strict guidelines for energy efficiency. Each ENERGY STAR qualified home can keep 4,500 lbs of greenhouse gases out of our air each year.

www.energystar.gov



BUILDER RECOGNITION: PLAQUES



Sources listed on ENERGY STAR for Homes Web Site



BUILDER RECOGNITION: MARKETING WITH LOGO





www.holtonhomes.com

You'll appreciate your ENERGY STAR® qualified home every time you open a utility bill.

Look for these important energy efficiency features that can save you up to \$400 a year:

- ENERGY STAR qualified windows employ advanced technologies to improve performance.
- The government-backed ENERGY STAR label identifies homes that are truly energy efficient.
- ENERGY STAR qualified windows employ advanced technologies to improve performance.
- The government-backed ENERGY STAR label identifies homes that are truly energy efficient.
- Independent testing and inspection ensures energy-efficient home performance.



ltonhomes.com

Your Web Site

at has a view of the fut
® and Holton Homes.

Your Name

STAR label meet strict guidelines for
tial Protection Agency (EPA). Our ENERGY
energy efficient than standard homes.

ills, and attics of our homes provides even
utility bills. Our homes undergo a
n independent Home Energy Rater to
ated to provide maximum efficiency.

ap you warm without breaking the bank.
5% more efficient than standard models -
ing bills.

ap you warm without breaking the bank.
5% more efficient than standard models -
ing bills.

AGE
nd package of energy-efficient lighting
is lighting uses less energy, emits less



Hot diggity!



It's tight!

To earn the government's ENERGY STAR, a home must meet strict energy efficiency guidelines set by the U.S. EPA. ENERGY STAR qualified homes are quieter and more comfortable, have lower utility bills, and help protect the environment by reducing greenhouse gas emissions.



Y STAR, a home must meet strict energy efficiency guidelines
AR qualified homes are quieter and more comfortable, have
ct the environment by reducing greenhouse gas emissions.



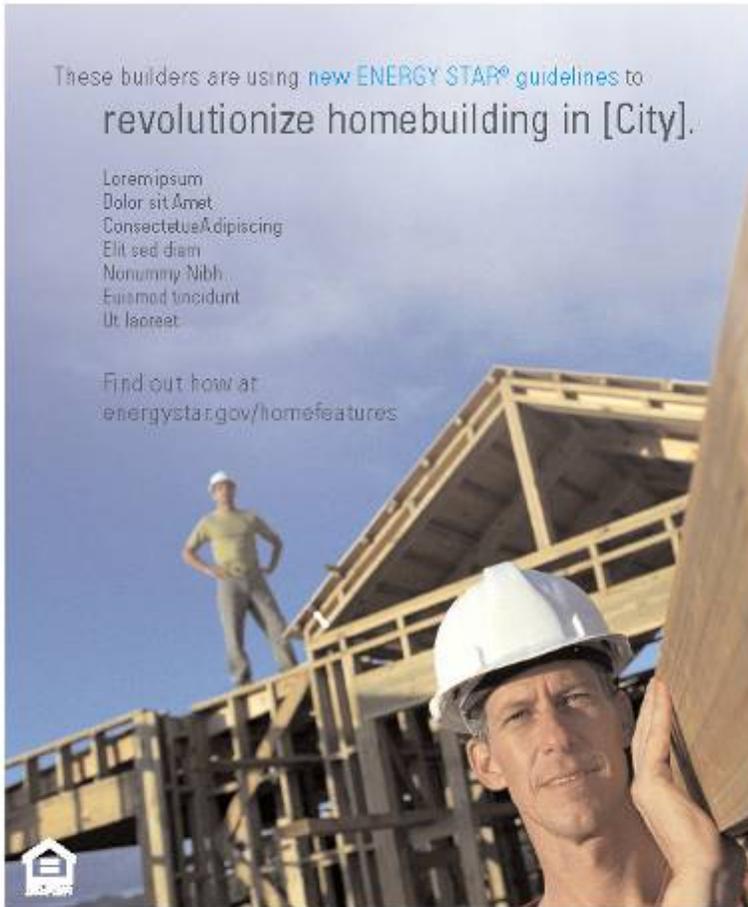
BUILDER RECOGNITION: OUTREACH CAMPAIGN



These builders are using new ENERGY STAR® guidelines to revolutionize homebuilding in [City].

Lorem ipsum
Dolor sit Amet
Consectetur Adipiscing
Elit sed diam
Nonummy Nibh
Eiusmod incididunt
Ut laoreet

Find out how at
energystar.gov/homefeatures



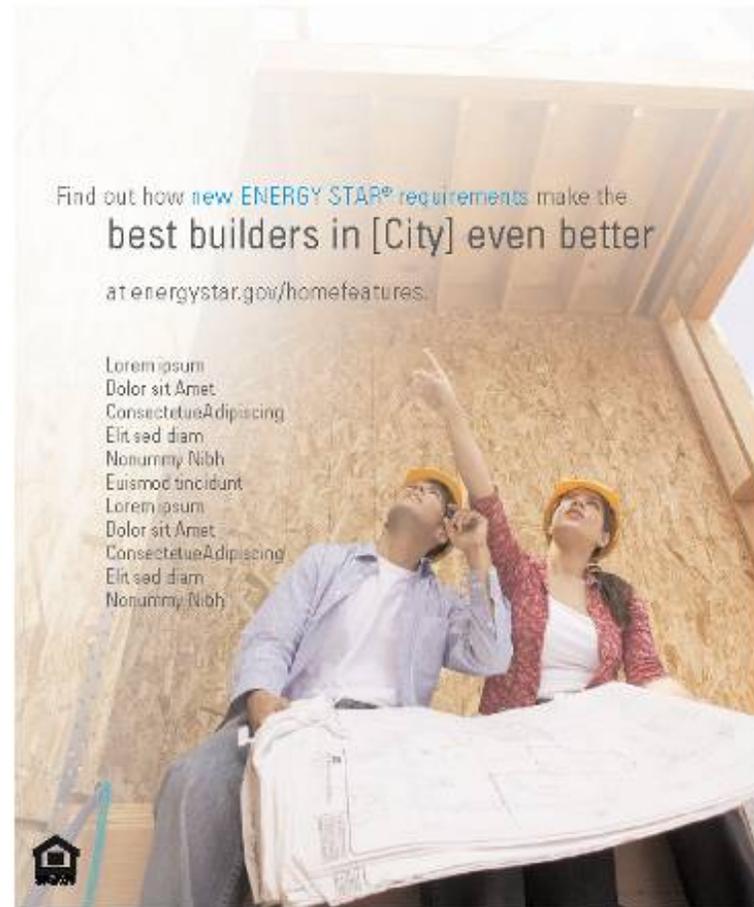
To earn the government's ENERGY STAR, a home must be independently verified to meet new and more rigorous guidelines set by the U.S. Environmental Protection Agency. ENERGY STAR qualified homes are quieter and more comfortable, have lower utility bills, and help protect the environment by reducing greenhouse gas emissions. Learn more. Visit energystar.gov.



Find out how new ENERGY STAR® requirements make the best builders in [City] even better

at energystar.gov/homefeatures.

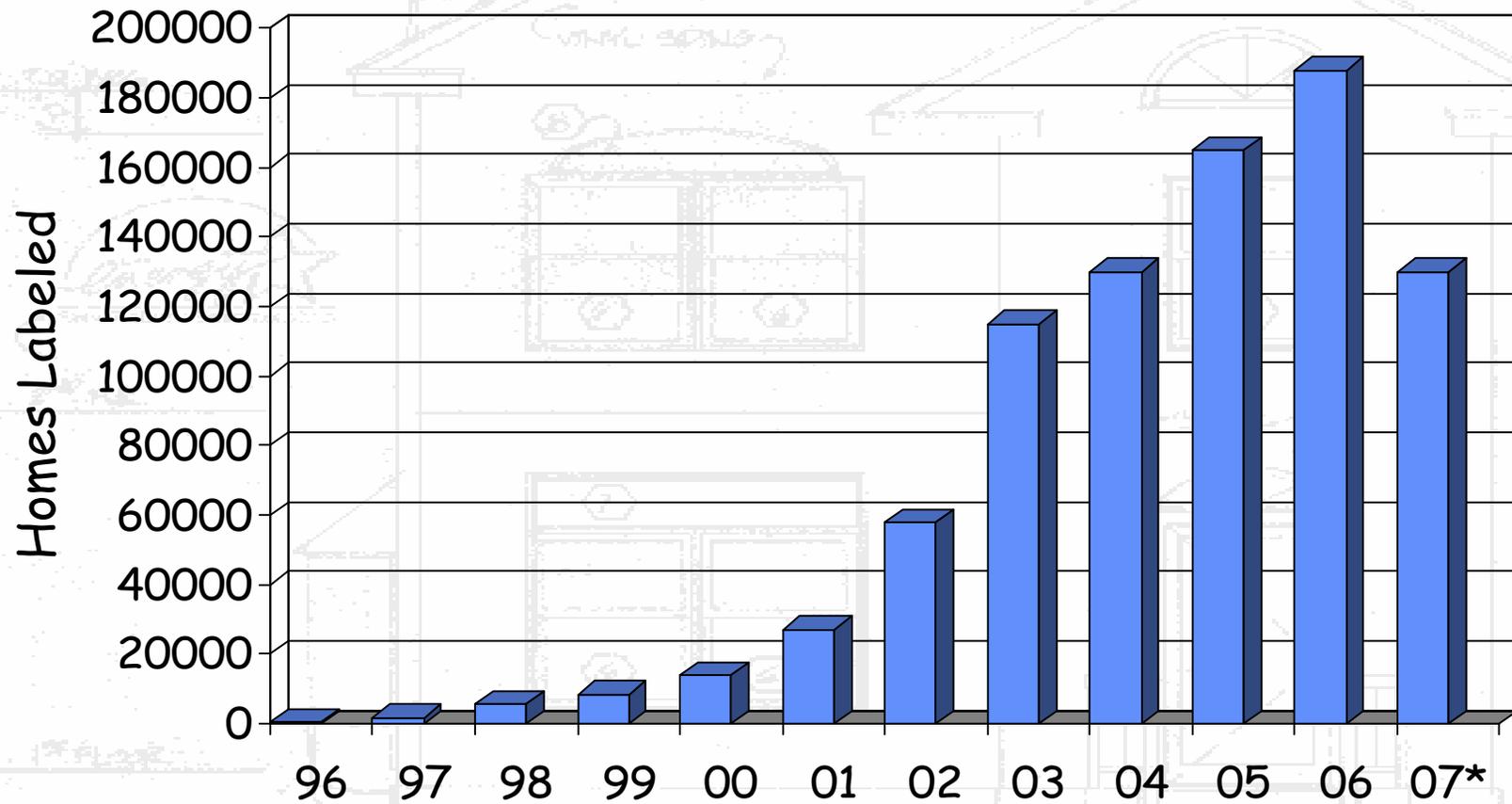
Lorem ipsum
Dolor sit Amet
Consectetur Adipiscing
Elit sed diam
Nonummy Nibh
Eiusmod incididunt
Lorem ipsum
Dolor sit Amet
Consectetur Adipiscing
Elit sed diam
Nonummy Nibh



To earn the government's ENERGY STAR, a home must be independently verified to meet new and more rigorous guidelines set by the U.S. Environmental Protection Agency. ENERGY STAR qualified homes are quieter and more comfortable, have lower utility bills, and help protect the environment by reducing greenhouse gas emissions. Learn more. Visit energystar.gov.

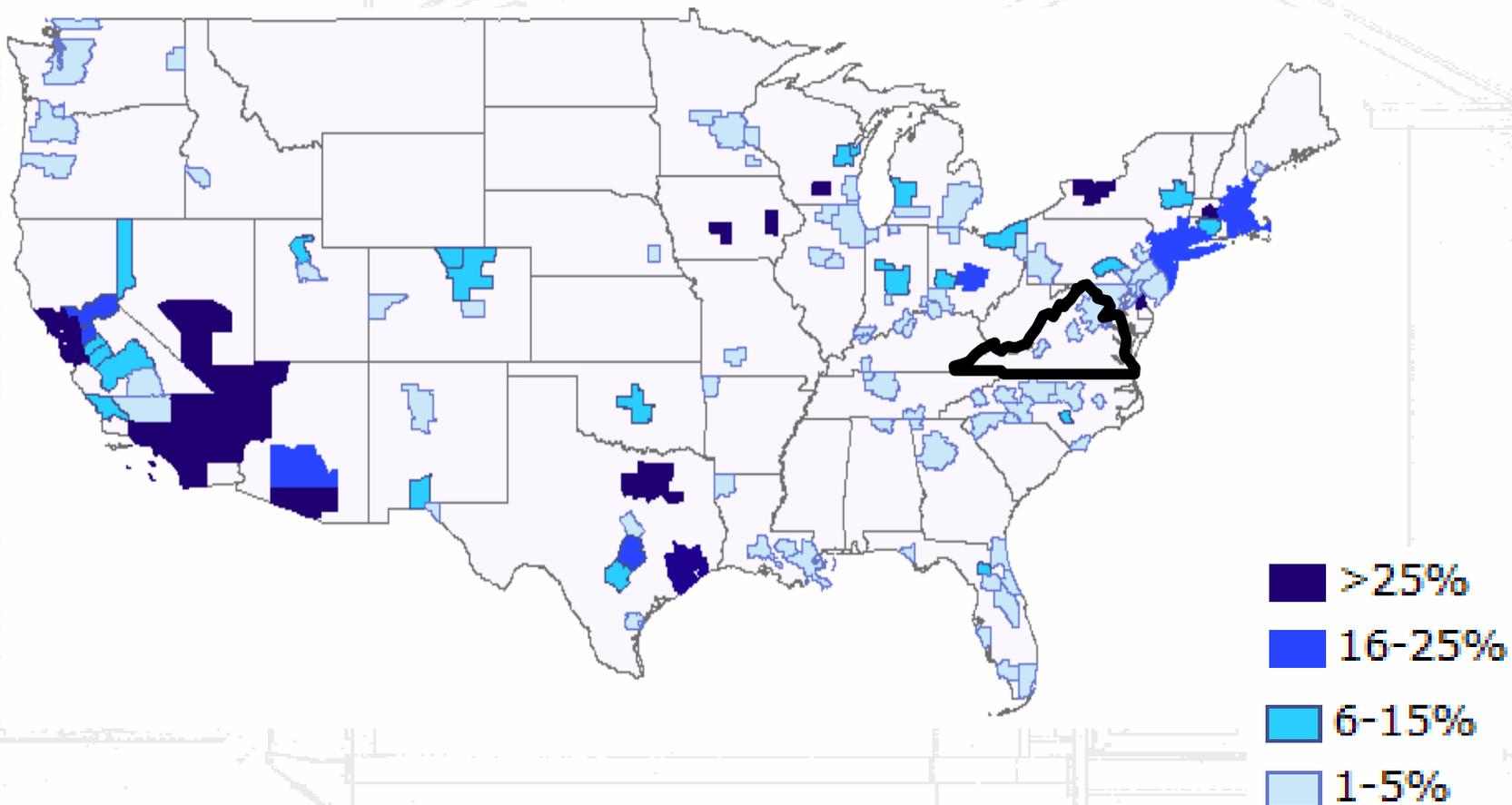


RESULTS: EXPONENTIAL GROWTH



**Estimate based on Q1 and Q2 reporting results*

RESULTS: MARKET PENETRATION



ENERGY STAR FOR HOMES METRICS



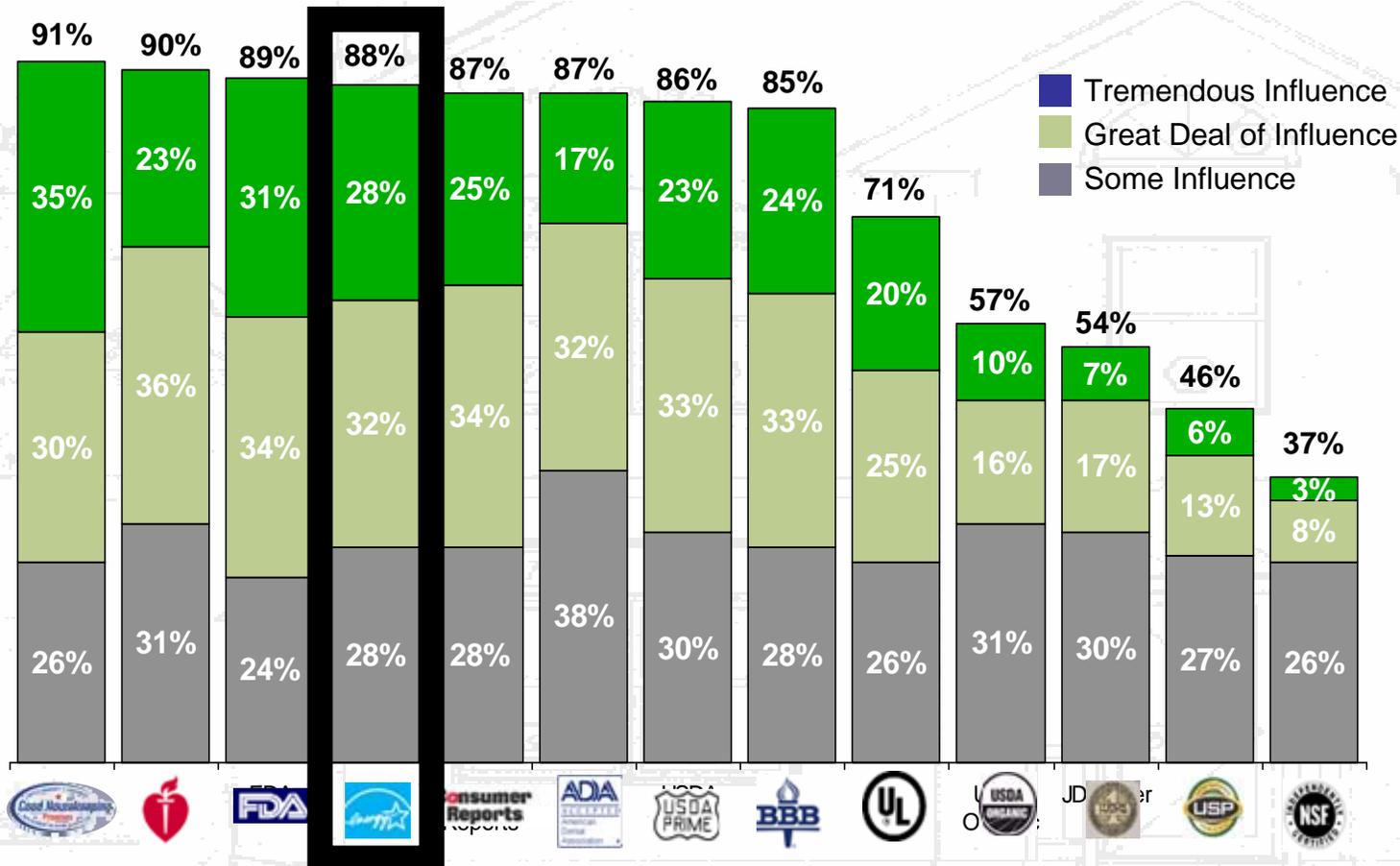
- **~5,000** *Active Builder Partners*
- **800,000+** *Labeled Homes*
- **20%+** *Penetration in 25 Markets*

WHAT WE ARE SELLING



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

BRAND ADVANTAGE



Source: Fairfield Research, May 2003

BRAND ADVANTAGE



=

Brand Shorthand:

- ***Truly Energy Efficient***
- ***Credible***
- ***Environmental Leadership***

COST ADVANTAGE



Monthly

<i>Utility Savings</i>	<i>\$40</i>
------------------------	-------------

<i>Added Mortgage</i>	<i>\$15</i>
-----------------------	-------------

<i>Cost Savings</i>	<i>\$25</i>
---------------------	-------------

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.

QUALITY ADVANTAGE

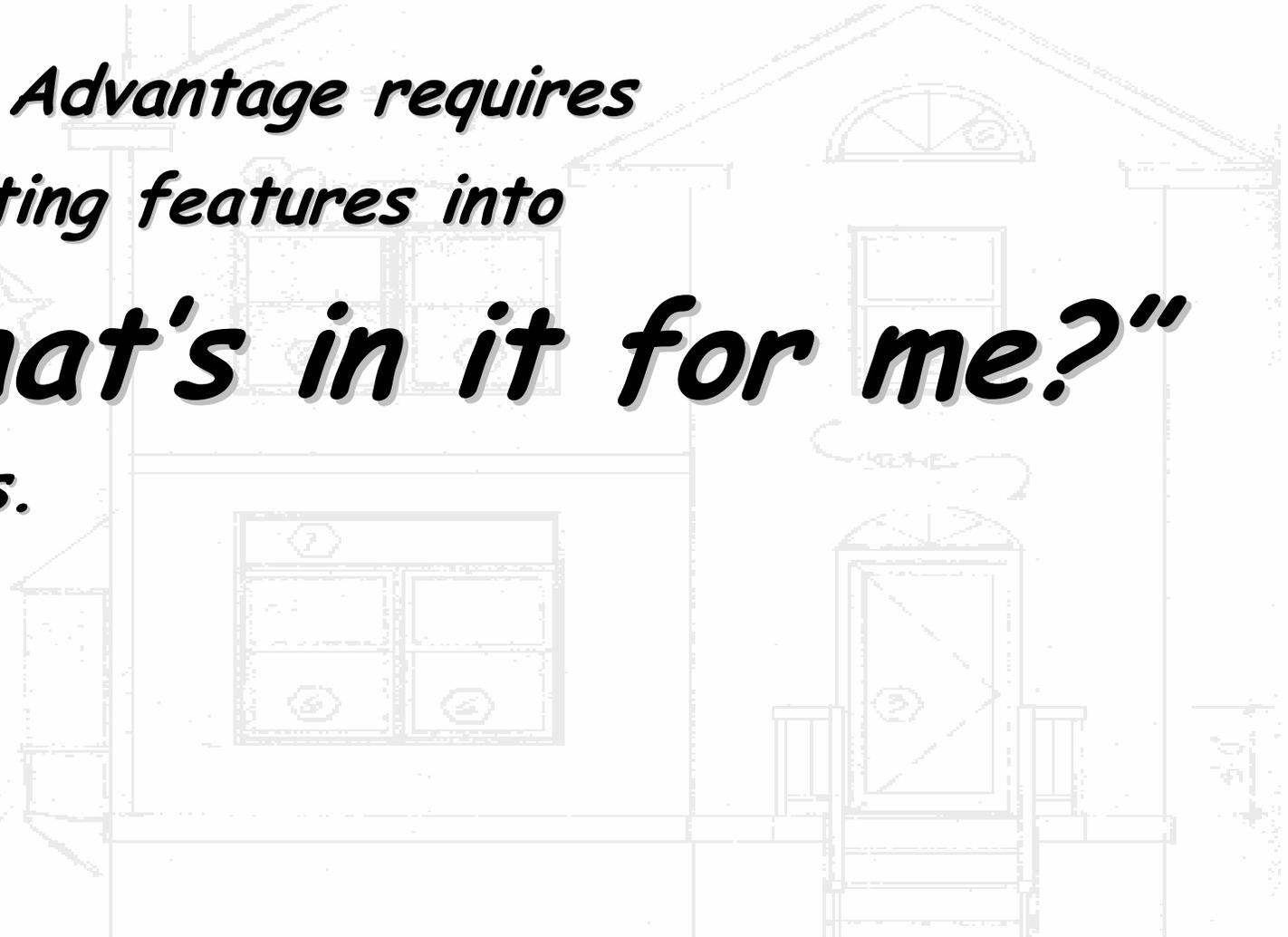


Quality Advantage requires

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:

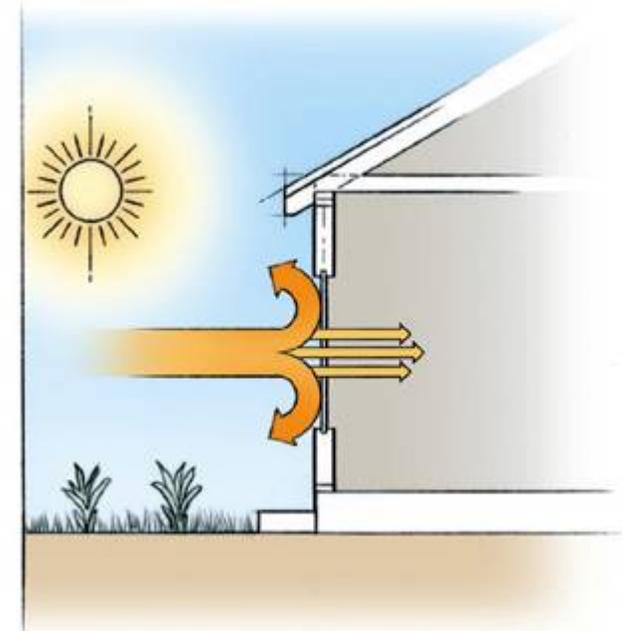
Think of heating and cooling ducts as the lungs of your home; we seal ducts so dust, bugs and pollen can't compromise the air you breathe.

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."

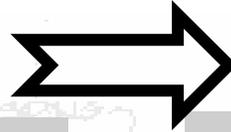
ENERGY STAR Partner Astoria Homes, Nevada



QUALITY ADVANTAGE



Features



WIIFM Benefits

- *Properly Installed Insulation System*
- *Tight Construction*
- *Tight Ducts*
- *Advanced Windows*
- *High Eff./ Right-Sized Equip.*
- *Inspections/Testing*

- *More Quiet*
- *More Comfort*
- *No Drafts*
- *Less Bugs/Pests*
- *Better IAQ*
- *Higher Quality*
- *Less Maintenance*
- *Better Workmanship*
- *Better Investment*

PEACE-OF-MIND ADVANTAGE

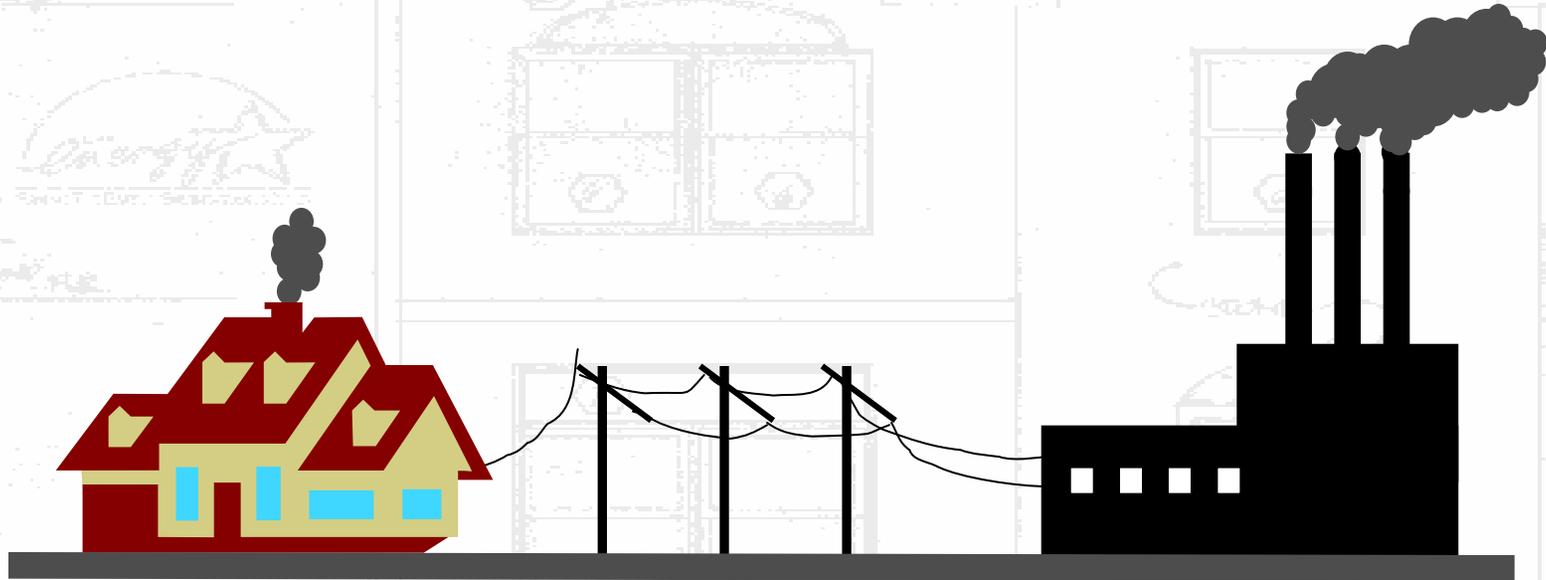


- ❑ ***Did I select a special home?***
< 12% of all homes in U.S. earn ENERGY STAR
- ❑ ***Is my home well-built?***
Rigorous inspection and testing
Strict guidelines from EPA and DOE
- ❑ ***Will my home maintain it's value?***
Upgraded technology and comfort systems;
Increasingly sought after performance label;
Protection from projected rise in energy costs;
Home designed for future market expectations

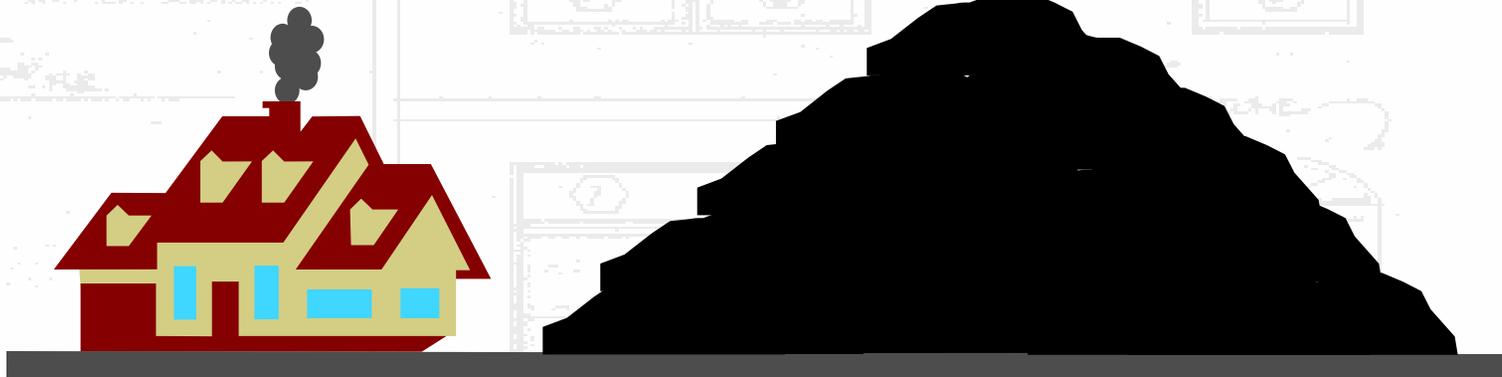
ENVIRONMENTAL ADVANTAGE



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...

Build ENERGY STAR Qualified Homes?

- *Threshold of Pain*
- *Defects No Longer Invisible*
- *Smarter Consumers*

THRESHOLD OF PAIN



ca@ecartoons.com
-latoons@telus.net





TOM'S SHELL

*Self
Serve*

*Cash or
Credit*

Regular

ARM 9

Plus

LEG 9

Premium

**First 9
Born**

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



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.

THRESHOLD OF PAIN IN ACTION



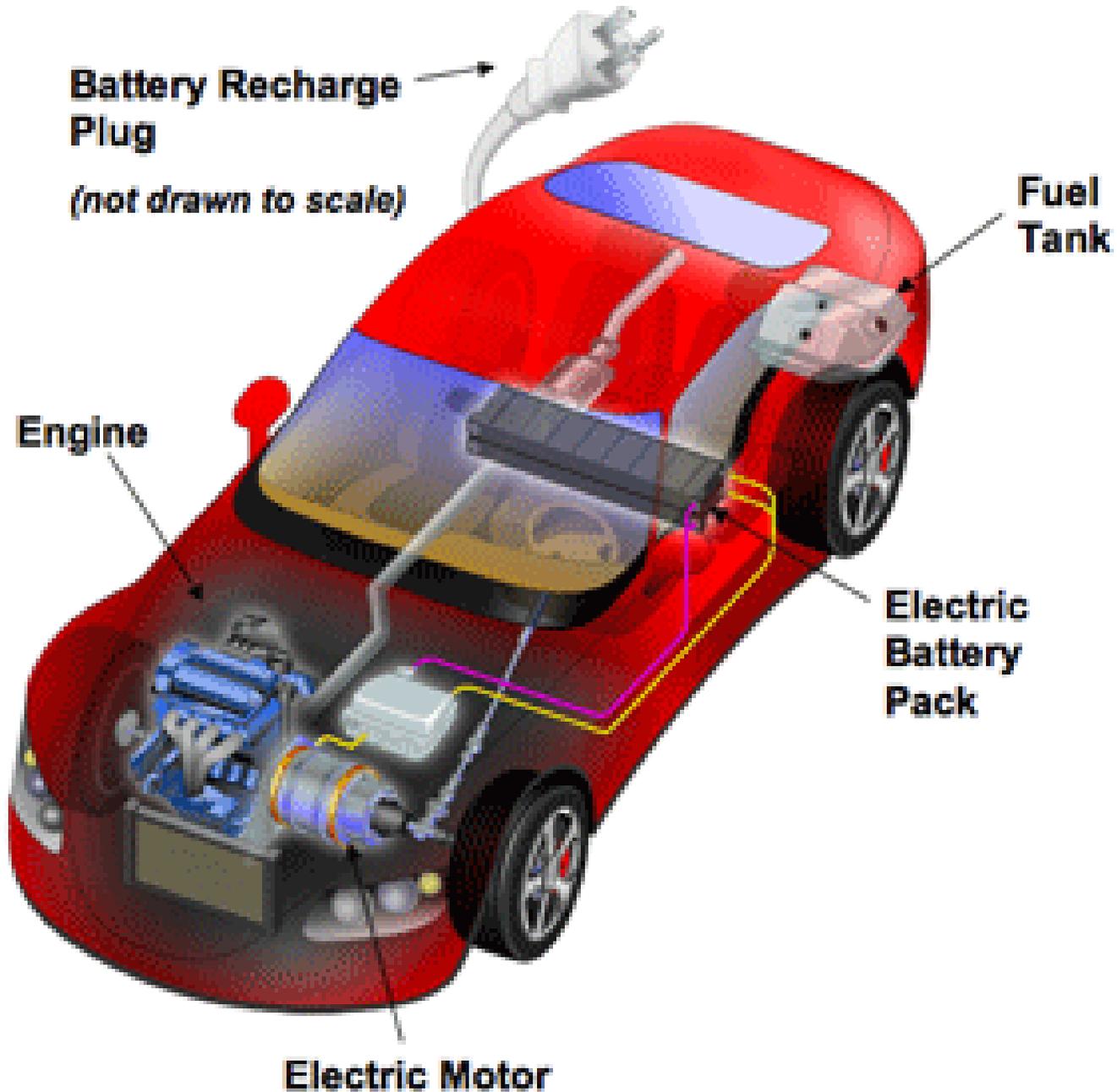




For national security we need transportation fuel options:

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

How a Plug-In Hybrid Works





Likely Scenario:

\$.30-.40/kWh

Electricity



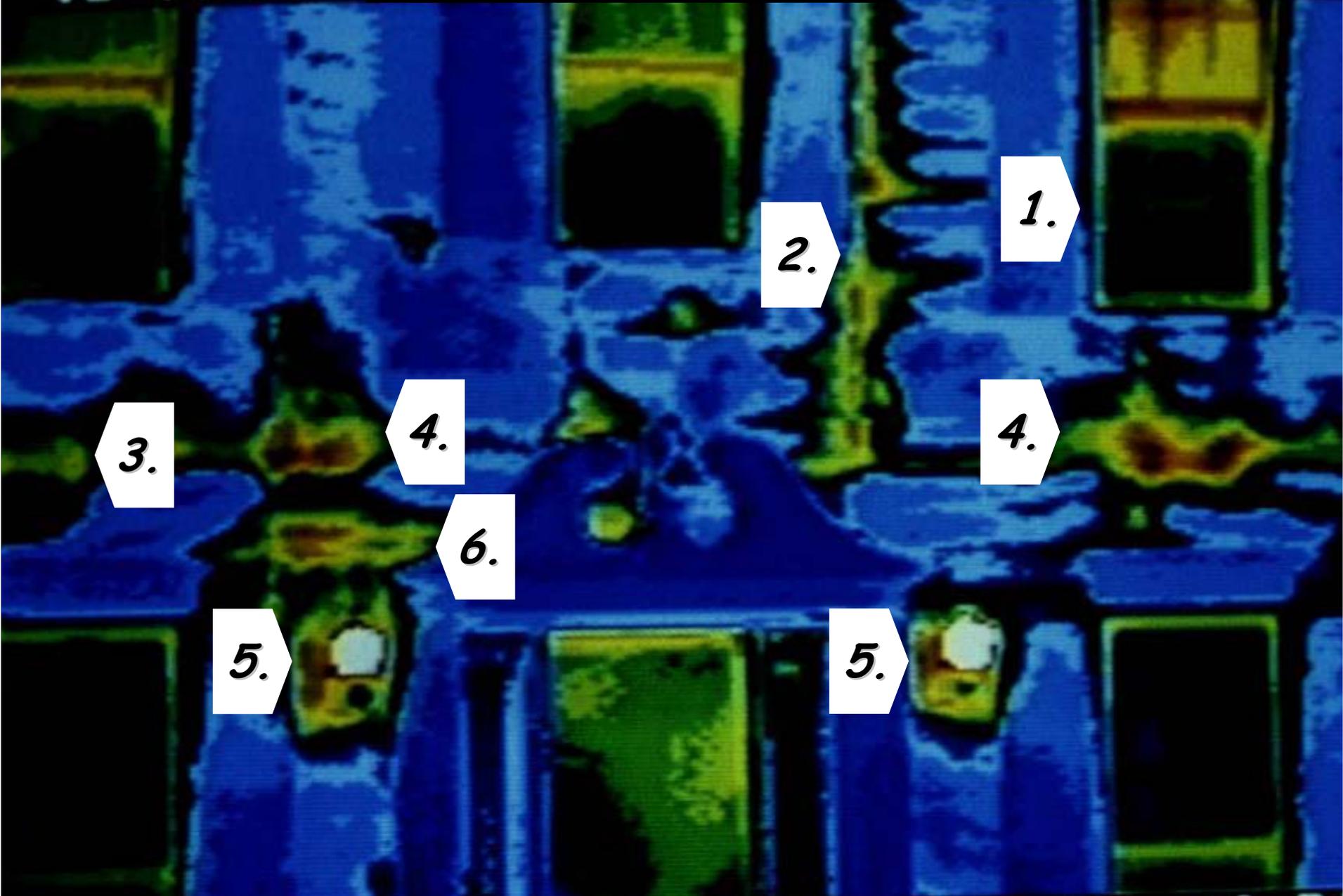
Defects Invisible



02/15/93

Defects Visible

00 BB 20 41 59

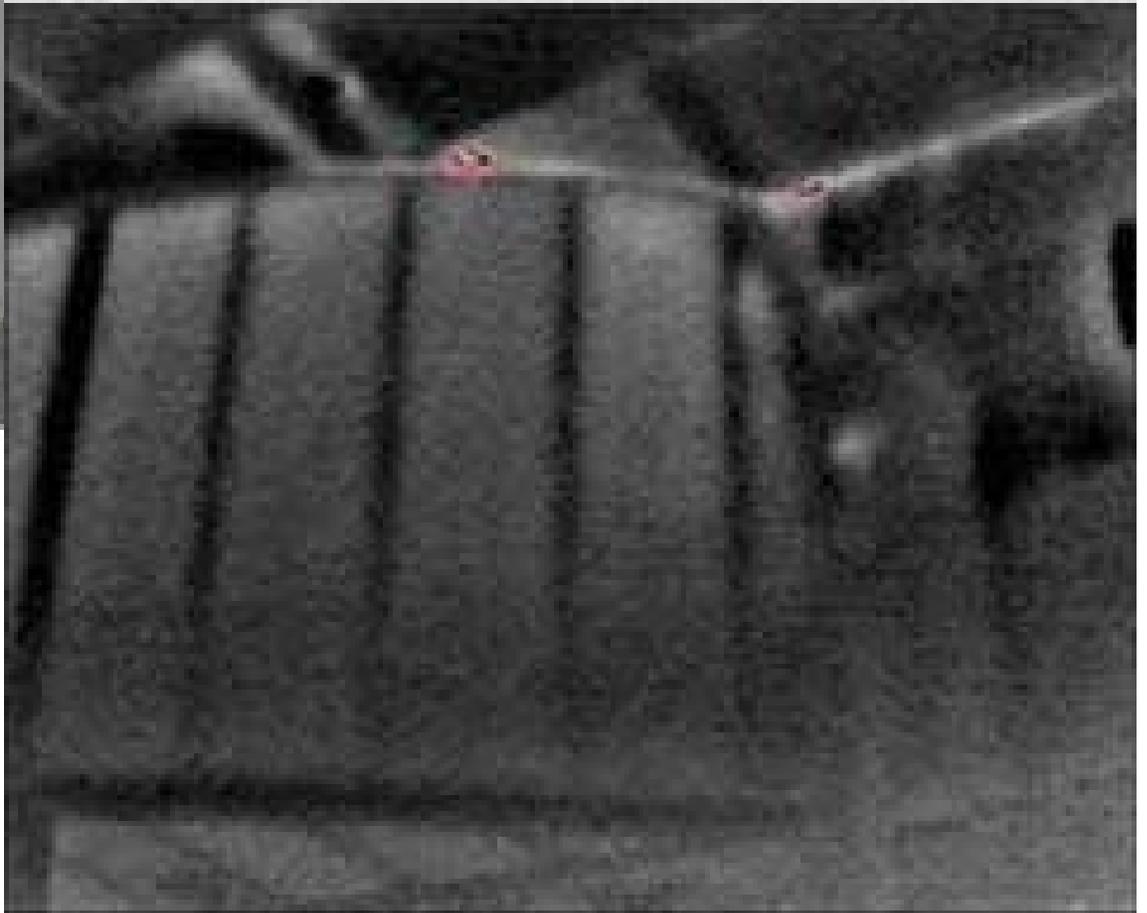
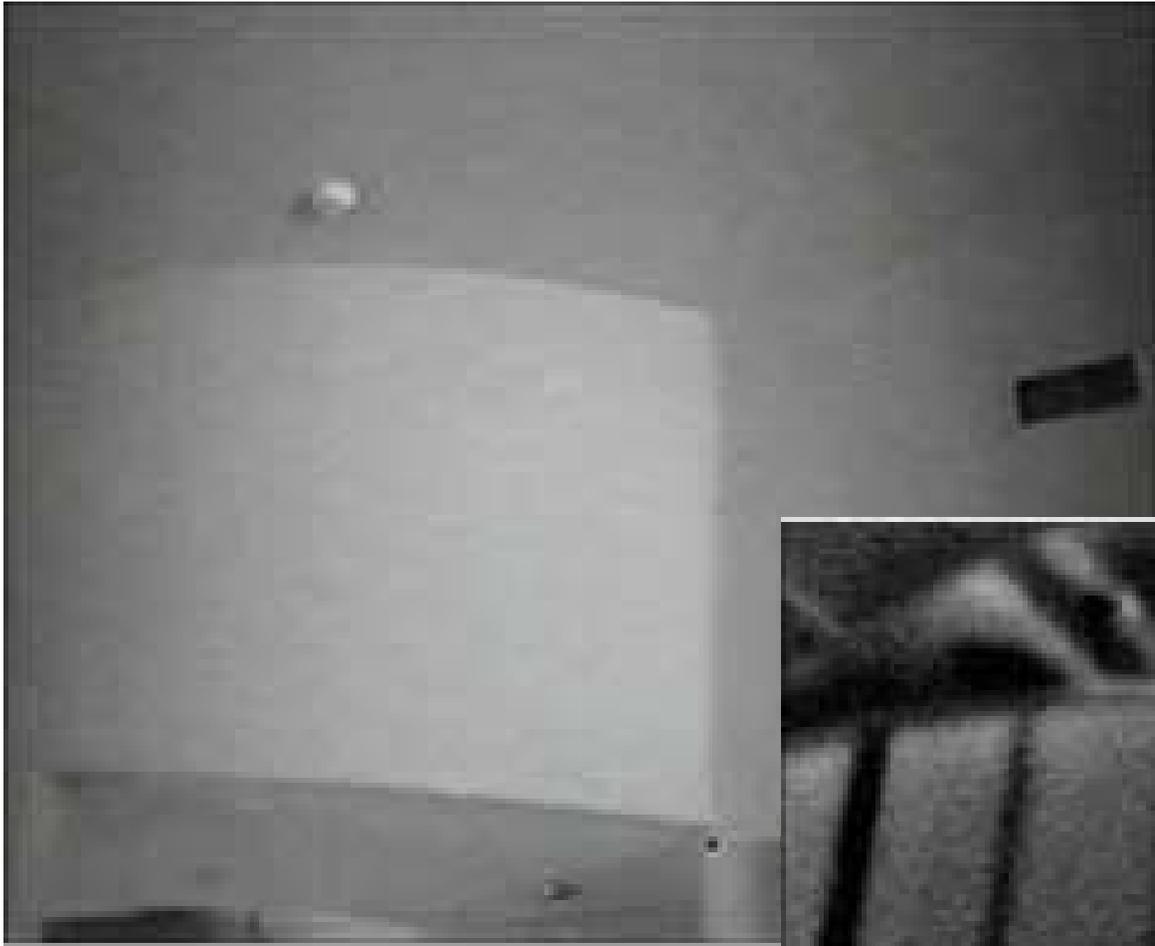


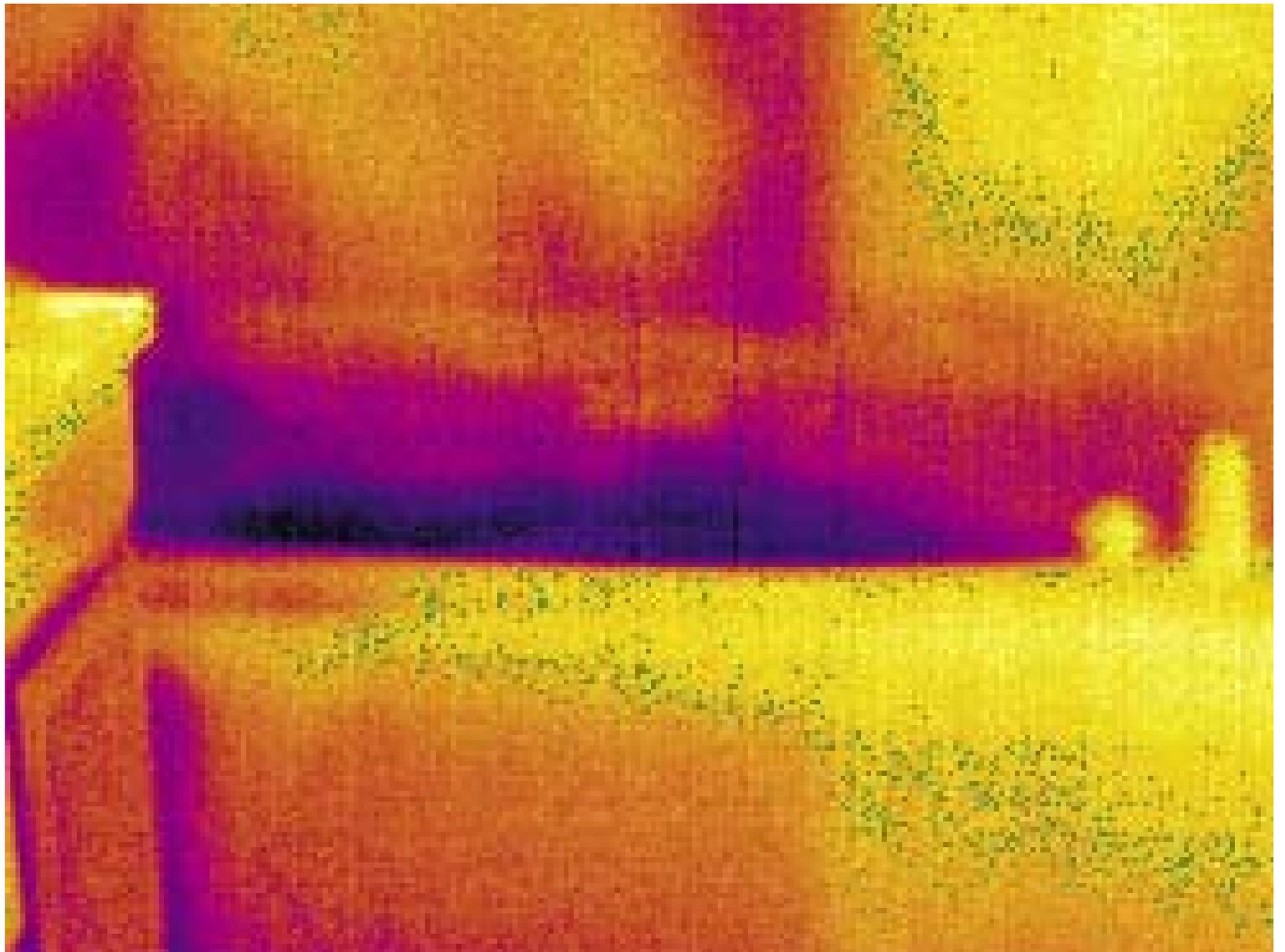
Used Homes = Obsolete Competition

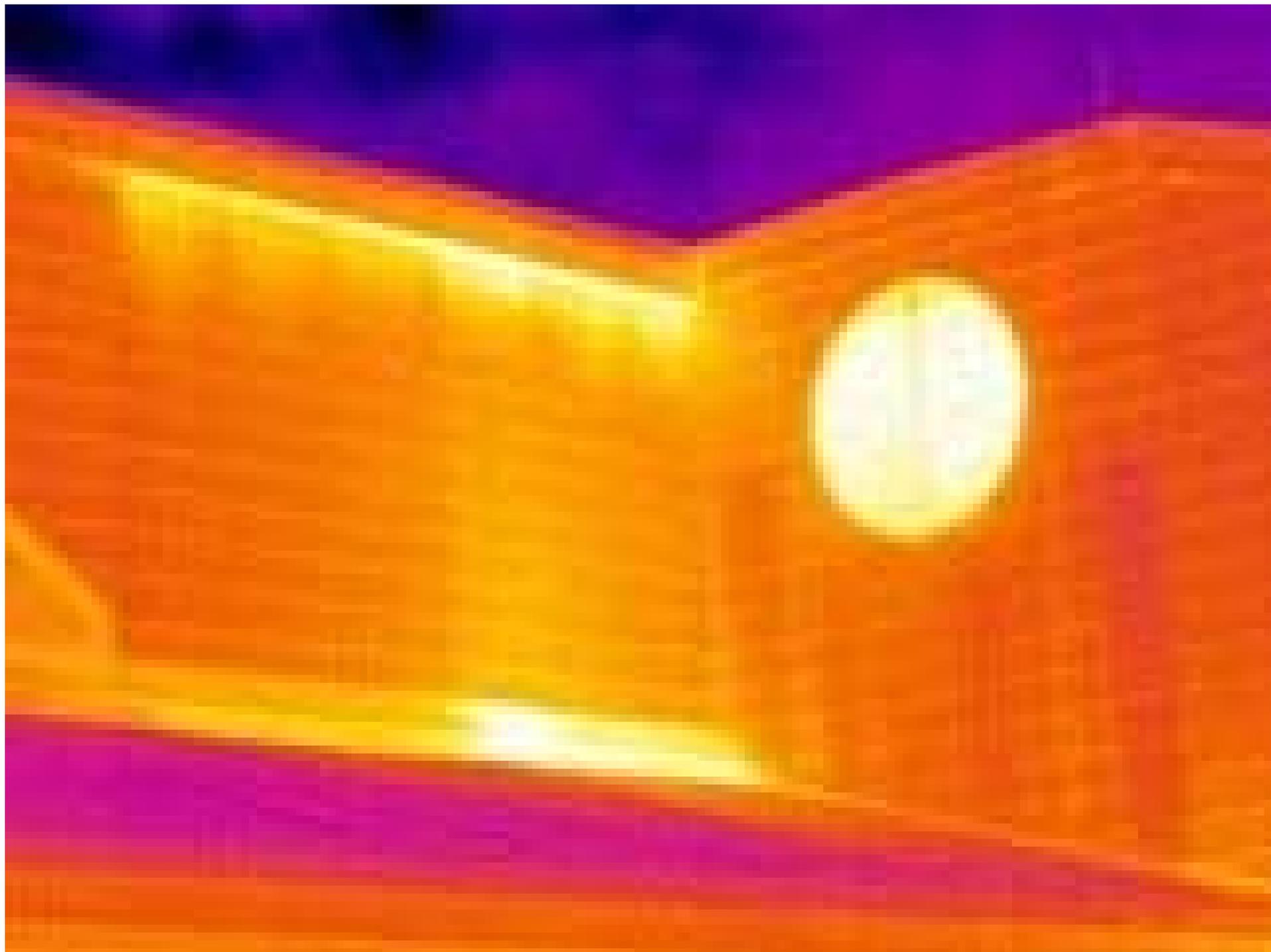


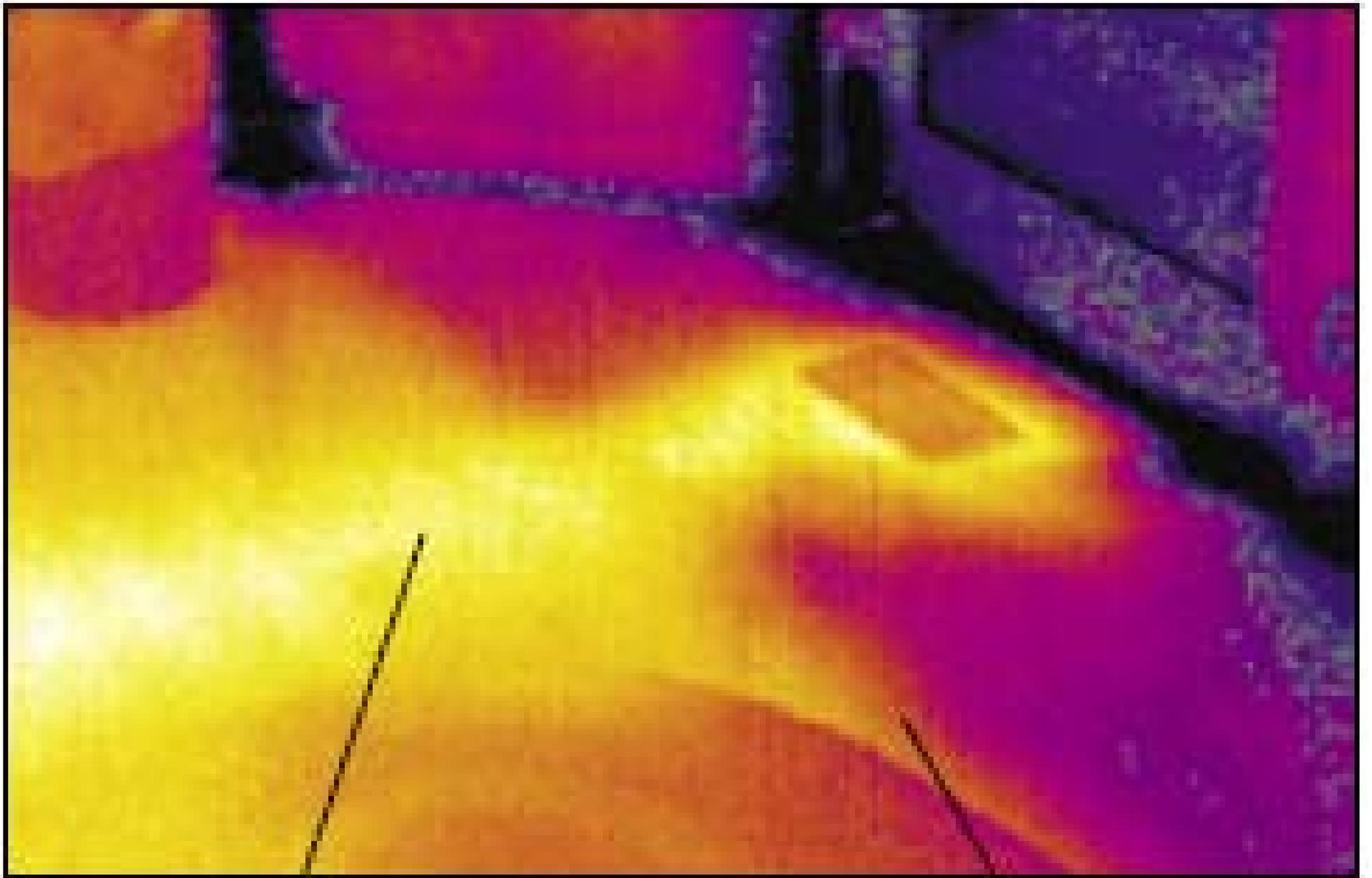
New Homes = Obsolete Competition



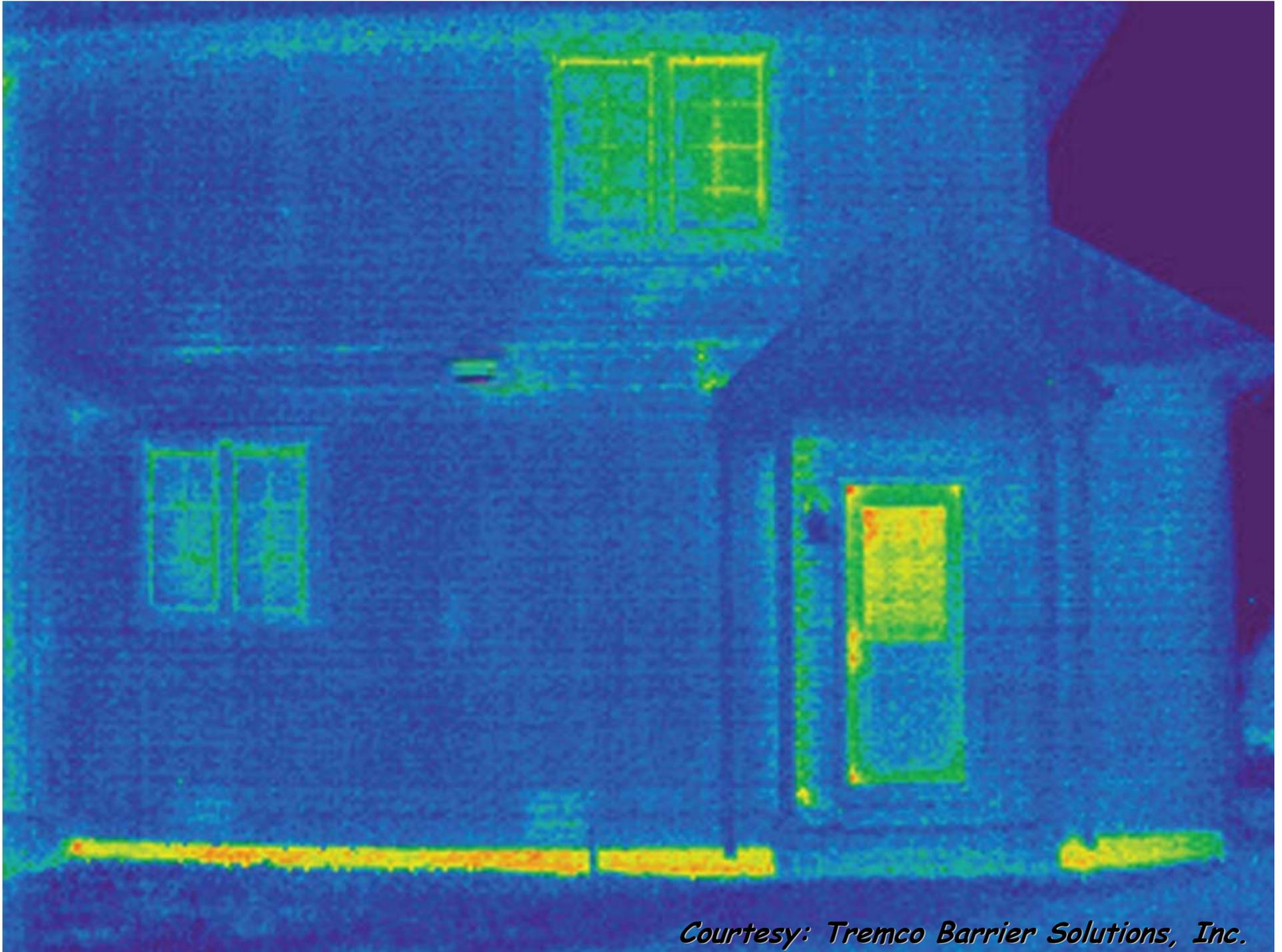




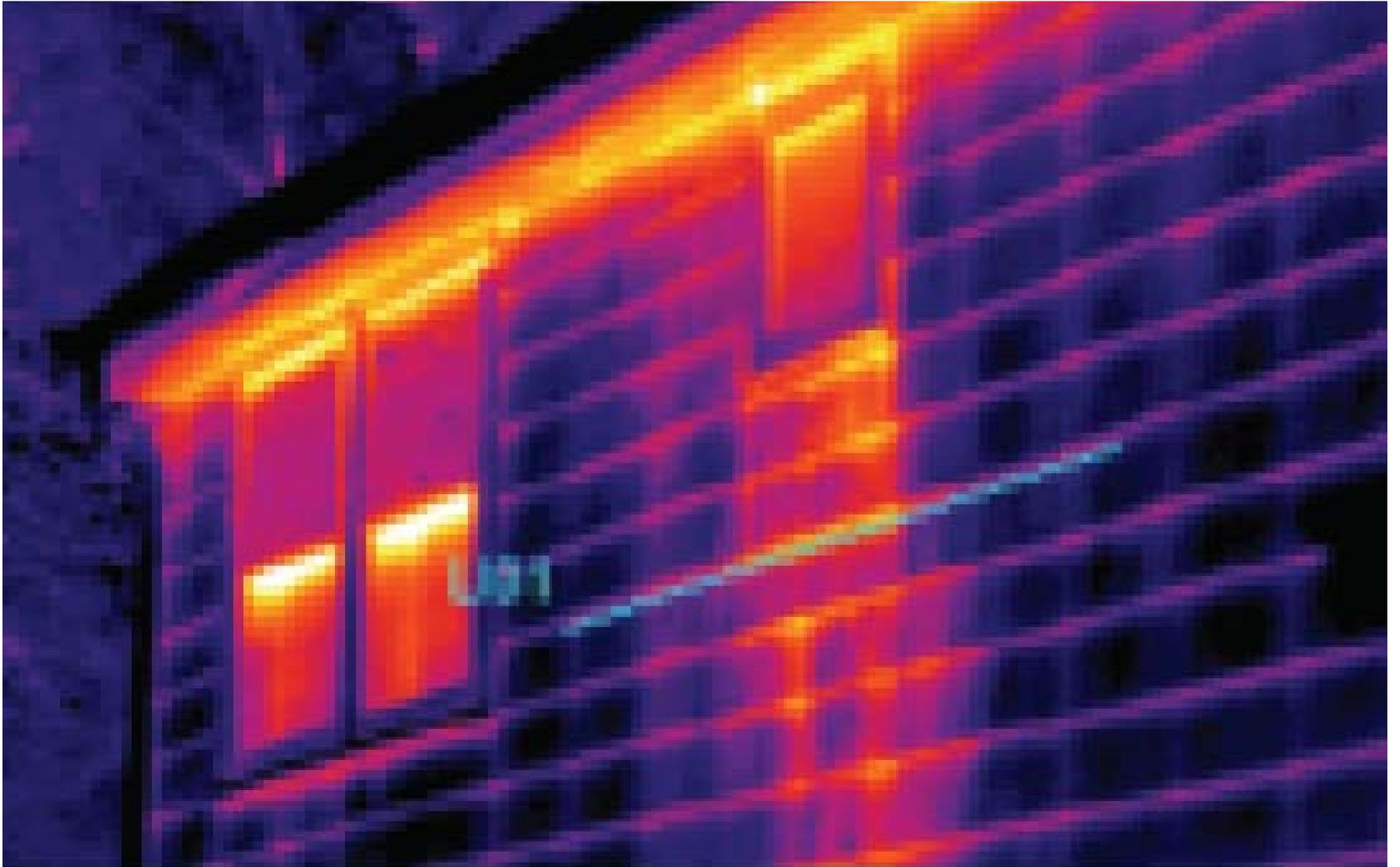




Courtesy of Fort Collins Utilities



Courtesy: Tremco Barrier Solutions, Inc.



Water Damage

CODE NONCOMPLIANCE EXPOSED



*Most thermal bypass details
required by code, but
not enforced.*

Are builders still liable?



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



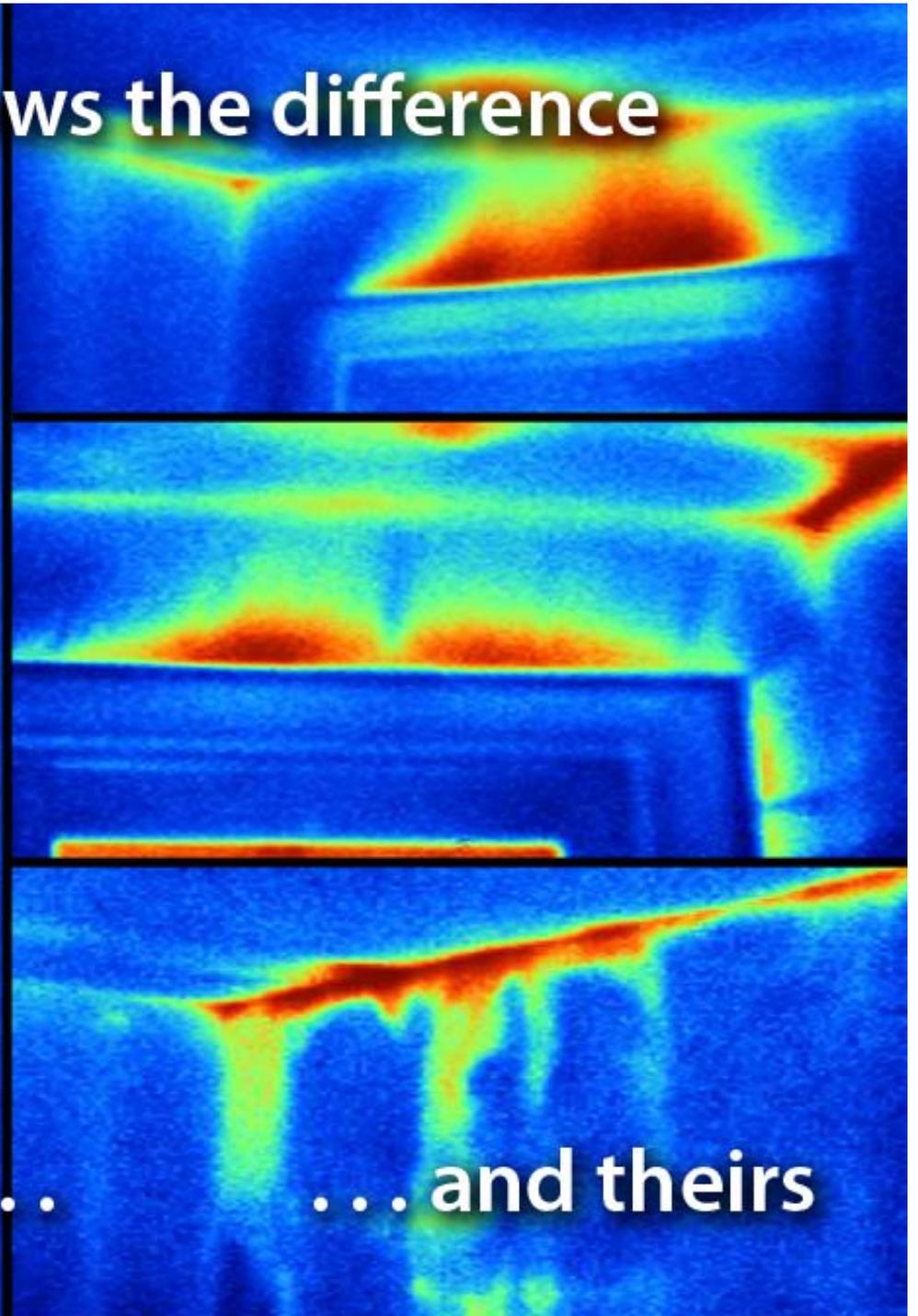
My inner child grew up to live in a 22-year-old house, not a new one, and he wants to sell it someday and doesn't want it to be as obsolete as his grandpa's outhouse and wash basin.

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

Infrared imaging shows the difference



Our insulated walls . . .

. . . and theirs

Infrared Energy Auditing – How Home Inspectors Gain a Competitive Edge

According to the U.S. Department of Energy, the typical family spends close to \$2,500 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 Vics of Building Performance Consulting in Schenectady, NY and Gary Goodman of Energy Construction, LLC in Ravena, NY rely on their FLIR Systems EX200 infrared camera for home energy auditing assessments. Built for harsh environments, the EX200 is a rugged yet flexible infrared solution featuring interchangeable optics, high-resolution imaging and extreme thermal sensitivity. Feature-rich and affordable, the EX200 is the smallest, smartest infrared camera on the market today.

"We are thrilled to have this instrument," said Vics. "We use the EX200 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 along 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 nondestructive method, which is a definite competitive edge for our business."

Both Vics 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 SmartSM 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," Vics 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 ThermoCAM 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.

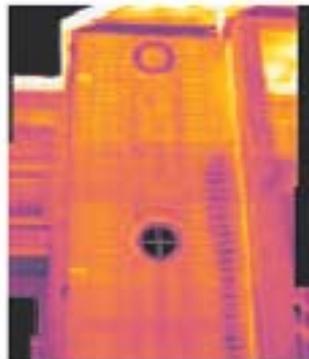
Infrared thermography is a well-accepted method of imaging and evaluating the

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 ThermoCAM 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.inthermography.com or call 1-800-464-6372.

Howard Vics 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 an insulating and air-sealing homes in the Capital region for over 25 years. For more information you can reach Howard Vics at (518) 355-4546 and Gary Goodman can be reached at (518) 758-4303.



FLIR
The Global Leader in Infrared Cameras

THE ULTIMATE SCARY MAN



"Construction defects

can dramatically change the comfort and quality of your home... We can help!...

Over \$430,000,000

awarded to our clients!!!"

<http://www.kasdansimonds.com/constructiondefects.asp>

SMARTER CUSTOMERS



~80%

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

MORE INFO FOR SMARTER BUYERS



JD Powers and Assoc. 2005 Builder Quality Rankings

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

MORE INFO FOR SMARTER BUYERS



J.D. Power Builder Comparisons



2006 New-Home Builder Customer Satisfaction Study

Portland

Award Recipient: Centex

Company	<u>Overall Customer Satisfaction</u>	<u>Quality of Workmanship & Materials</u>	<u>Price & Value</u>	<u>Home Design</u>
▲▼ Centex Award Recipient 	▲▼ ●●●●●	▲▼ ●●●●●	▲▼ ●●●●●	▲▼ ●●●●●
Arbor Custom	●●●●○	●●●●○	●●●●○	●●●●○
D.R. Horton	●●●○○	●●○○○	●●○○○	●●○○○
Don Morissette	●●○○○	●●○○○	●●○○○	●●○○○
JLS Custom	●●○○○	●●○○○	●●○○○	●●○○○
Legend Homes Corp.	●●●○○	●●●○○	●●●○○	●●●○○

Scoring Legend

●●●●● Among the best ●●●●○ Better than most ●●●○○ About average ●●○○○ The rest

MORE INFO FOR SMARTER BUYERS



[ABOUT US](#) | [INVESTOR RELATIONS](#) | [PRESS ROOM](#) | [CAREERS](#) | [CONTACT](#) | [DEL WEBB](#) | [DIVOSTA HOMES](#)

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PULTE HOMEOWNER FOR LIFE™

[GETTING STARTED](#) | [FIND YOUR HOME](#) | [PERSONALIZE YOUR HOME](#) | [FINANCE YOUR HOME](#) | [BUILDING YOUR HOME](#) | [LIVING IN YOUR HOME](#)

Highest in
Customer
Satisfaction

GO



PULTE HOMES
Come and
visit us today.



Find Your Home

Where do you want to live?

Select a state to begin
your search.

SELECT STATE:

--- Select State ---



Ready to Move

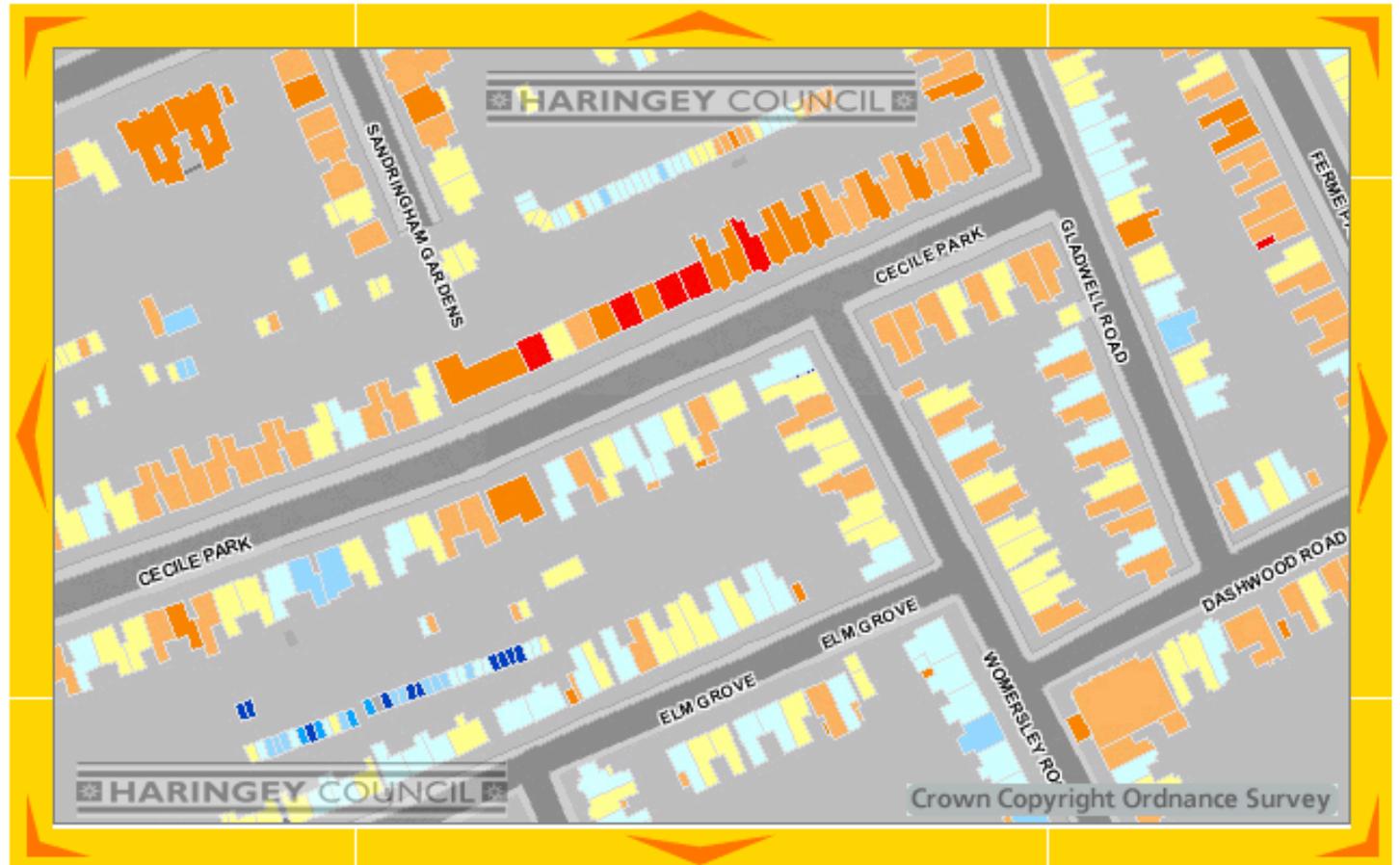
Sign up to receive
email updates on
available homes.

GO

Haringey Interactive Heat Loss Map

[Return to Haringey.gov.uk](http://Haringey.gov.uk)

Developed by  Ltd.



Find an address

Street Name

or Postcode



Heat Loss Survey Data provided by hotmapping.co.uk & [Horton Levi](http://HortonLevi.com)

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DOES LEADERSHIP MATTER?



MIKE LUCKOVICH
ARTIST: JIMMY GIBSON
© 2004



THELMA & LOUISE

LEADERSHIP OPPORTUNITY



Minimize Cost:

ENERGY STAR Cost:
\$2,500

100 Home Dilemma:
\$2,500 x 100 homes =

\$.25 million

vs.

Maximize Value:

New Home Avg. Cost:
\$500,00+

< .5% investment

- **Visible Quality**
- **Obsolete Competition**
- **Reduced Liability**
- **Increased Satisfaction**
- **Recognition as Leader**

How...

- *...building science works*
- *...to apply building science*
- *...to partner with ENERGY STAR?*

BUILDING SCIENCE
KEY COMPONENTS

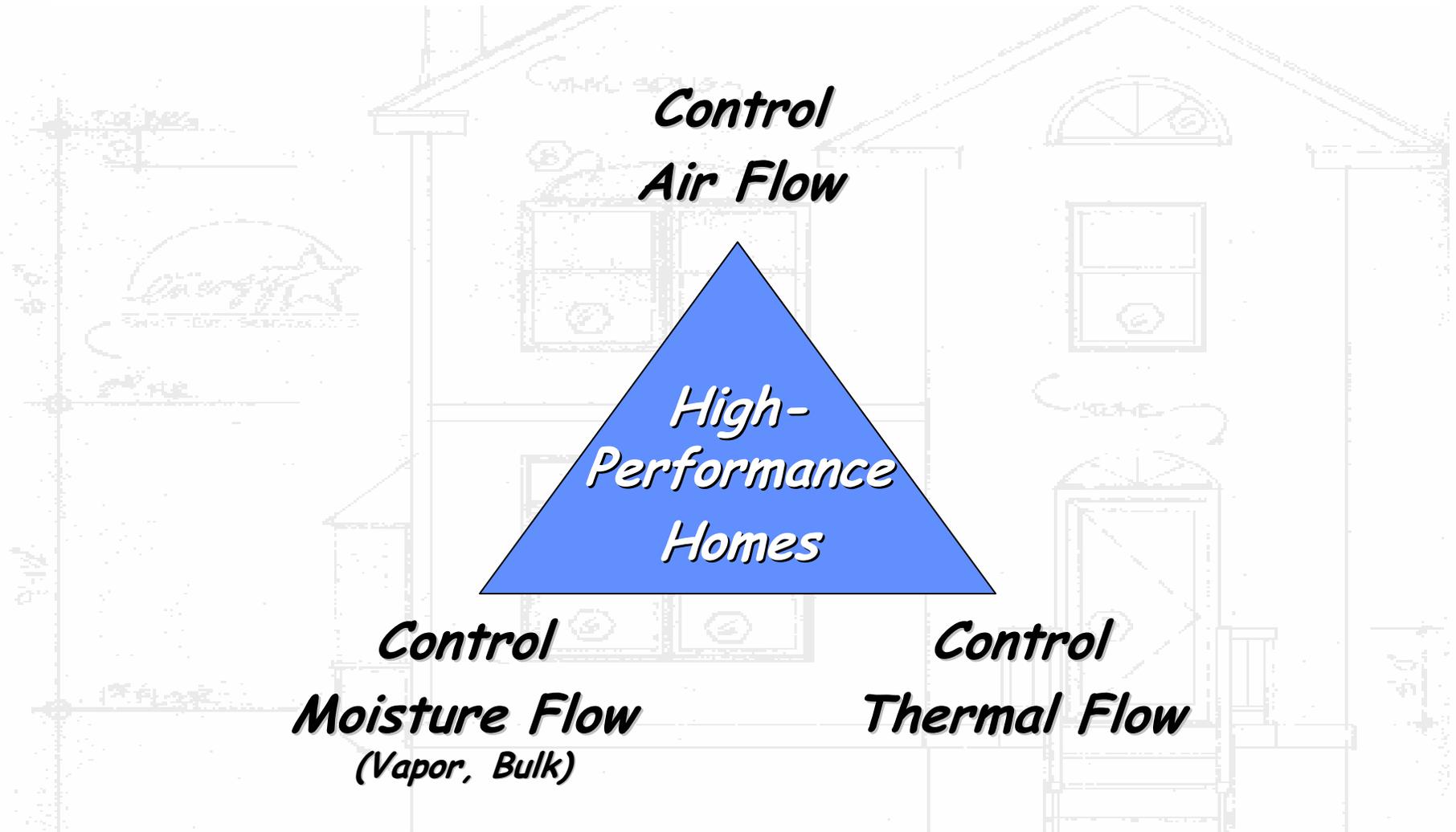


***Control
Air Flow***

***High-
Performance
Homes***

***Control
Moisture Flow
(Vapor, Bulk)***

***Control
Thermal Flow***



BUILDING SCIENCE
HOMES ARE LESS TOLERANT!



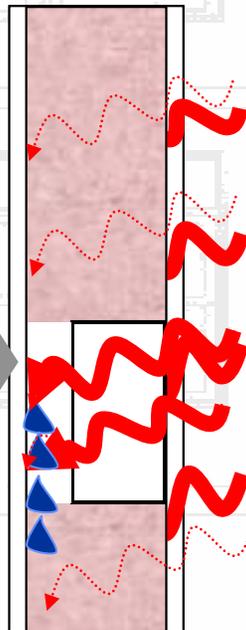
All action happens at surfaces

Without Insulation:

Potential Problem!

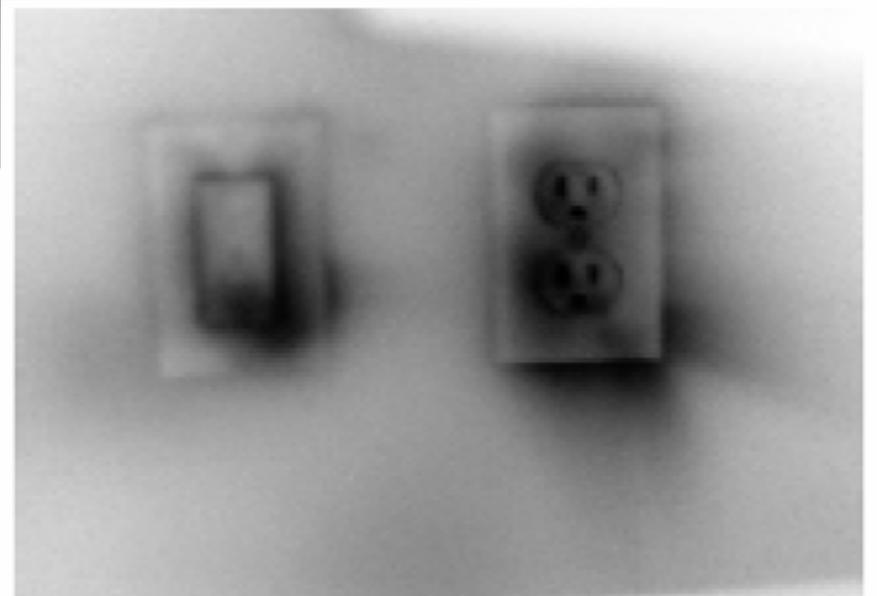
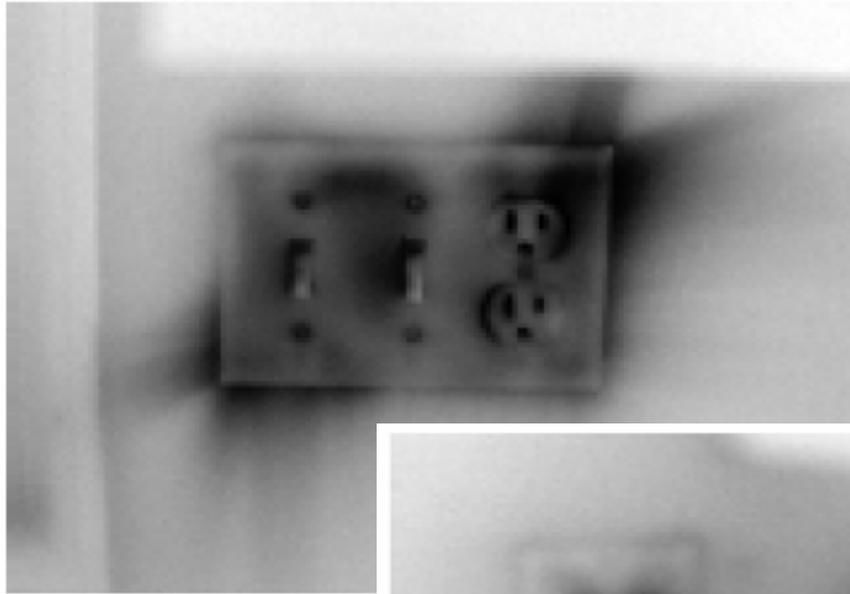
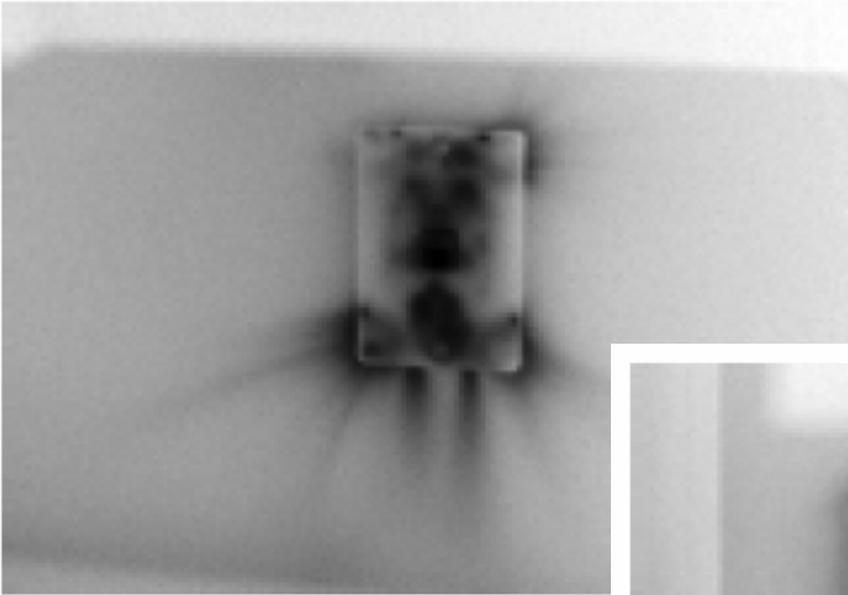
Outside:
30°F

*34 F
Cold
Surface*



Inside:
70°F, 45°F Dew Pt.

*Therefore,
must control
air leakage!!!*



BUILDING SCIENCE
WHY CONTROL AIR FLOW?



Courtesy of Building Science Corp.

BUILDING SCIENCE WHY CONTROL AIR FLOW?



Courtesy of Building Science Corp.

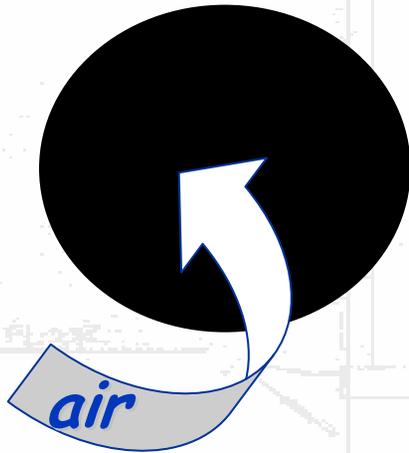
BUILDING SCIENCE WHY CONTROL FLOW?



Courtesy of Building Science Corp.



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

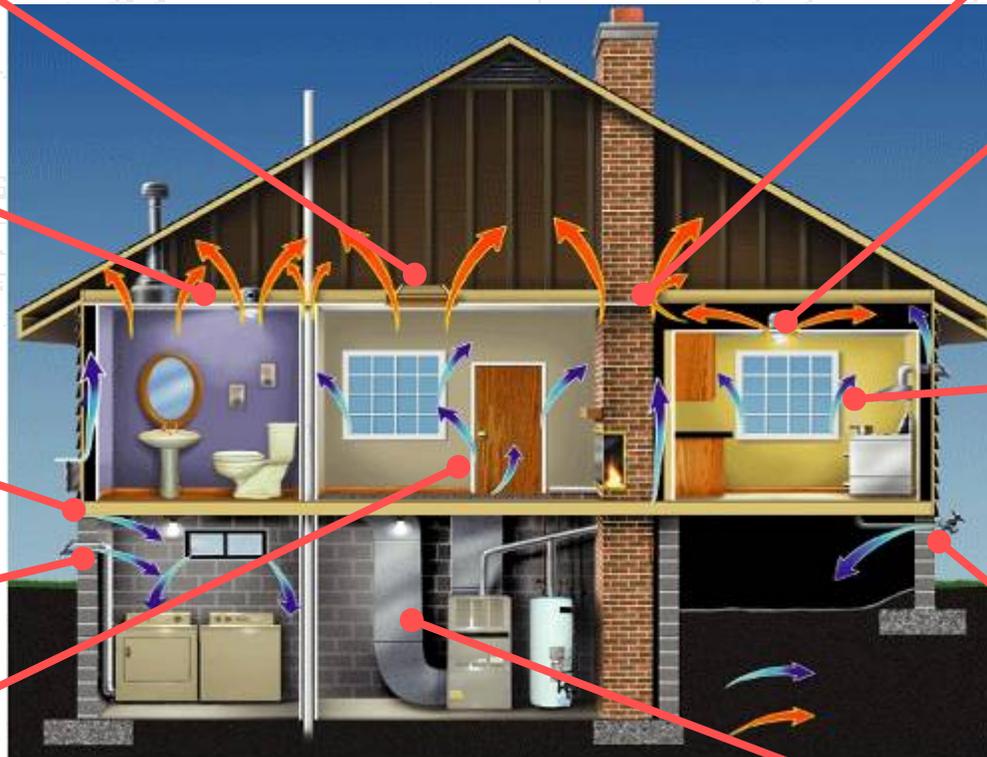


*Air will take path of least
Resistance through largest hole:
So seal big holes first!*

BUILDING SCIENCE
BIG HOLES



*Access
Panels
Ceiling
fixtures
Sill
Plates
Vents
Door
Openings*

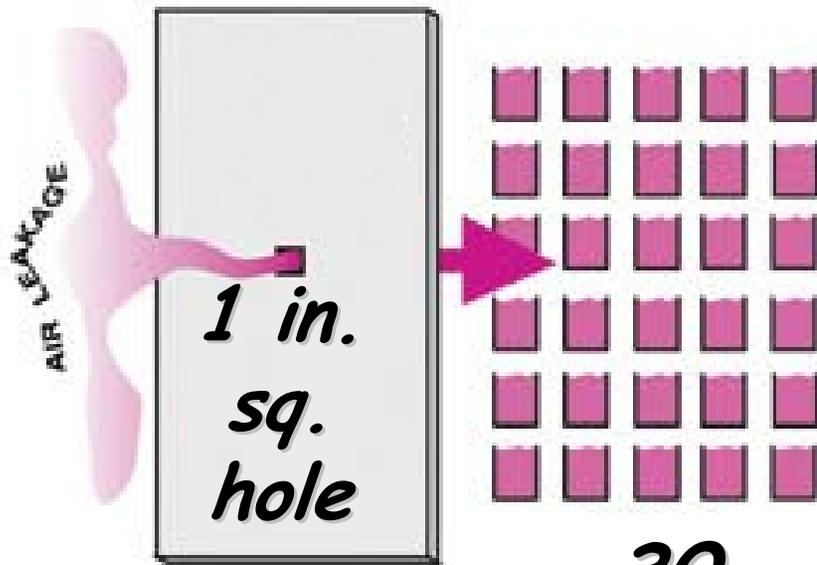


*Chases
Dropped
Ceilings
Window
Openings
Plumbing
Penetrations
Ducts*

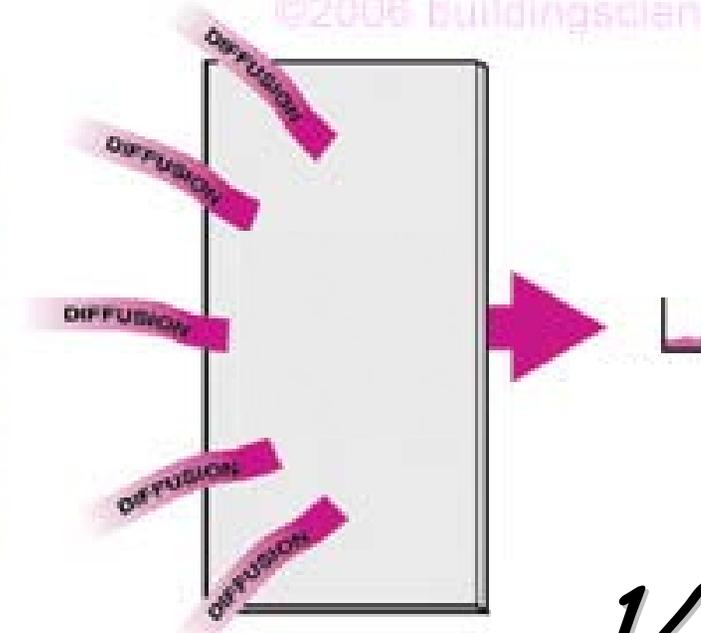
4' x 8' Sheet of Gypsum Board

Interior at 70°F and 40% RH

©2006 buildingscience.com



30
quarts
water



vs.

1/3
quart
water



2004.05.24







***Batt/Blown-in Insulation
is NOT an air barrier***

Resists Heat Flow

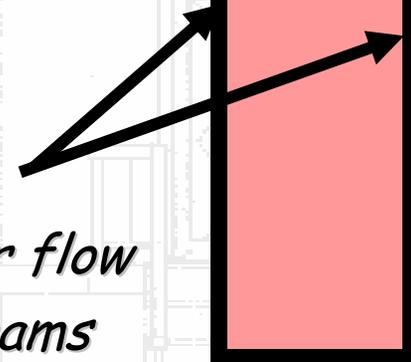


Air Flow



...need Air Barrier

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

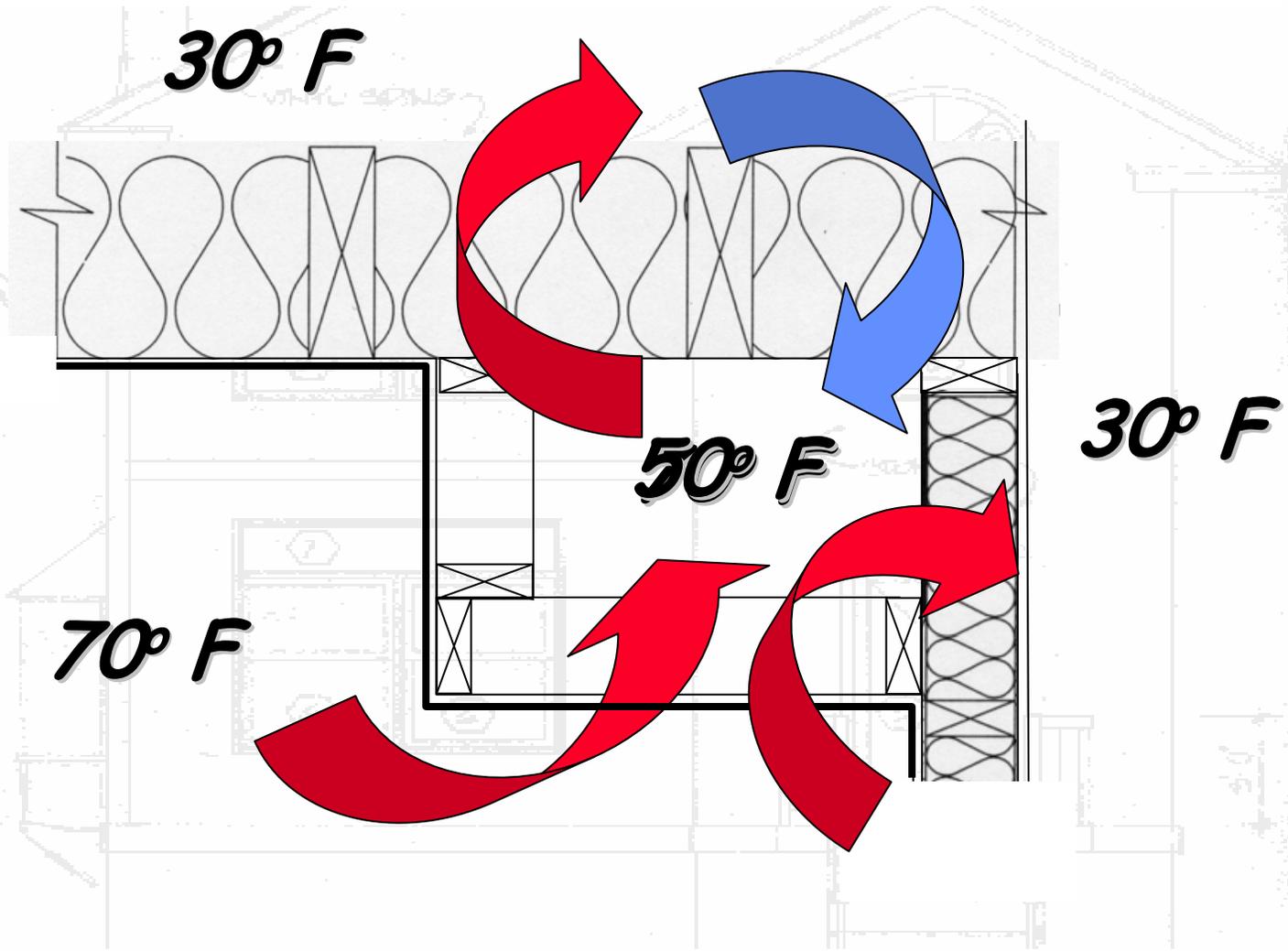


BUILDING SCIENCE AIR BARRIER EXPERIMENT



BUILDING SCIENCE

WHY COMPLETE AIR BARRIER



BUILDING SCIENCE

WHY COMPLETE AIR BARRIER



BUILDING SCIENCE

WHY SURFACE TEMPERATURES MATTER



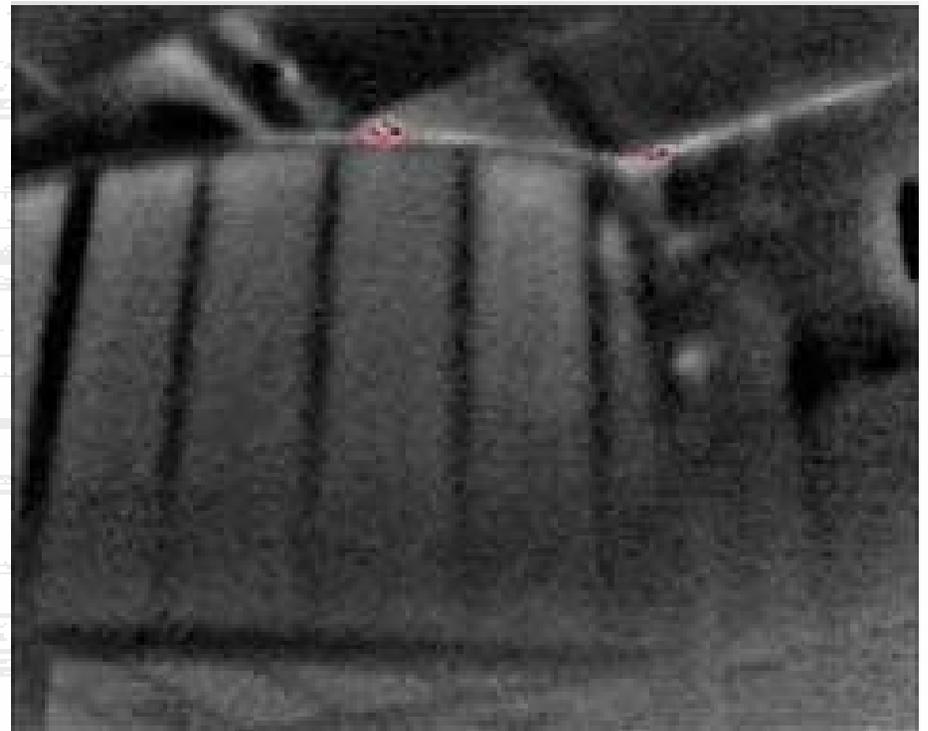
Mean Radiant Temperature (MRT) dominates comfort (40% > than ambient temp.).

30 °F



BUILDING SCIENCE

WHY CONTROL THERMAL FLOW?



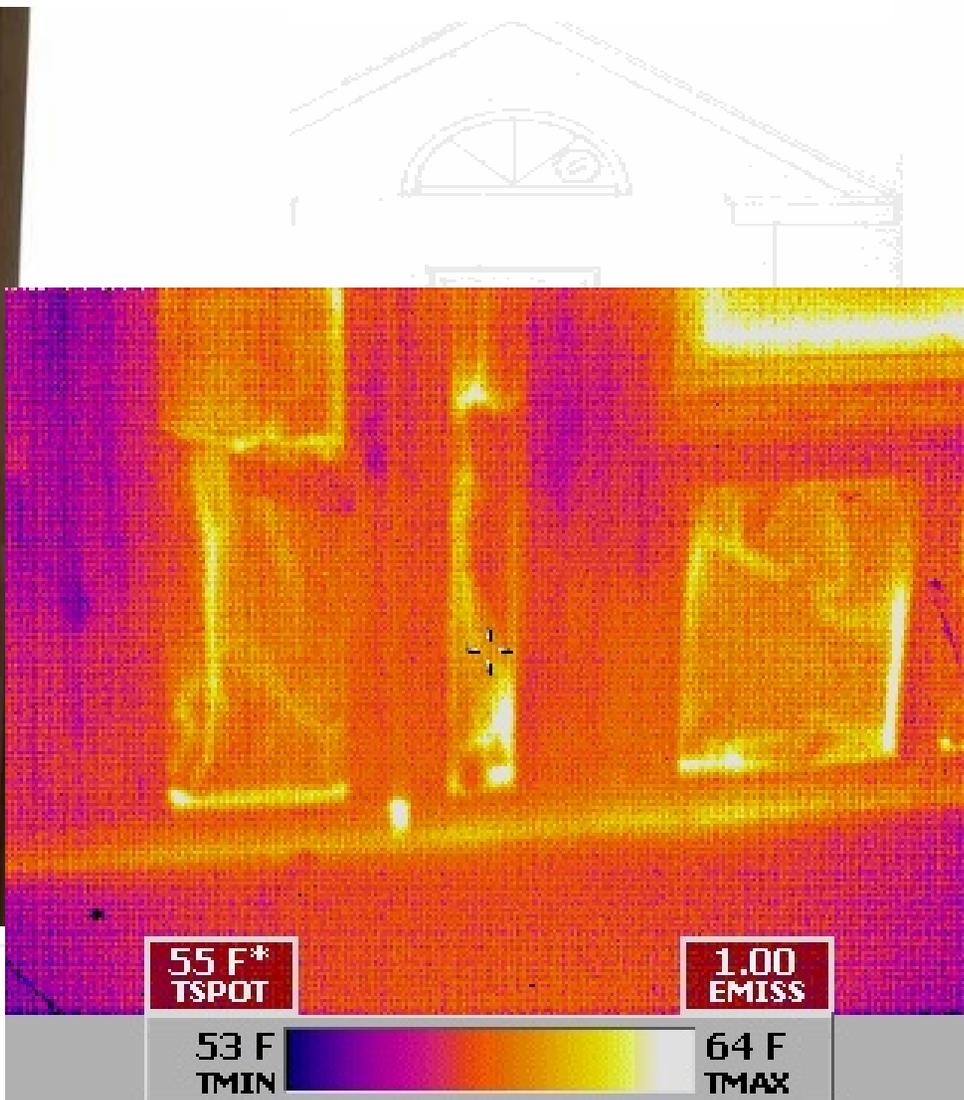
BUILDING SCIENCE

WHY CONTROL THERMAL FLOW?



BUILDING SCIENCE

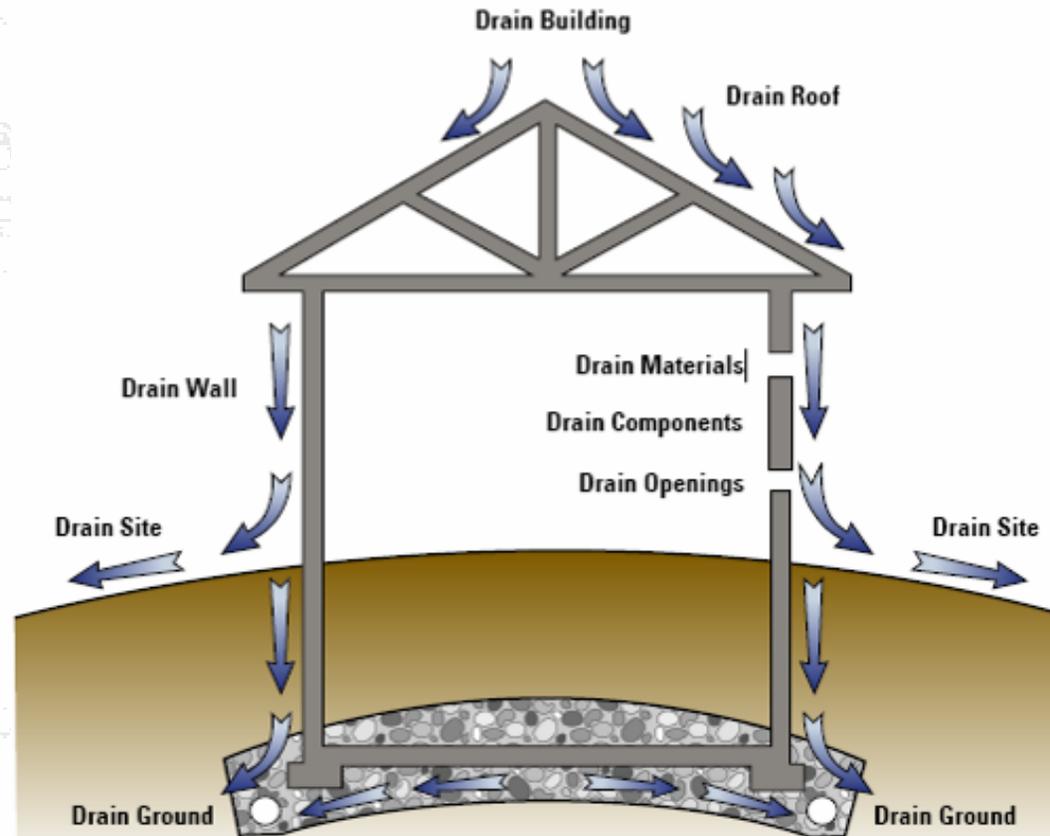
WHY CONTROL THERMAL FLOW



BUILDING SCIENCE AND DON'T FORGET BULK MOISTURE



Bulk moisture must be drained.



ENERGY STAR FOR HOMES TRAINING



Applying Building Science



SEAL UN-DESIGNED HOLES FLOOR SILL PLATE LEAKAGE



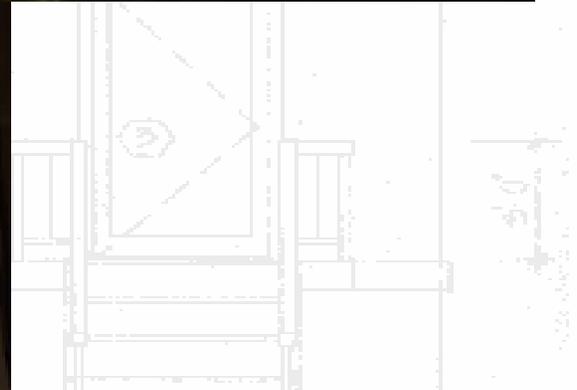
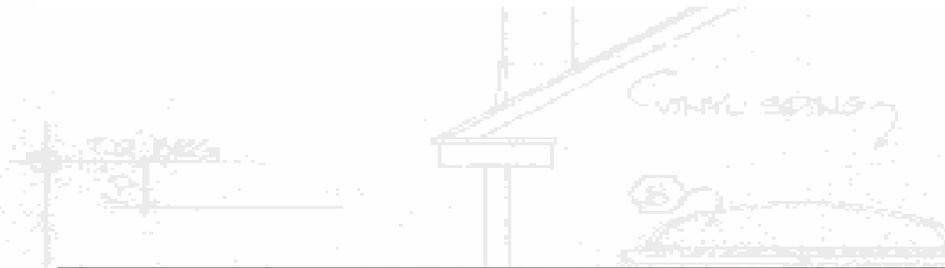
Courtesy of Building Science Corp.

SEAL UN-DESIGNED HOLES FLOOR SILL PLATE SEALING



Courtesy of Building Science Corp.

SEAL UN-DESIGNED HOLES WINDOW/DOOR ROUGH OPENINGS



SEAL UN-DESIGNED HOLES

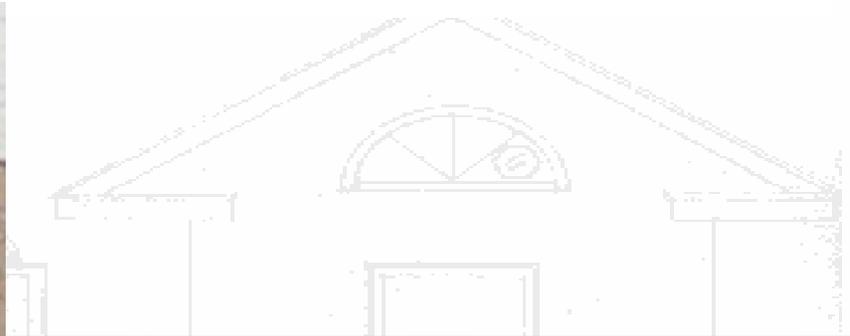
PLUMBING PENETRATION SEALING



Courtesy of Building Science Corp.

SEAL UN-DESIGNED HOLES

ELECTRIC PENETRATION SEALING



SEAL UN-DESIGNED HOLES ELECTRICAL OUTLET SEALING



Courtesy of Building Science Corp.

SEAL UN-DESIGNED HOLES ELECTRICAL SEALING



NOT ALL HOLES NEED TO BE SEALED!

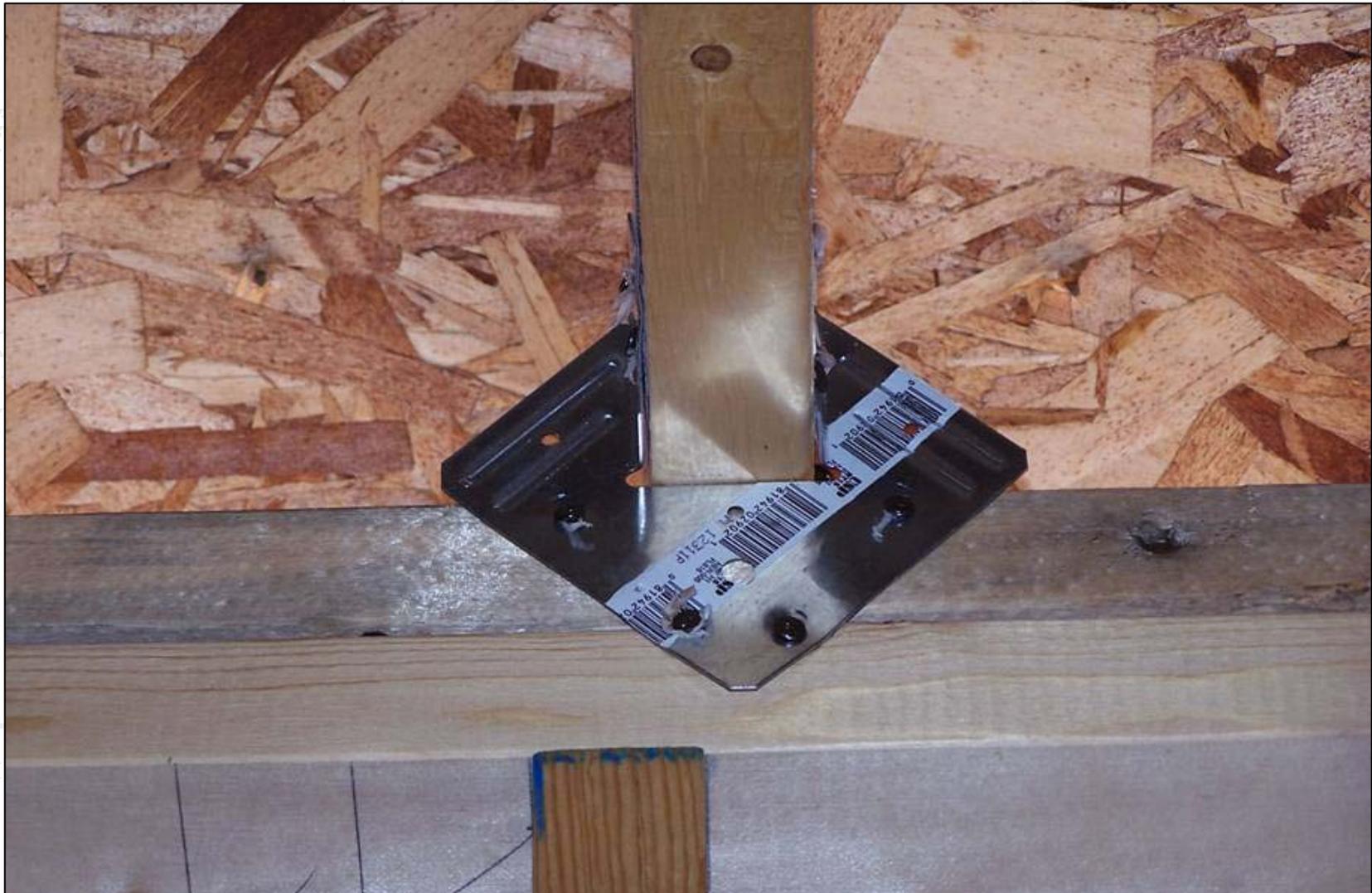


Key is to make sure crews have been trained to identify transitions between conditioned and unconditioned spaces



Courtesy of Building Science Corp.

WATCH FOR TRICKY HOLES



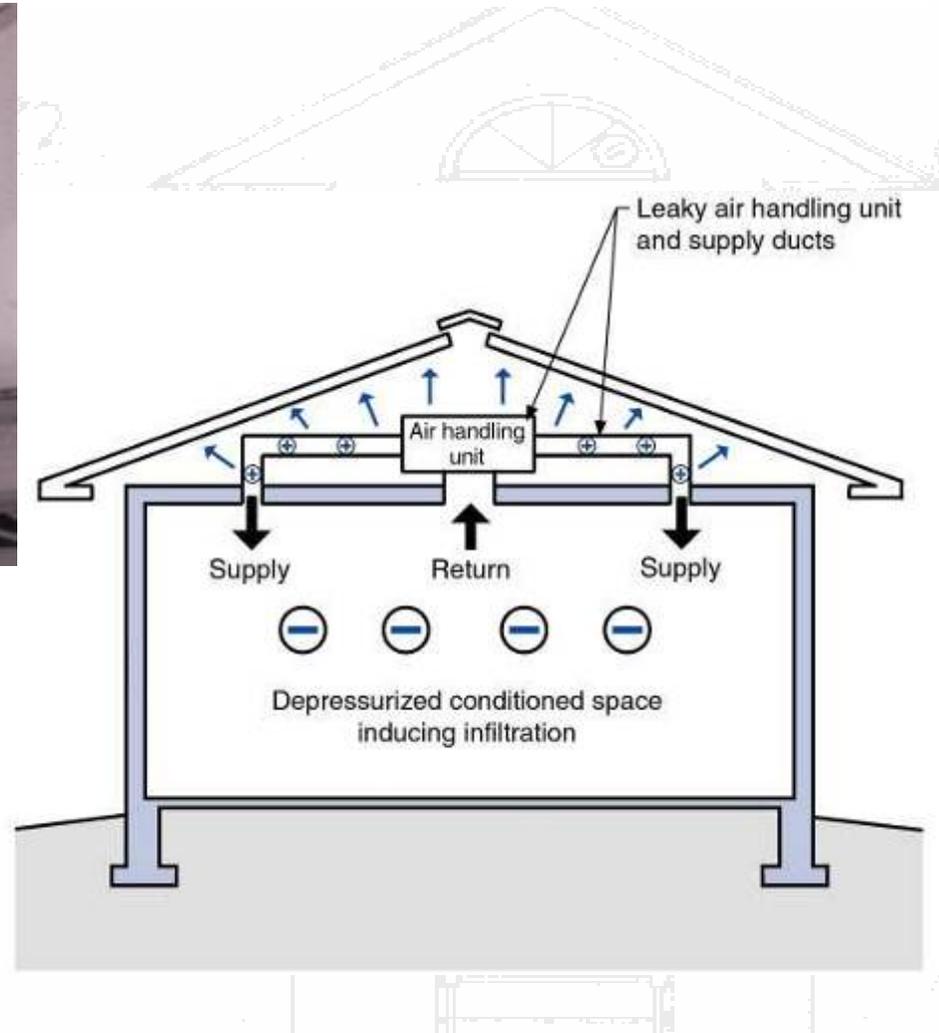




CONTROLLING AIR FLOW TIGHT DUCT PROBLEM:



© David Keefe

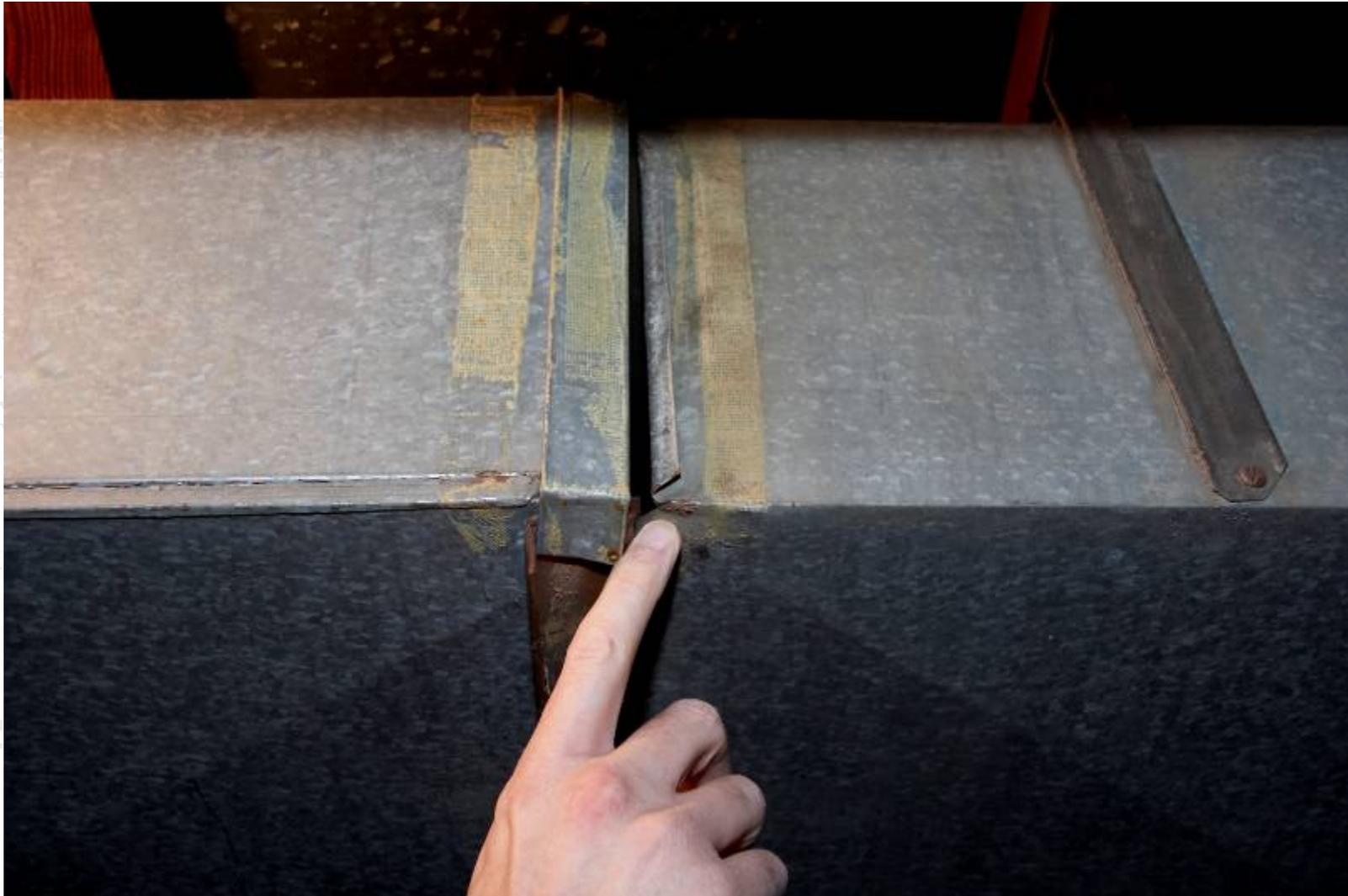


Courtesy of Building Science Corp.

CONTROLLING AIR FLOW TIGHT DUCT PROBLEM:



CONTROLLING AIR FLOW TIGHT DUCT PROBLEM:

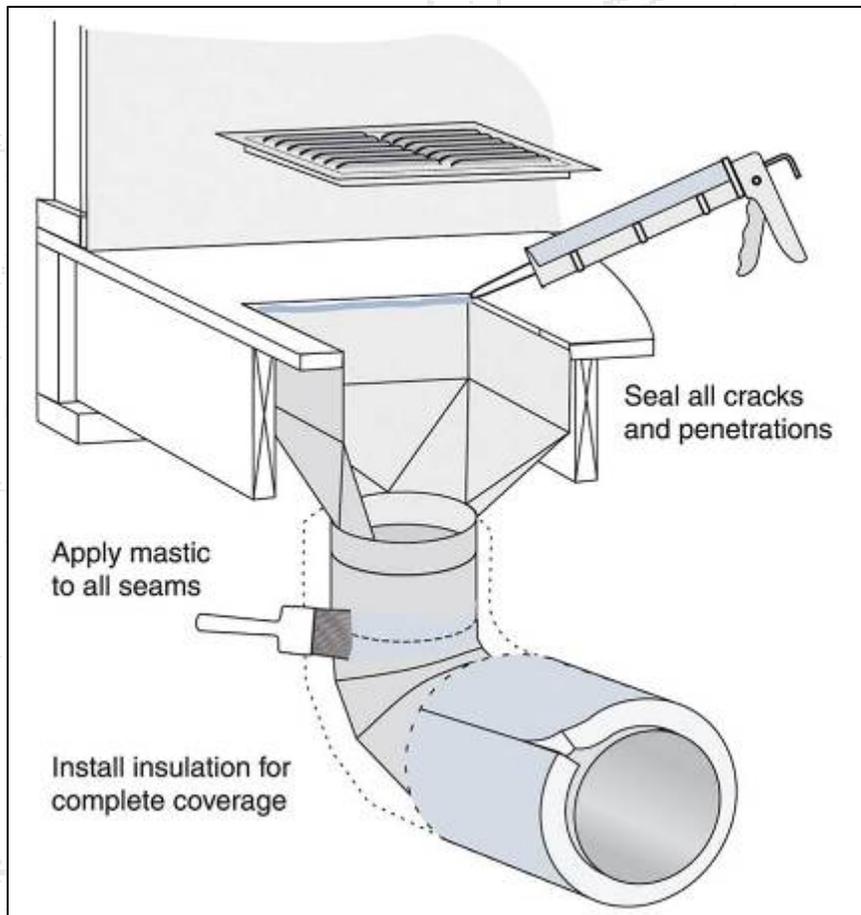


CONTROLLING AIR FLOW TIGHT DUCT PROBLEM:

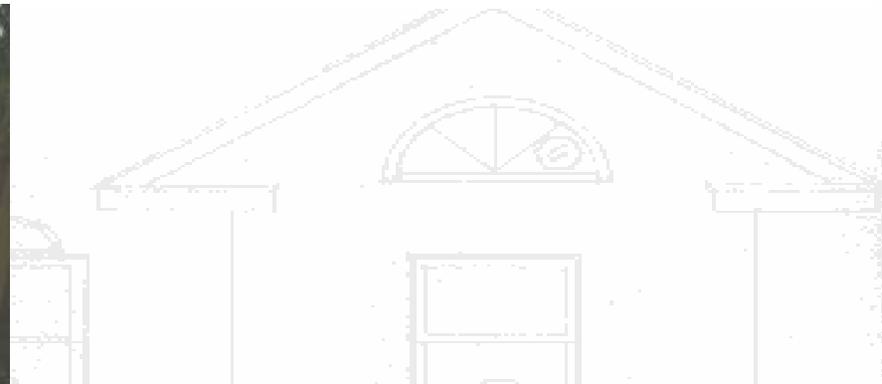




CONTROLLING AIR FLOW DUCTWORK AIR SEALING



CONTROLLING AIR FLOW SEALING DUCTS WITH MASTIC

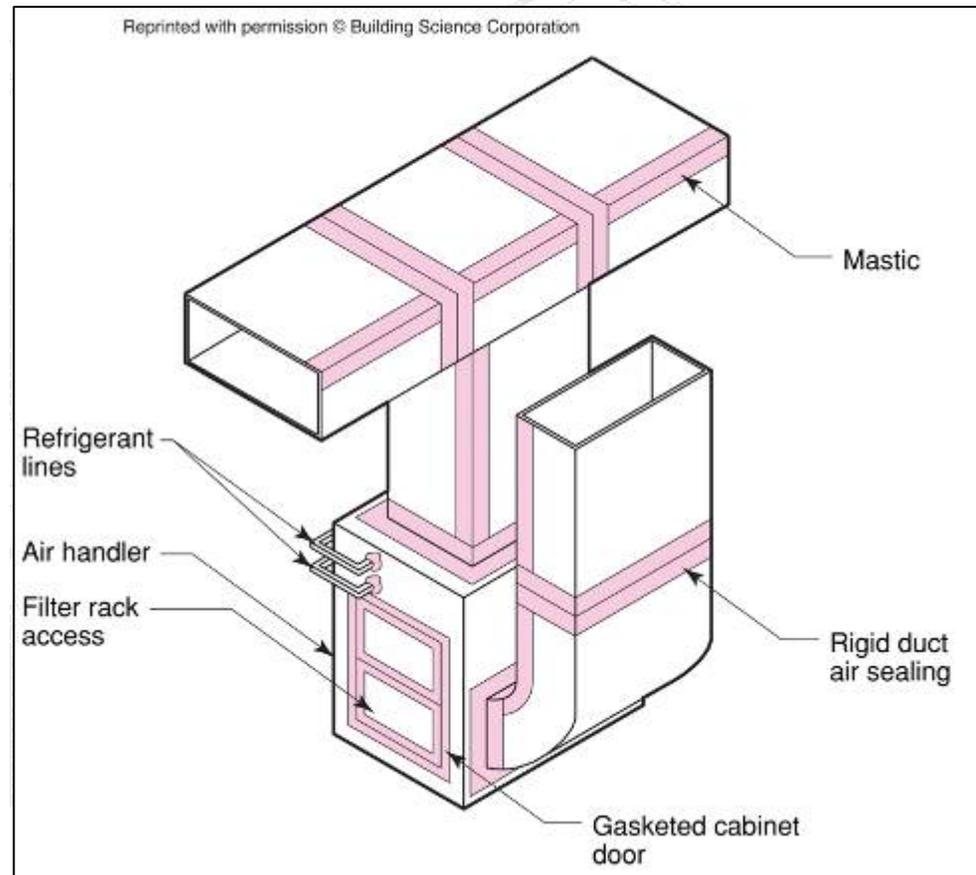


Courtesy of Building Science Corp.

CONTROLLING AIR FLOW HVAC CABINET/PLENUM AIR SEALING



SEALING WITH MASTIC



GASKETED DOORS & SEALED SEAMS

CONTROLLING AIR FLOW DUCT SIZING



INSULATION: VALUE KILLERS

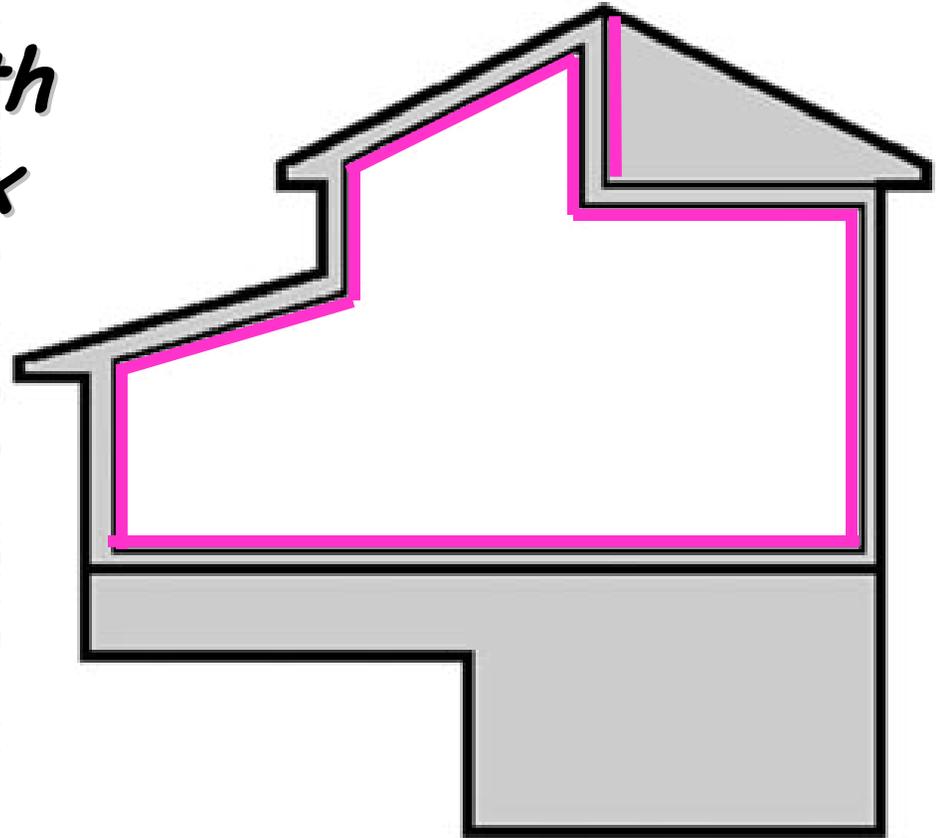


- *Incomplete Air Barrier*
 - *Misalignment with Air Barrier*
 - *Wind Intrusion* *Complete Air Barrier*
- *Gaps*
 - *Voids*
 - *Compression* *Properly Installed Insulation*

CONTROLLING AIR FLOW COMPLETE AIR BARRIER



- *Continuous*
- *Full contact with insulation on six sides*
- *Fully enclose conditioned space*



Courtesy of Southface Institute



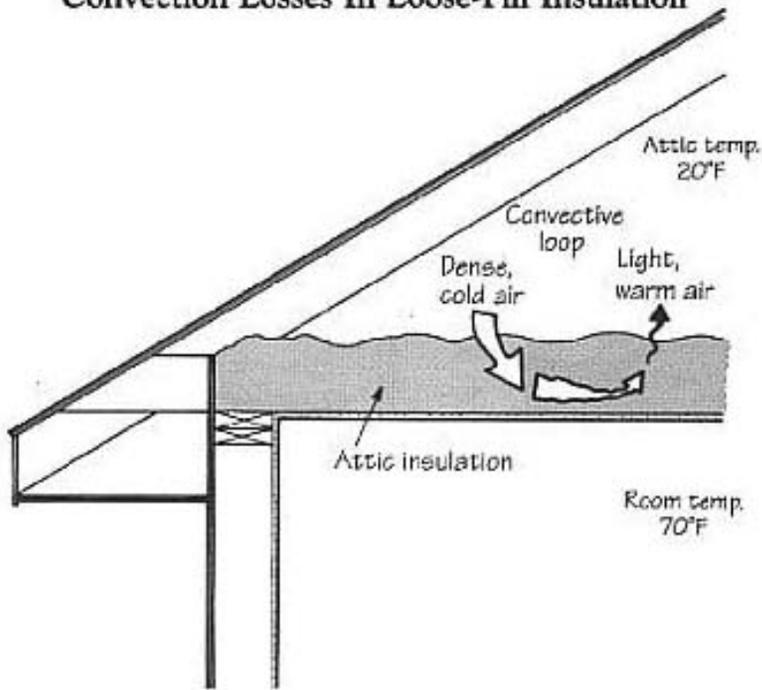
ENERGY STAR Qualified Homes Thermal Bypass Inspection Checklist

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 alternates to interior air barrier under Item no. 2 (Walls Adjoining Exterior Walls or Unconditioned Spaces)					
	All Climate Zones:					
	1.1 Overall Alignment Throughout Home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1.2 Garage Band Joint Air Barrier (at bays adjoining conditioned space)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1.3 Attic Edge Baffles Where Vents/Storage Exit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	1.5 Air Barrier At All Band Joints (Climate Zones 4 and Higher)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1.6 Minimize Thermal Bridging (e.g., OVC Railing, SIPs, ICFs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
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 R50/NET Grade 1 insulation fully supported + Continuous top and bottom plates or sealed blocking					
	2.1 Wall Behind Shower/Tub	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.2 Wall Behind Fireplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.3 Insulated Attic Slopes/Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.4 Attic Knee Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.5 Slightly Slant Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.6 Wall Adjoining Porch Roof	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.7 Staircase Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2.8 Double Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	3.2 Car/Service Floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	4.2 Piping Shaft/Penetrations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	4.3 Flue Shaft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	5.2 Attic Drop-down Stair (fully gasketed and insulated)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	5.3 Dropped Ceiling/Soffit (full air barrier aligned with insulation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	5.4 Recessed Lighting Fixtures (ICAT labeled and sealed to drywall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	5.5 Whole-house Fan (insulated cover gasketed to the opening)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Common Walls Between Dwelling Units	Requirements: Gap (then drywall shaft wall) common wall and structural framing (then units) is sealed at all exterior boundary conditions					
	6.1 Common Wall Between Dwelling Units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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: _____				

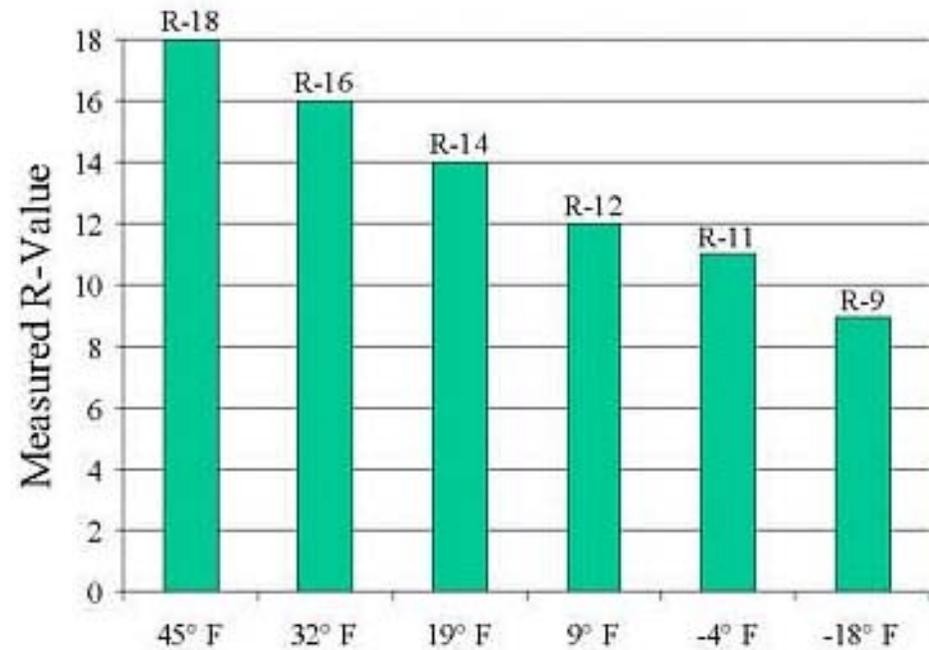
COMPLETE AIR BARRIER EXCEPTION TO SIX-SIDED AIR BARRIER



Convection Losses In Loose-Fill Insulation



R-Value vs. Temperature For Loose-Fill Fiberglass

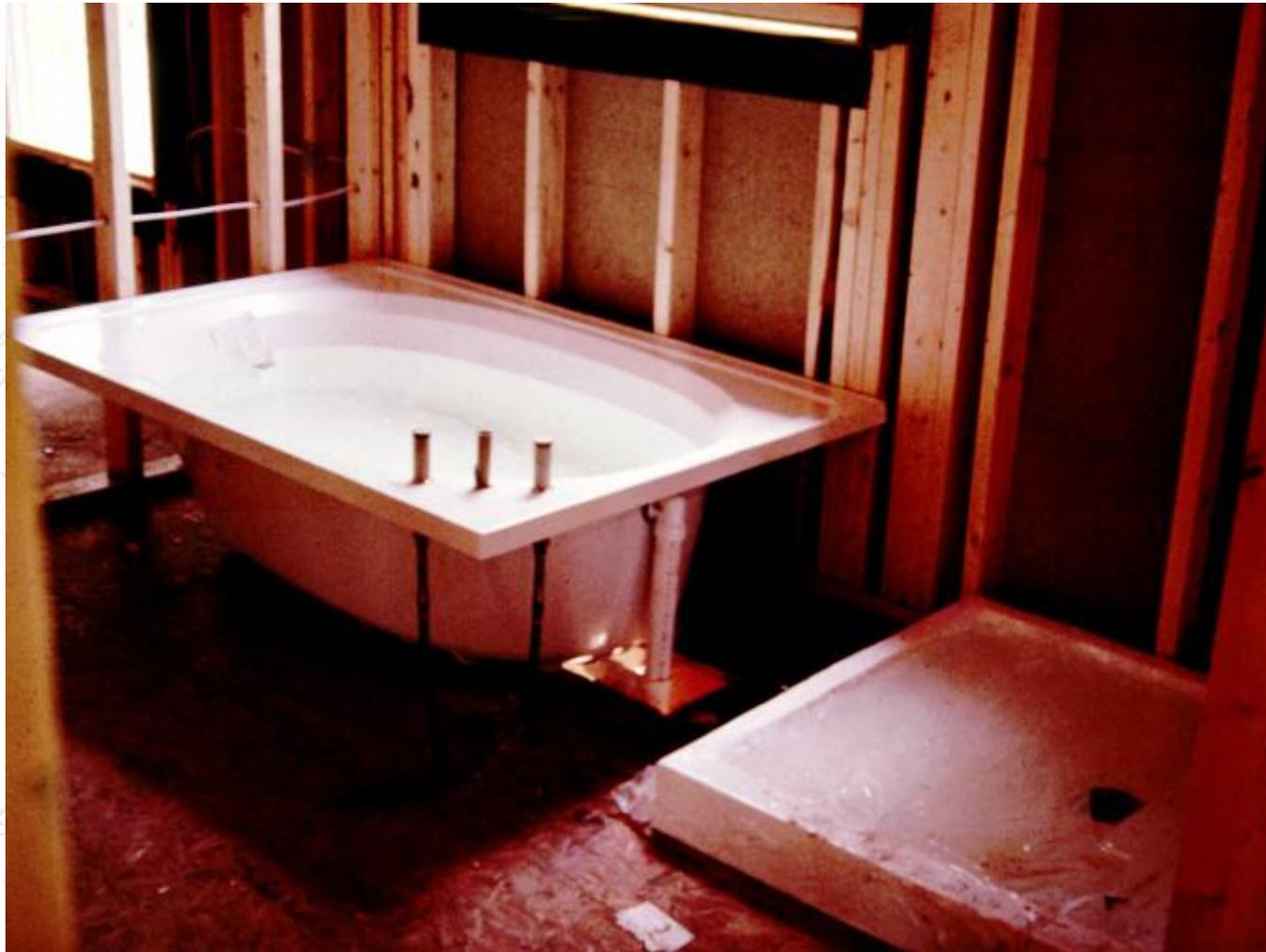


Source:
David South
Enviro-Seal Foam Insulation

COMPLETE AIR BARRIER BEHIND TUB INSULATION/AIR BARRIER



COMPLETE AIR BARRIER BEHIND TUB INSULATION/AIR BARRIER



Courtesy of Building Science Corp.

COMPLETE AIR BARRIER TUB WITHOUT AIR BARRIER

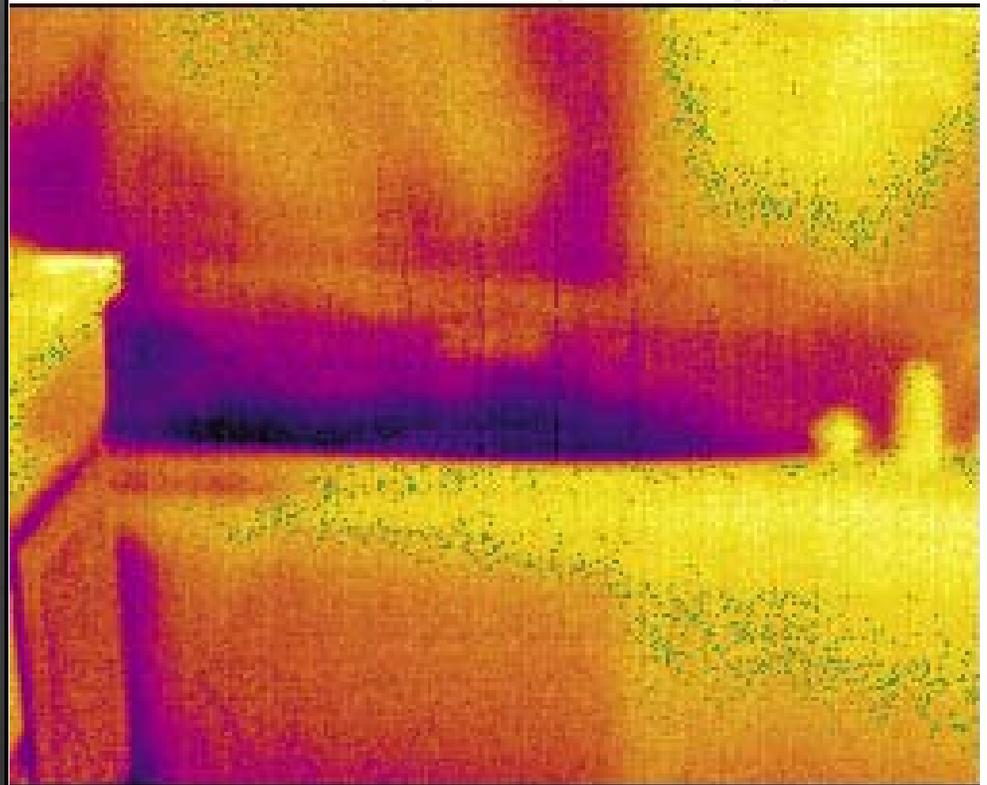


Bathtub on
Exterior Wall
w/o Air
Barrier



COMPLETE AIR BARRIER

TUB WITHOUT AIR BARRIER



Courtesy of Fort Collins Utilities

COMPLETE AIR BARRIER SHOWER/TUB AT EXTERIOR WALL



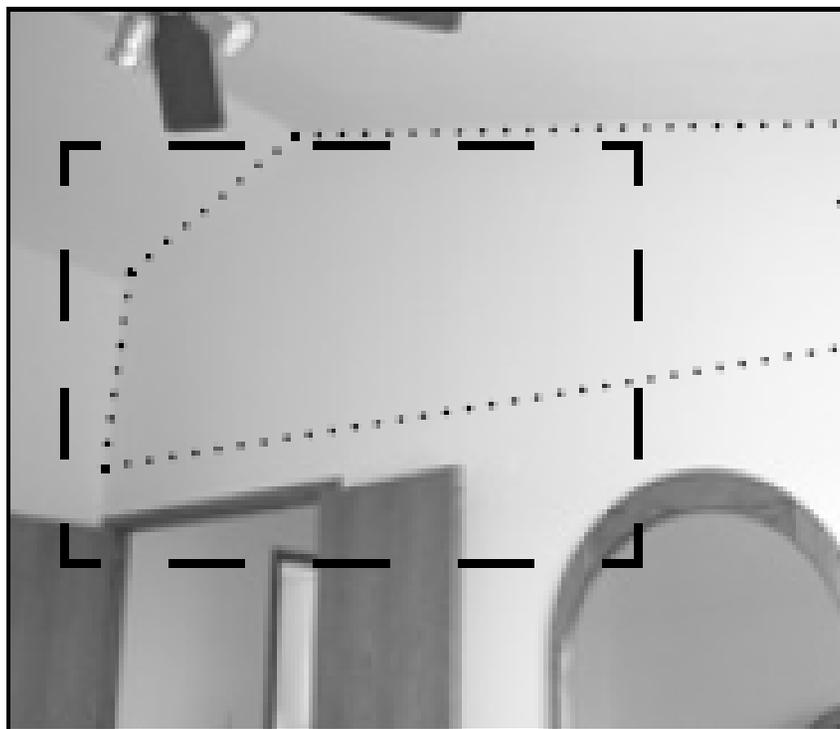
COMPLETE AIR BARRIER BEHIND TUB: INSULATION/AIR BARRIER



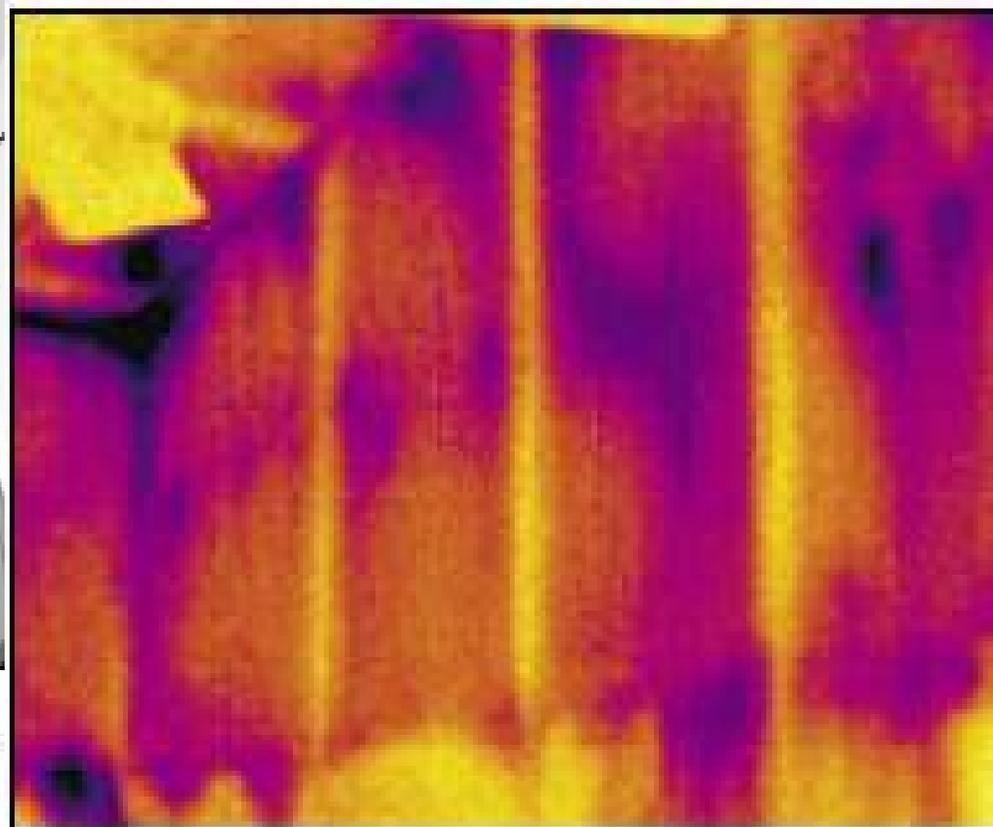
Courtesy of Building Science Corp.

COMPLETE AIR BARRIER

ATTIC KNEE WALL PROBLEM: WINTER



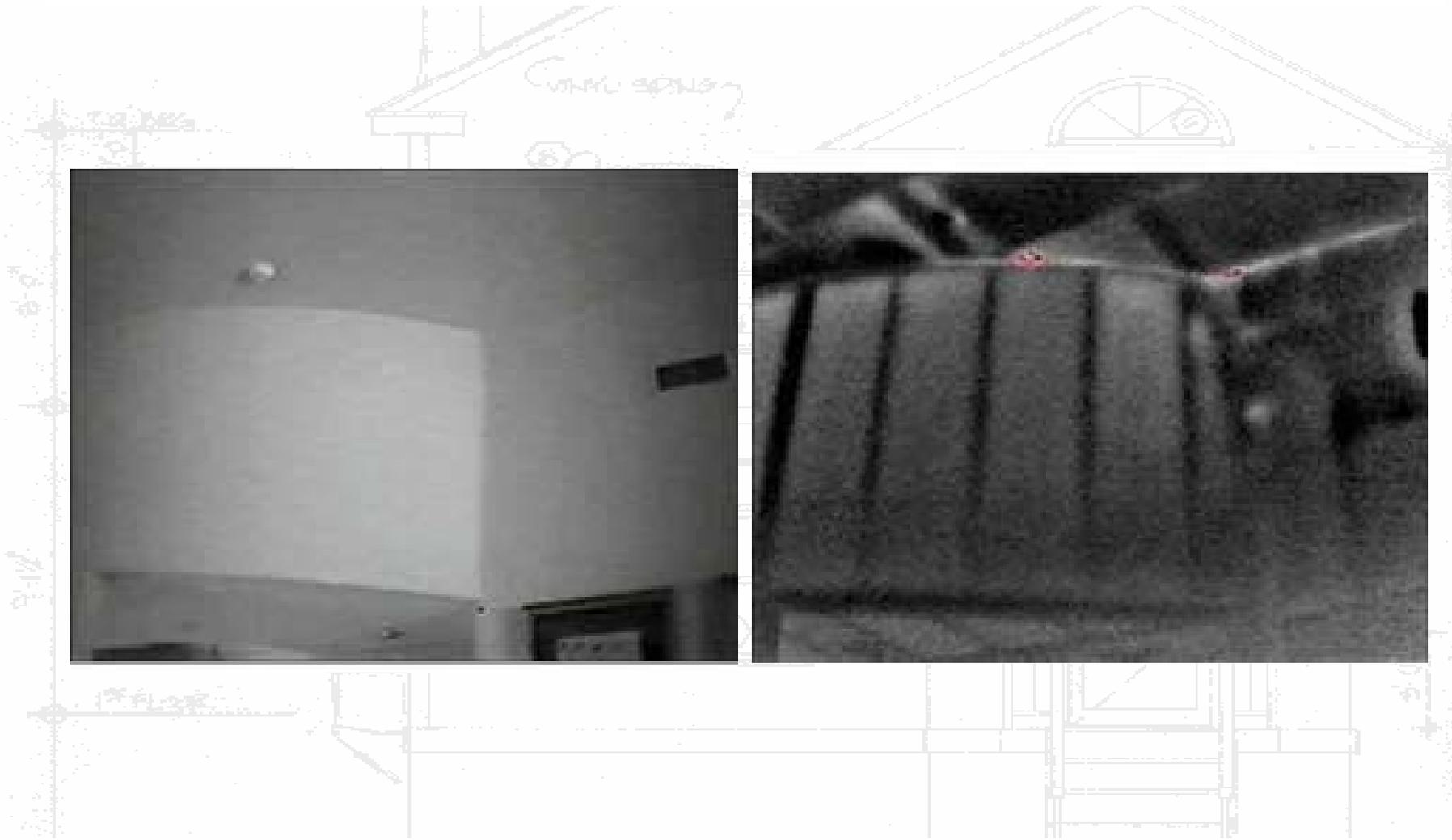
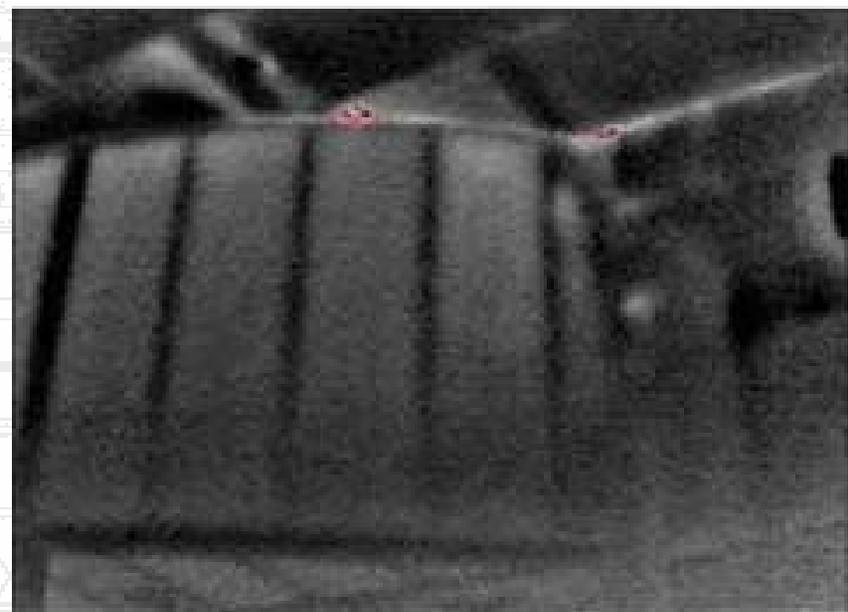
Knee wall



Courtesy of D.R. Wastchak

COMPLETE AIR BARRIER

ATTIC KNEE WALL PROBLEM: SUMMER



COMPLETE AIR BARRIER AIR BARRIER: KNEE WALL



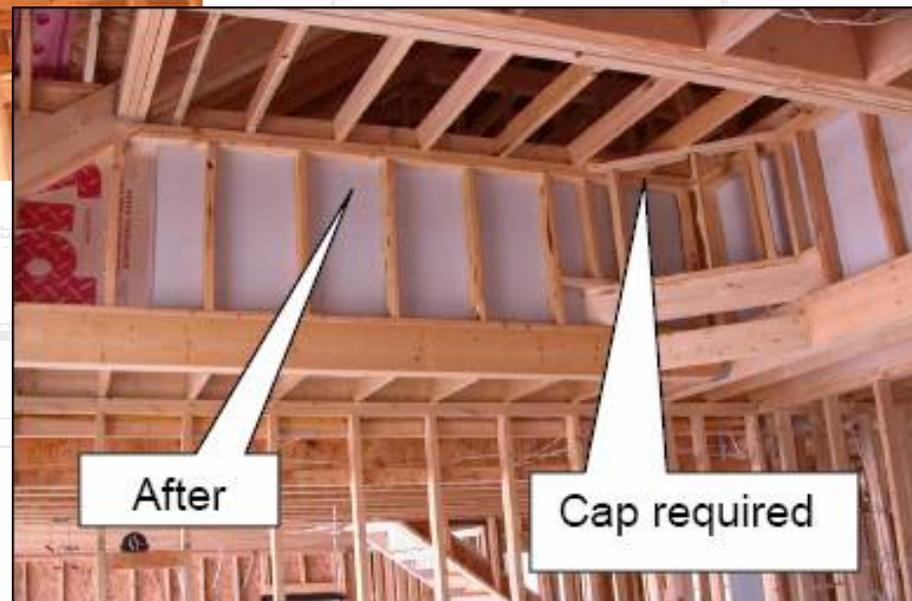
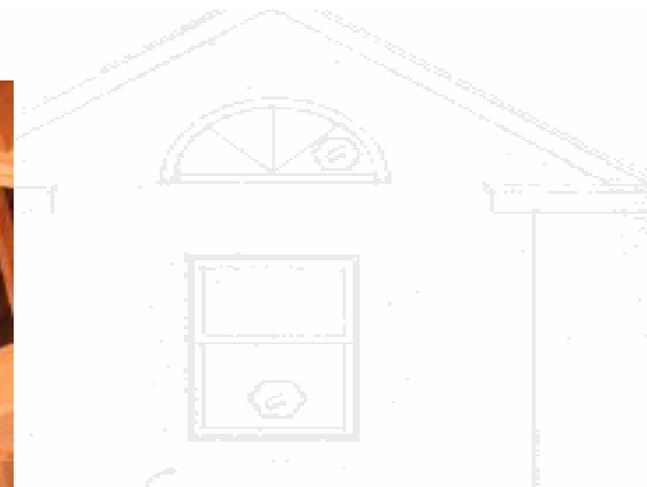
Hot Wall

Courtesy of Building Science Corp.

COMPLETE AIR BARRIER ATTIC KNEE WALLS



Before

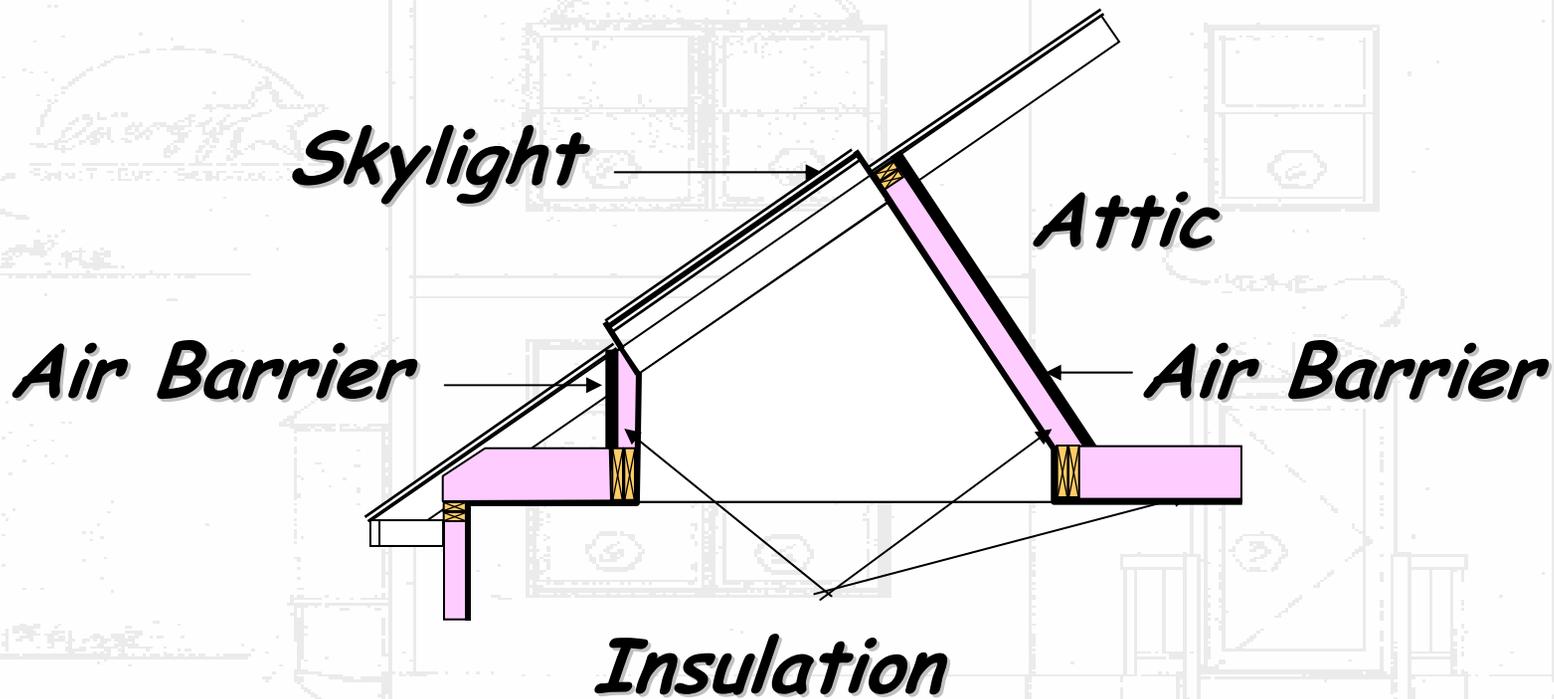


After

Cap required

Courtesy of Advanced Energy

COMPLETE AIR BARRIER SKYLIGHT SHAFT



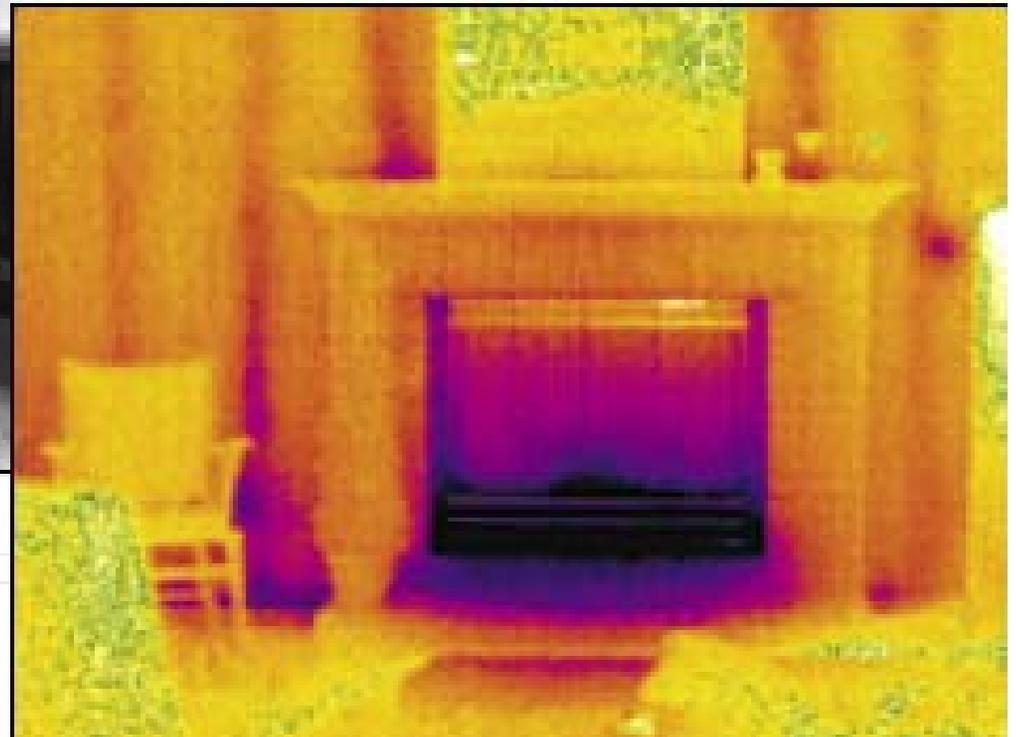
COMPLETE AIR BARRIER SKYLIGHT SHAFT



COMPLETE AIR BARRIER FIREPLACE PROBLEM



Courtesy of Fort Collins Utilities



COMPLETE AIR BARRIER FIREPLACE WALL PROBLEM



Courtesy of EnergyLogic

COMPLETE AIR BARRIER FIREPLACE WALL PROBLEM



COMPLETE AIR BARRIER FIREPLACE SOLUTION



Courtesy of Building Science Corp.



Courtesy of IBACOS

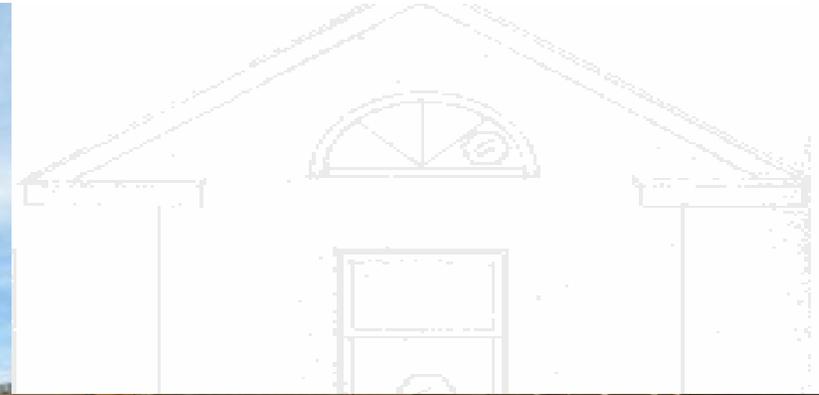
COMPLETE AIR BARRIER PORCH ROOF



COMPLETE AIR BARRIER PORCH ROOF



COMPLETE AIR BARRIER PORCH ROOF

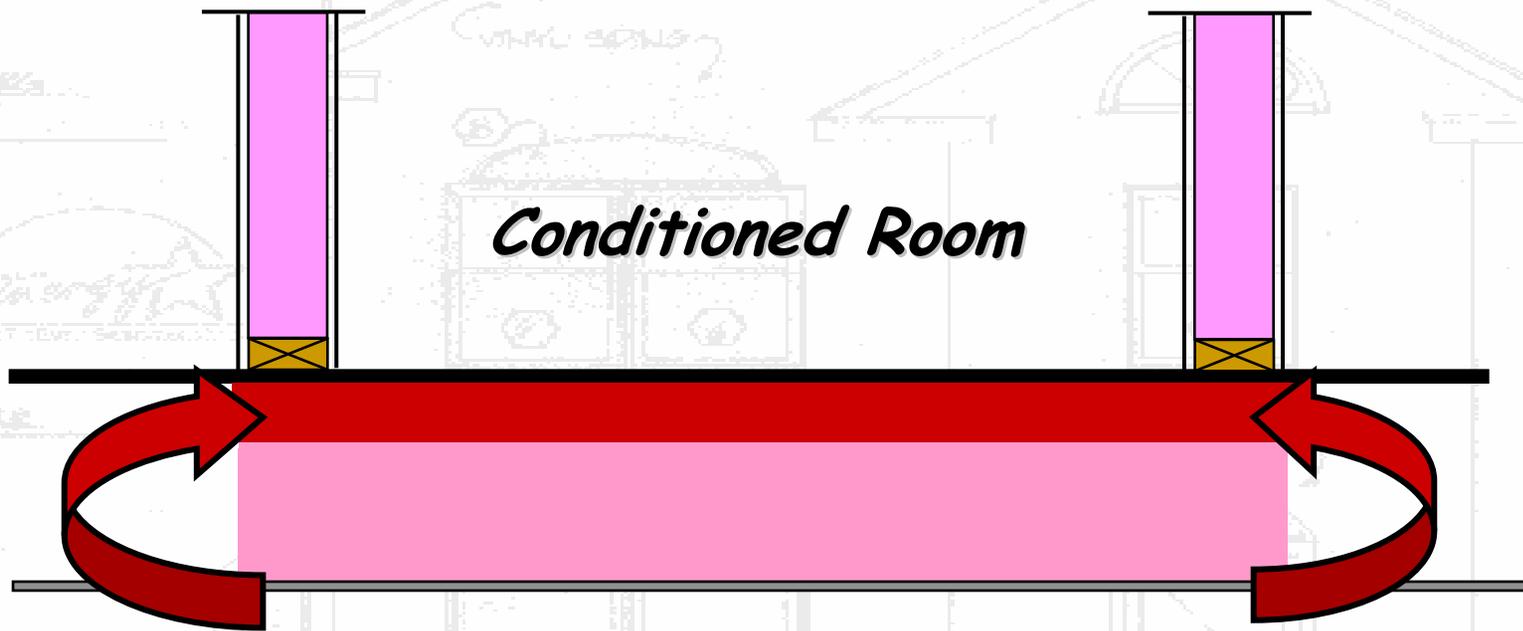


COMPLETE AIR BARRIER

INSULATED FLOOR OVER GARAGE



ENERGY STAR

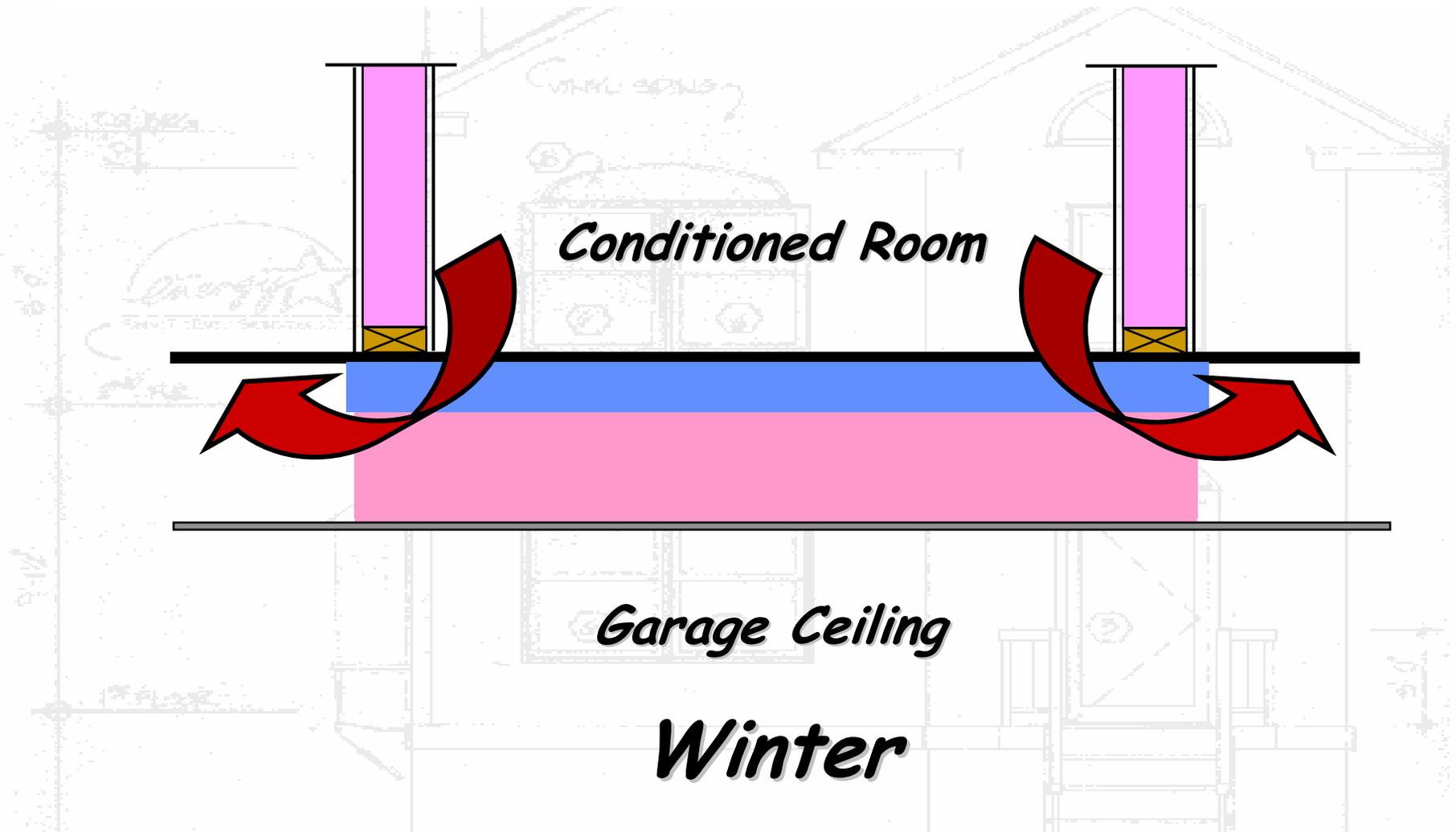


Conditioned Room

Garage Ceiling

Summer

COMPLETE AIR BARRIER
INSULATED FLOOR OVER GARAGE

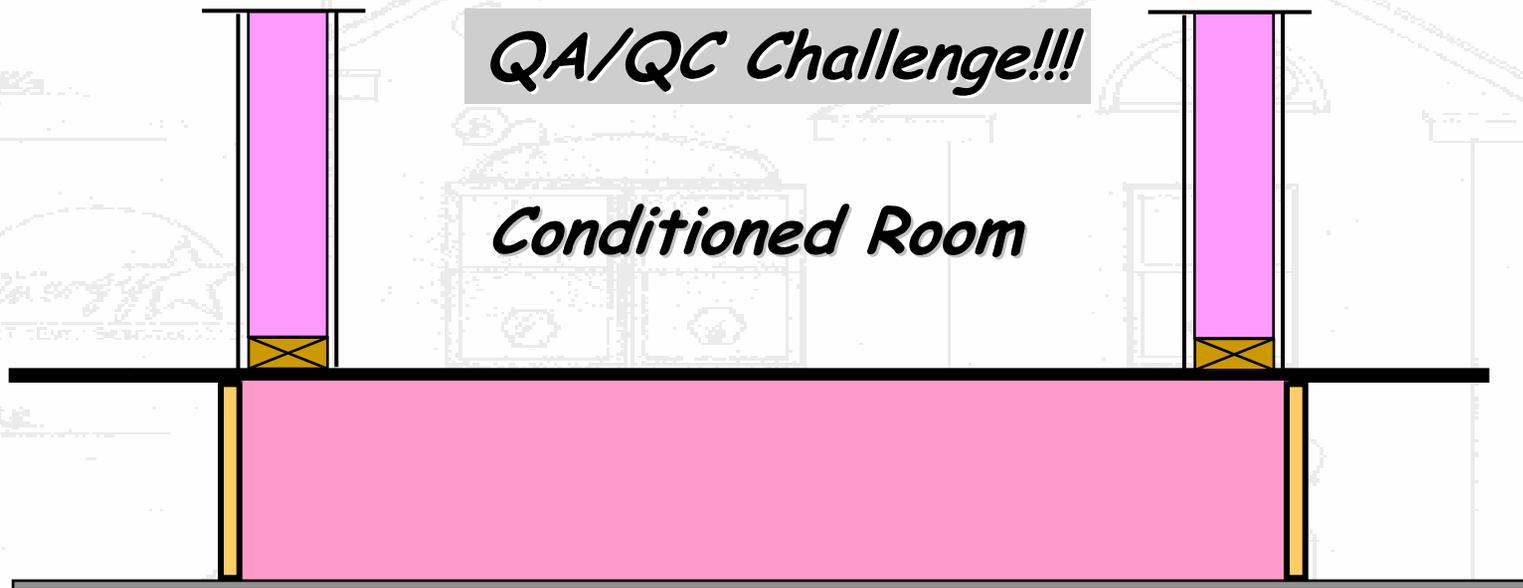


FLOORS BETWEEN CONDITIONED/UNCONDITIONED SPACES INSULATED FLOOR OVER GARAGE



QA/QC Challenge!!!

Conditioned Room



Garage Ceiling

***Option 1: Fill framing space with insulation
and blocking***





COMPLETE AIR BARRIER INSULATED FLOOR OVER GARAGE

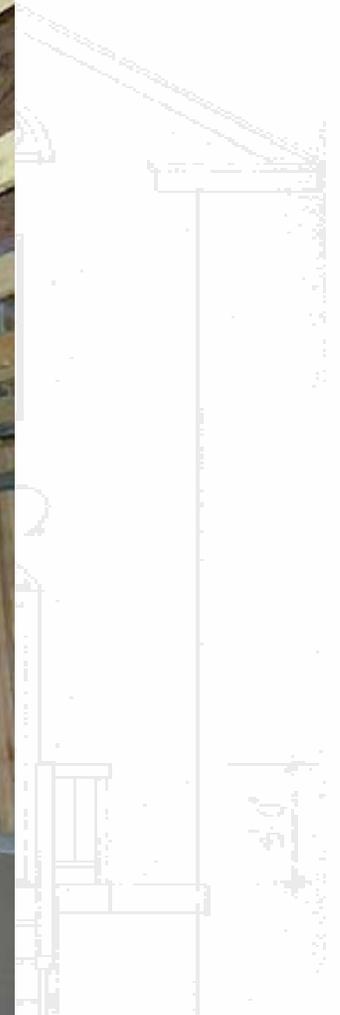


Air dams at both ends of open joists under room



Air dams under exterior wall of room

COMPLETE AIR BARRIER INSULATED FLOOR OVER GARAGE





*Insulation gap with
subfloor*

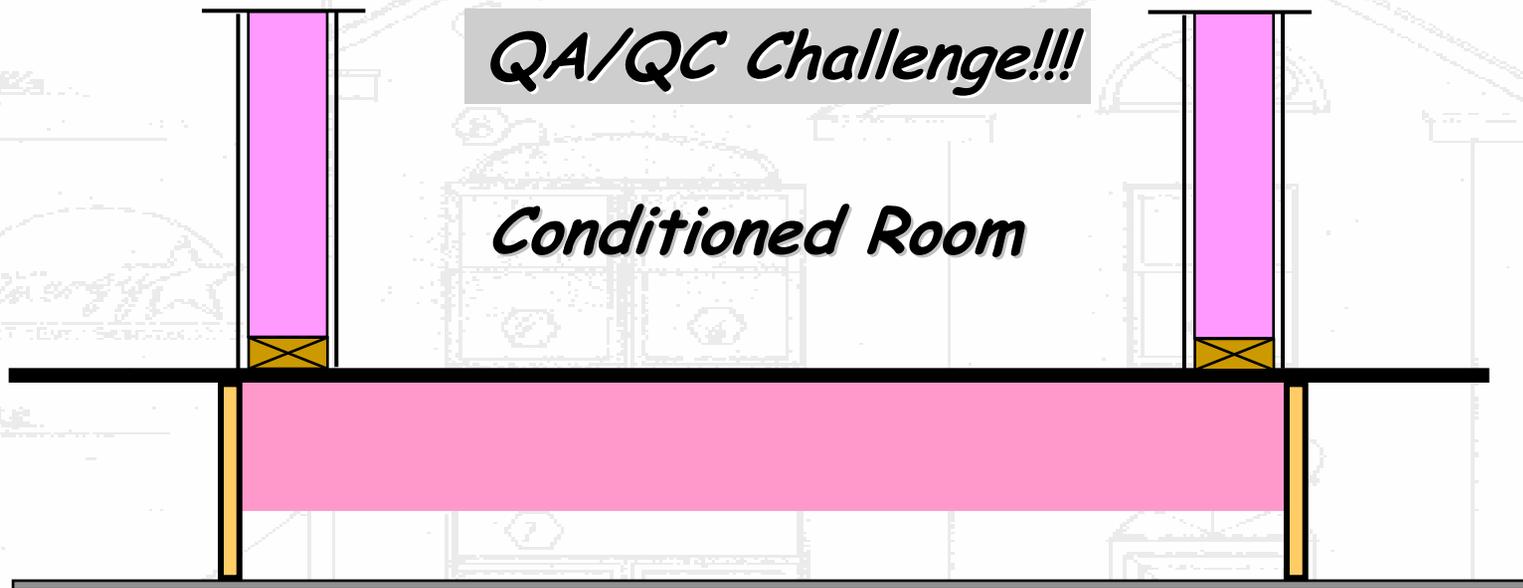


FLOORS BETWEEN CONDITIONED/UNCONDITIONED SPACES
INSULATED FLOOR OVER GARAGE



QA/QC Challenge!!!

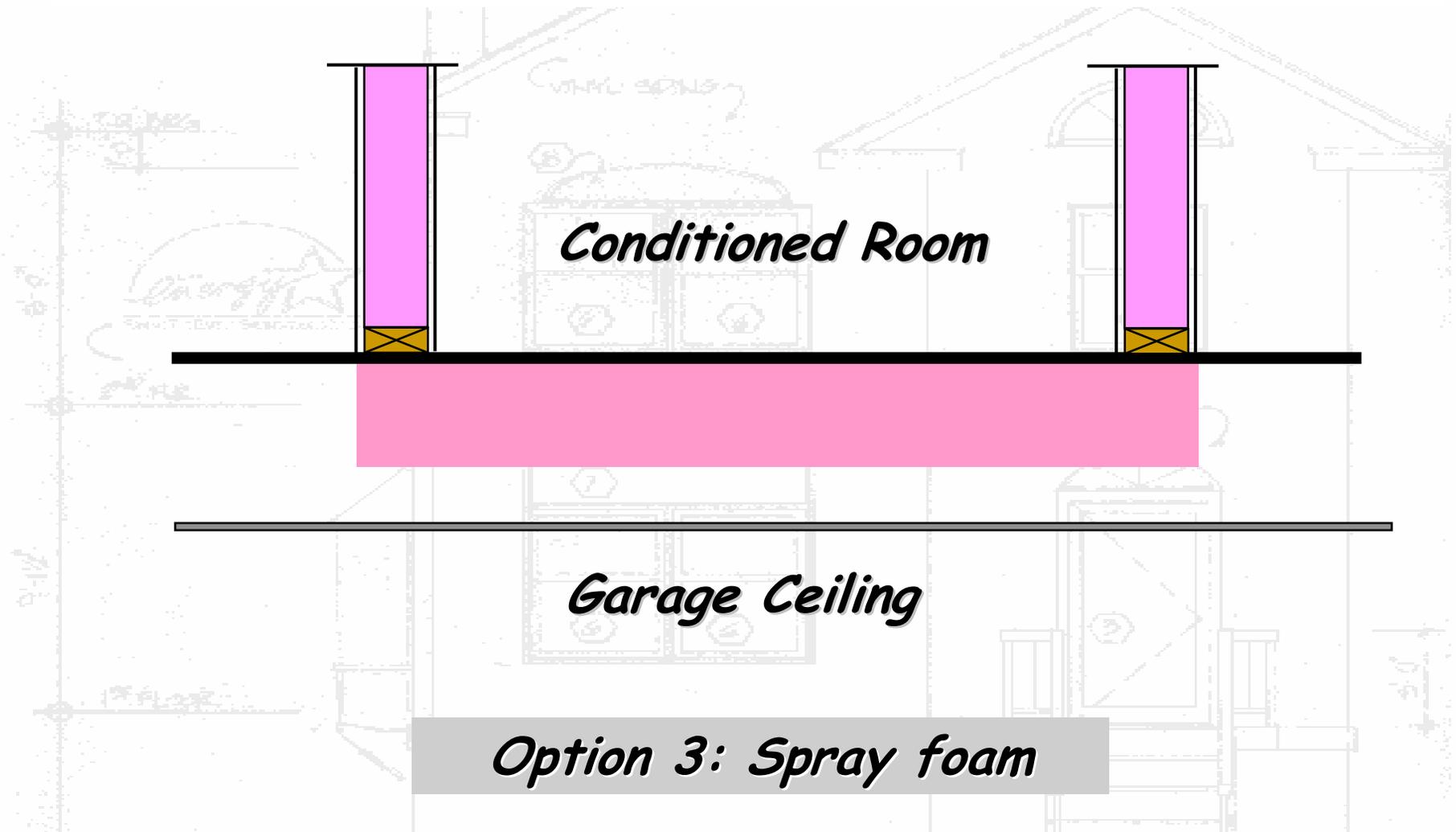
Conditioned Room



Garage Ceiling

***Option 2: Batt or Blown-in Insulation
aligned with sub-floor
Only acceptable until July 1, 2008***

FLOORS BETWEEN CONDITIONED/UNCONDITIONED SPACES INSULATED FLOOR OVER GARAGE

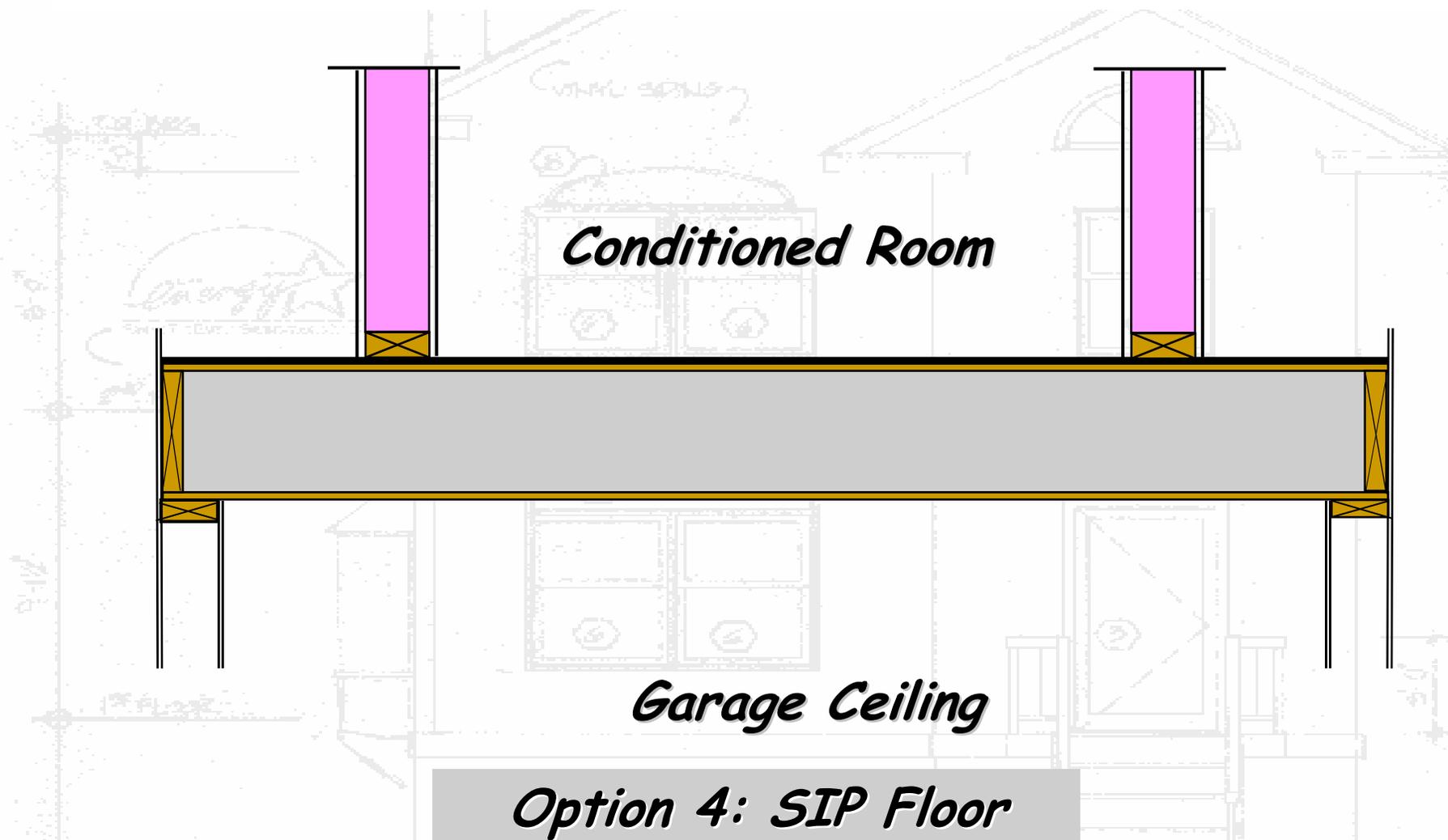


Conditioned Room

Garage Ceiling

Option 3: Spray foam

FLOORS BETWEEN CONDITIONED/UNCONDITIONED SPACES
INSULATED FLOOR OVER GARAGE



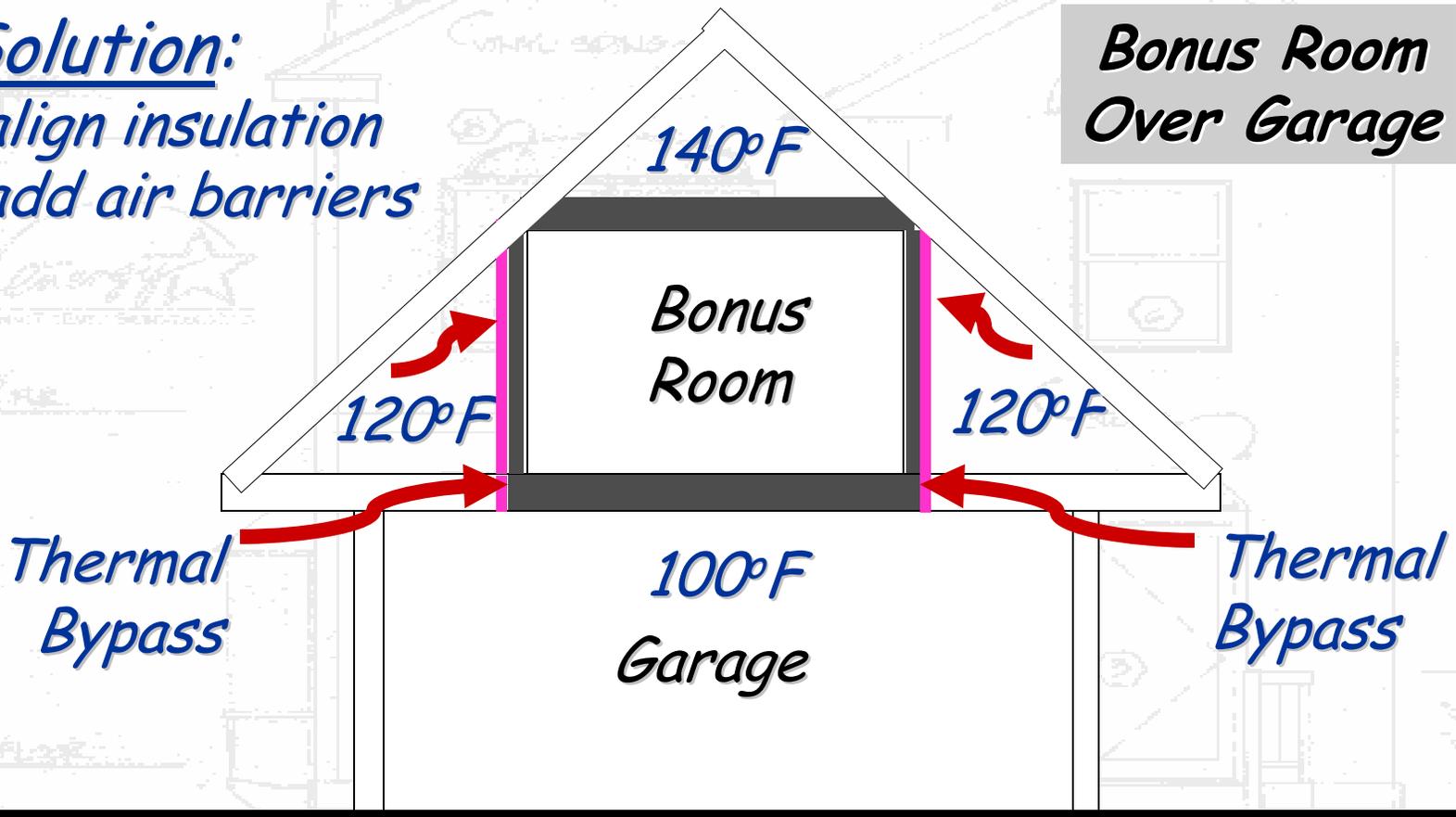
COMPLETE AIR BARRIER THE PERFECT STORM



Solution:

- align insulation
- add air barriers

**Bonus Room
Over Garage**



COMPLETE AIR BARRIER BONUS ROOM SOLUTION

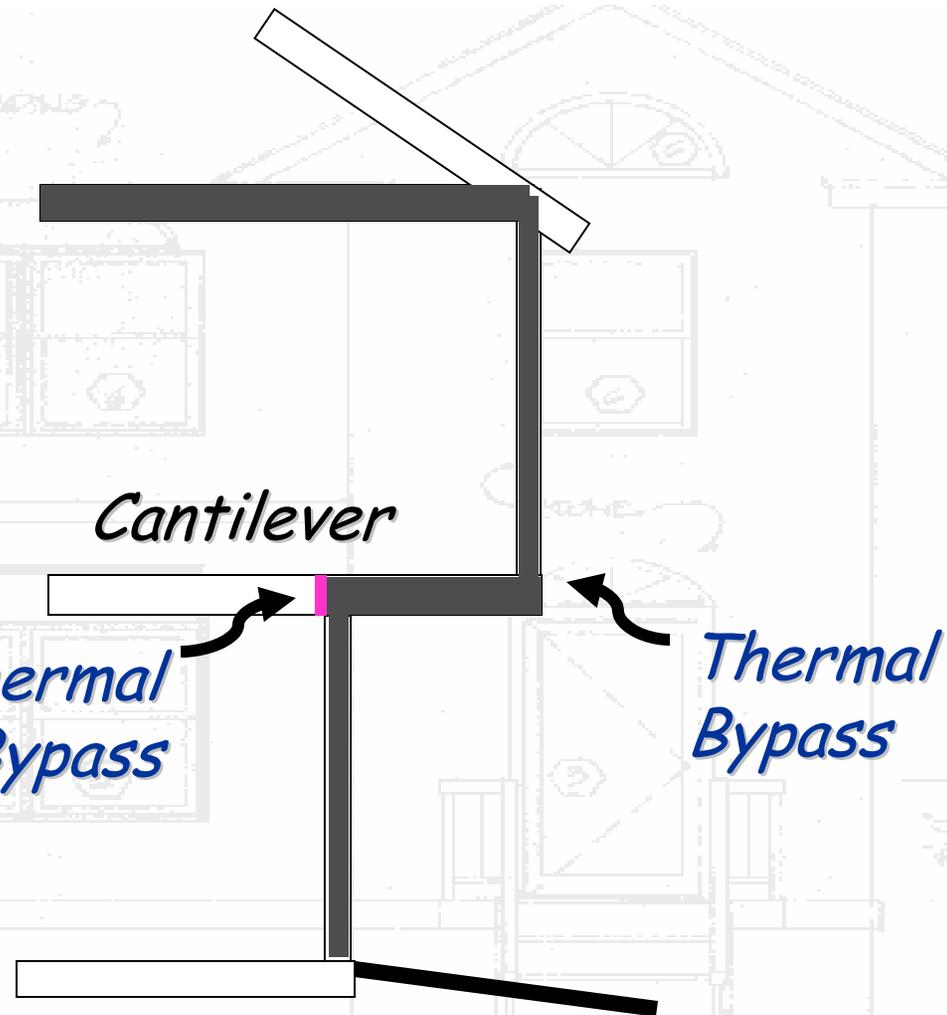


COMPLETE AIR BARRIER CANTILEVER FLOORS



Solution:

- align insulation
- add air barriers

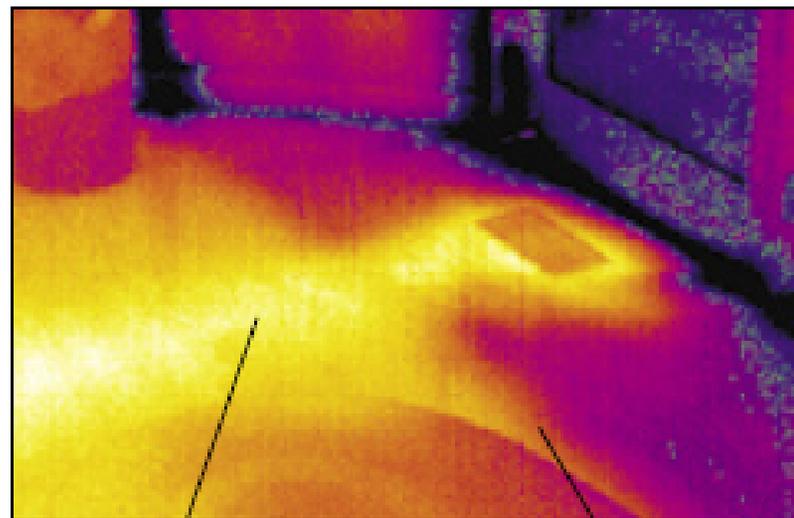


COMPLETE AIR BARRIER CANTILEVERED FLOOR PROBLEM



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

COMPLETE AIR BARRIER CANTILEVERED FLOOR SOLUTION?



***Not a
recommended
solution!***

COMPLETE AIR BARRIER CANTILEVERED FLOOR PROBLEM



Courtesy of Advanced Energy

COMPLETE AIR BARRIER CANTILEVERED FLOOR PROBLEM

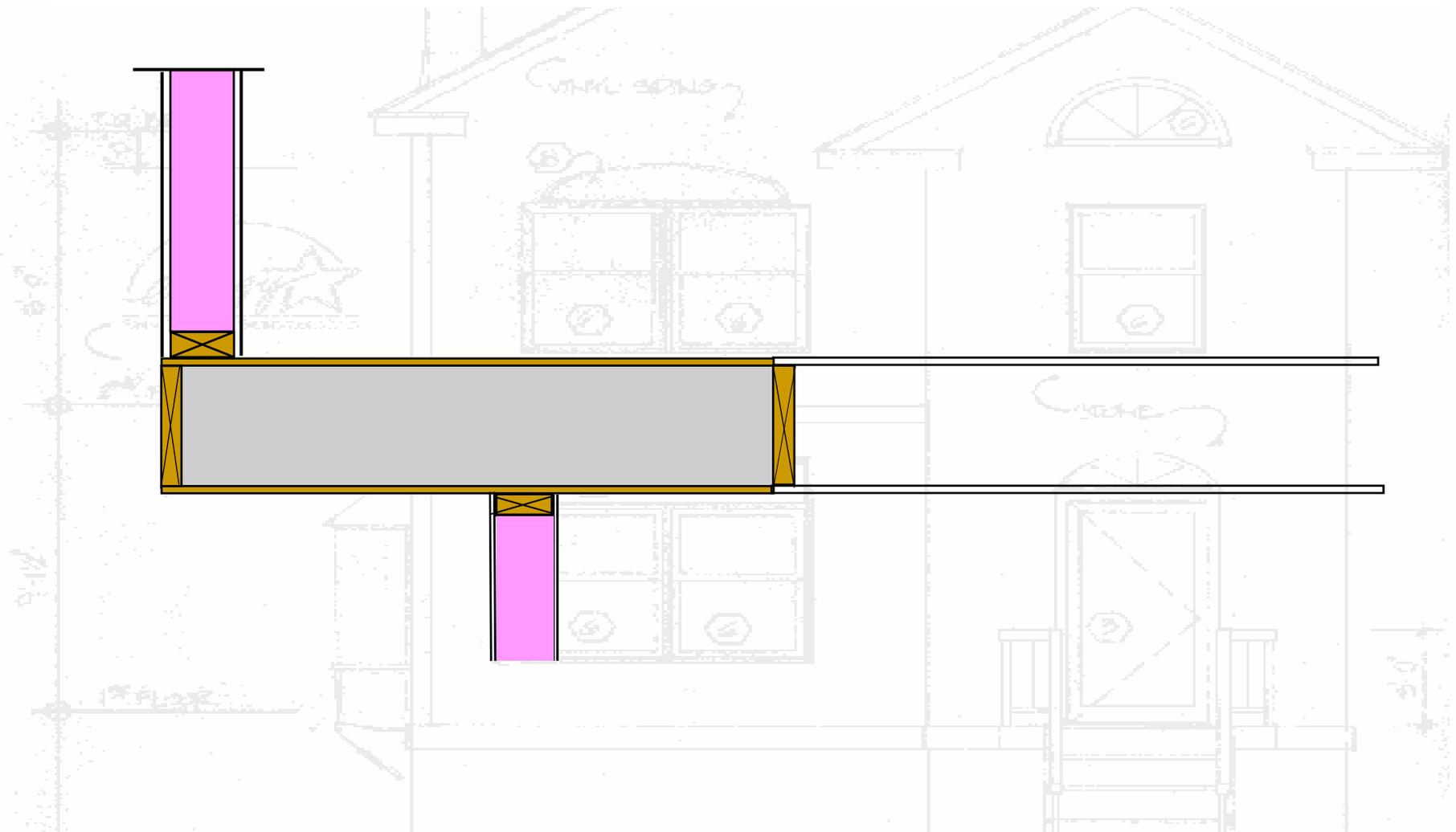


COMPLETE AIR BARRIER CANTILEVERED FLOOR SOLUTION

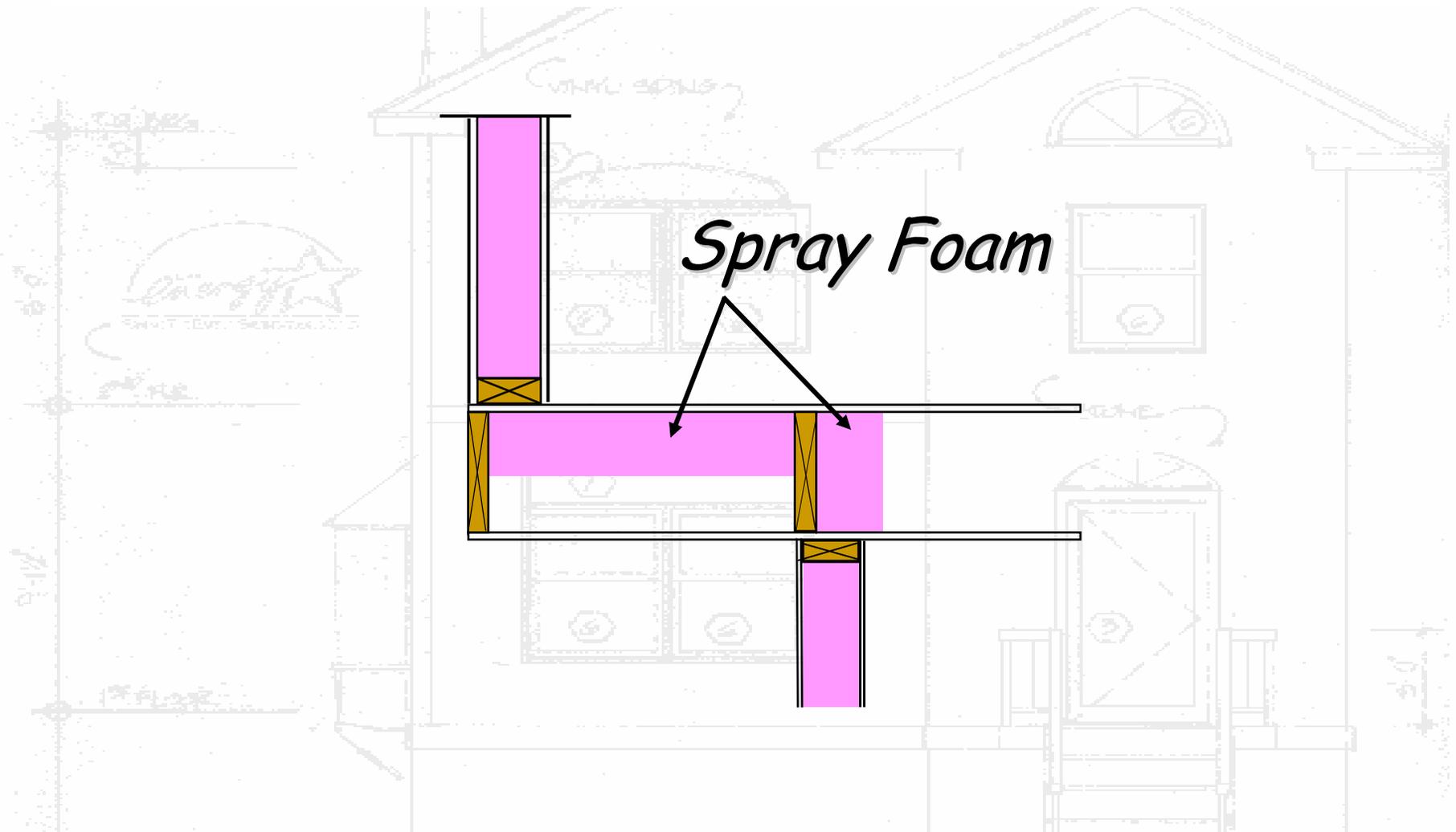


Courtesy of Fort Collins Utilities

COMPLETE AIR BARRIER CANTILEVERED FLOOR SOLUTION



COMPLETE AIR BARRIER CANTILEVERED FLOOR SOLUTION



COMPLETE AIR BARRIER SHAFT PROBLEM



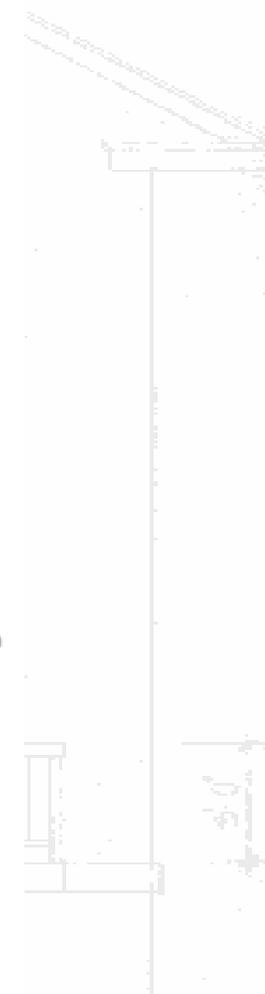
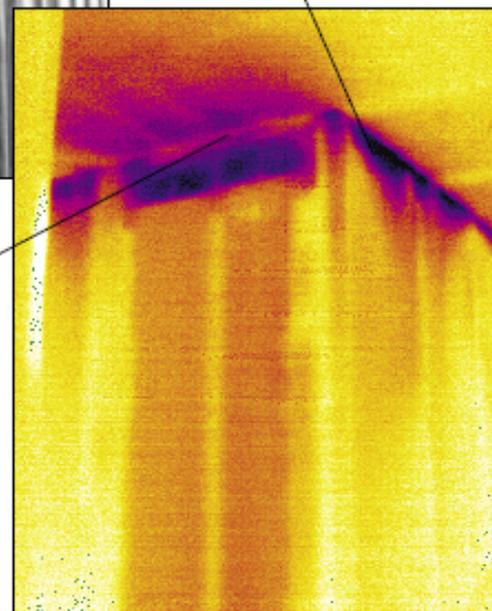
Courtesy of Advanced Energy

COMPLETE AIR BARRIER SHAFT PROBLEM

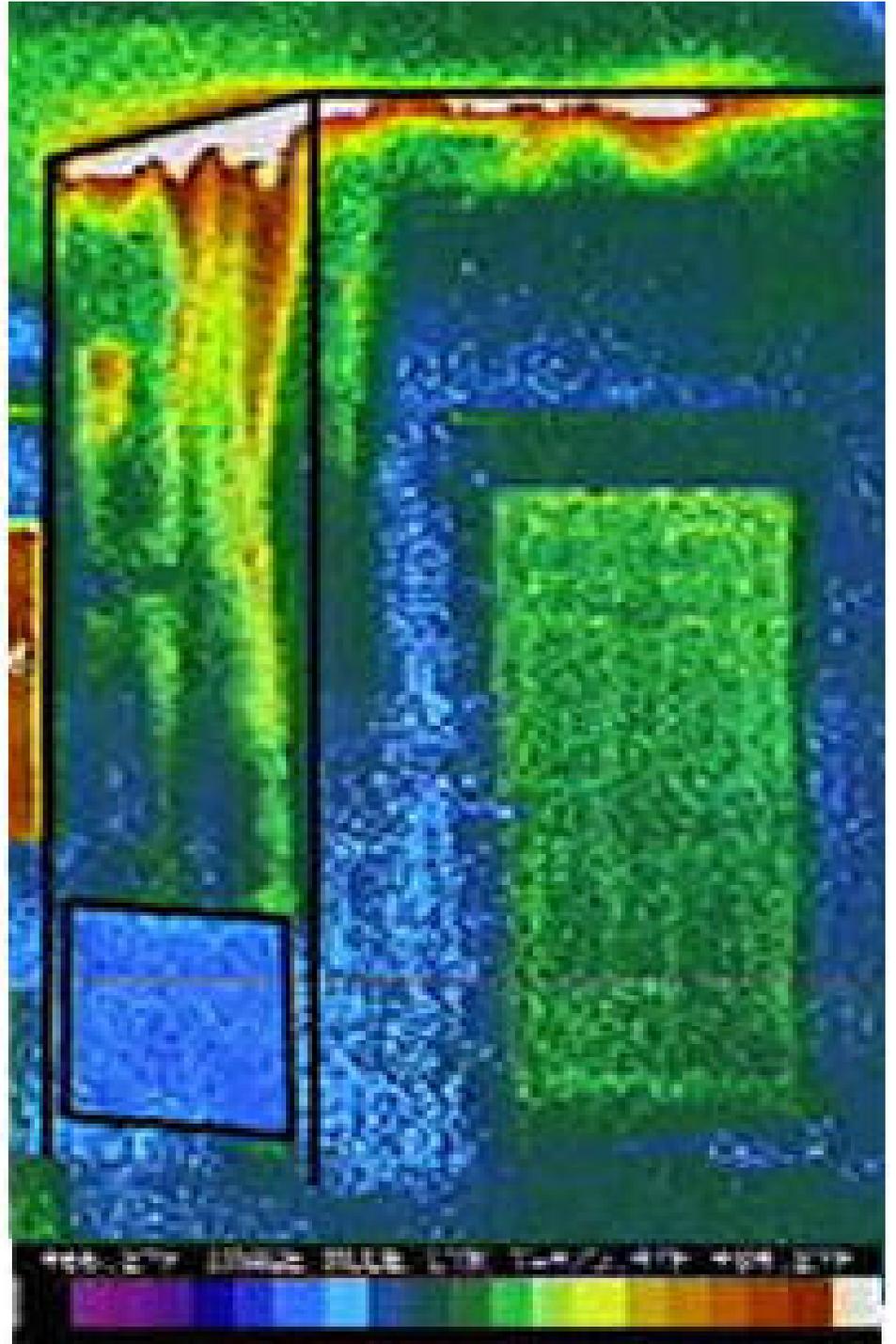


Air leaks through gaps between wallboard and framing. These gaps are skinny ($1/16''$ to $1/8''$ typical) but extend many lineal feet.

Blocking above return grille and wall cavity return was very leaky



Courtesy of Fort Collins Utilities



COMPLETE AIR BARRIER SHAFTS SOLUTION



Courtesy of Advanced Energy

COMPLETE AIR BARRIER

NO AIR BARRIER AT DROPPED CEILING



Courtesy of Building Science Corp.

COMPLETE AIR BARRIER DROPPED CEILING PROBLEM



Courtesy of Maryland Energy Administration

COMPLETE AIR BARRIER DROPPED CEILING PROBLEM



Dropped ceiling
insulated incorrectly

Courtesy of Advanced Energy

COMPLETE AIR BARRIER

DROPPED CEILING PROBLEM



ENERGY STAR



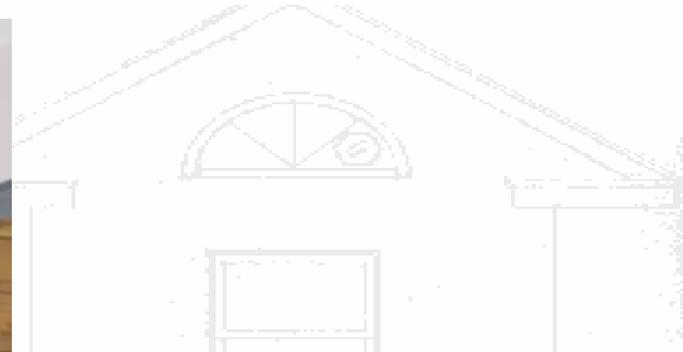
COMPLETE AIR BARRIER DROPPED CEILING SOLUTION



Capped dropped ceiling

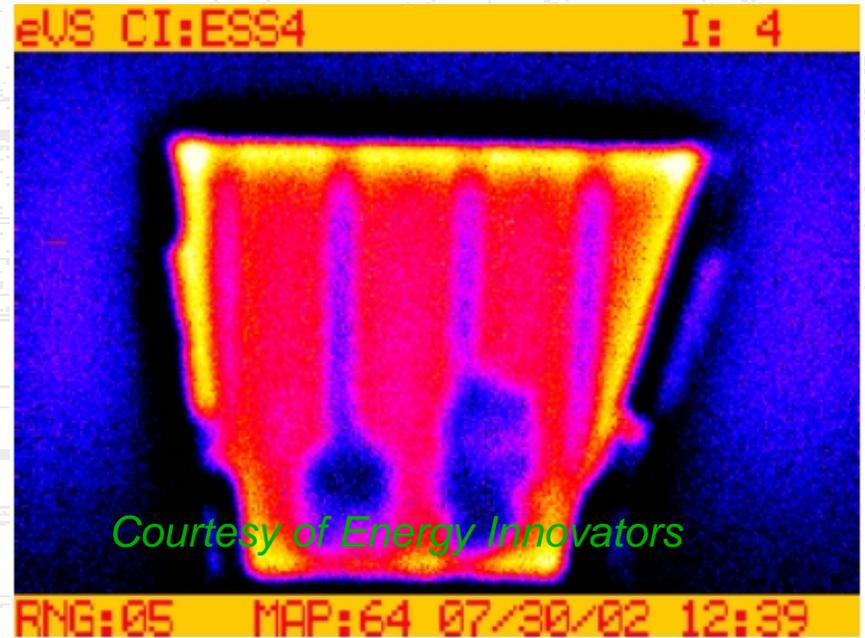
Courtesy of Advanced Energy

COMPLETE AIR BARRIER DROPPED CEILING SOLUTION



Courtesy of Building Science Corp.

COMPLETE AIR BARRIER ATTIC ACCESS STAIR PROBLEM



Courtesy of Energy Innovators

COMPLETE AIR BARRIER ATTIC ACCESS STAIR SOLUTIONS



Insulated Cover door:

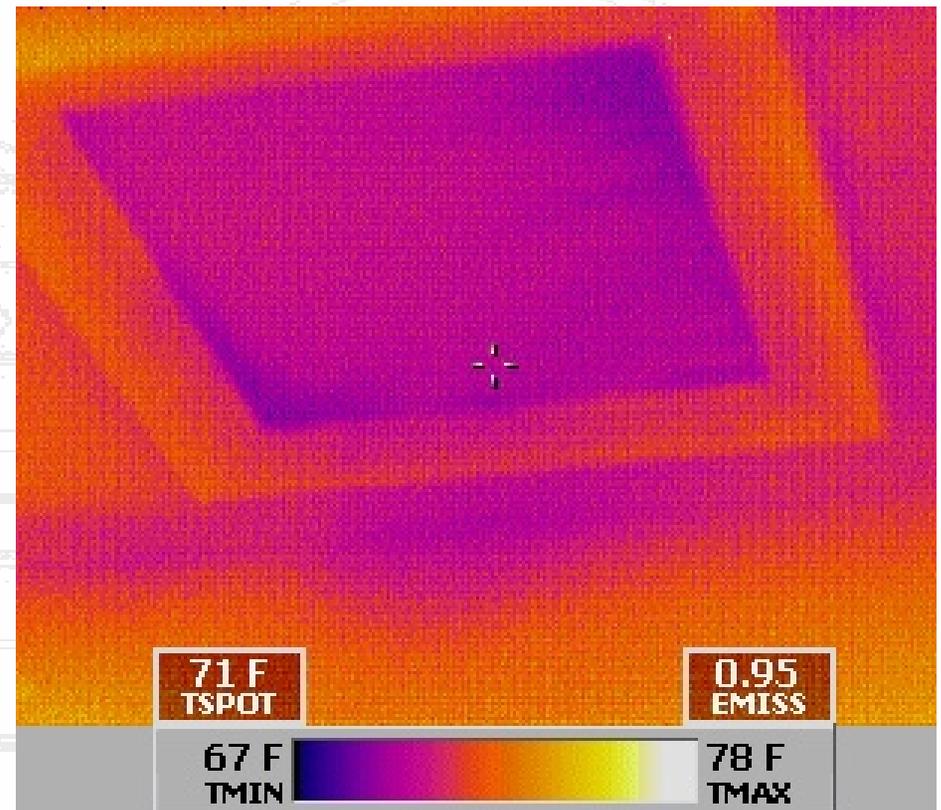
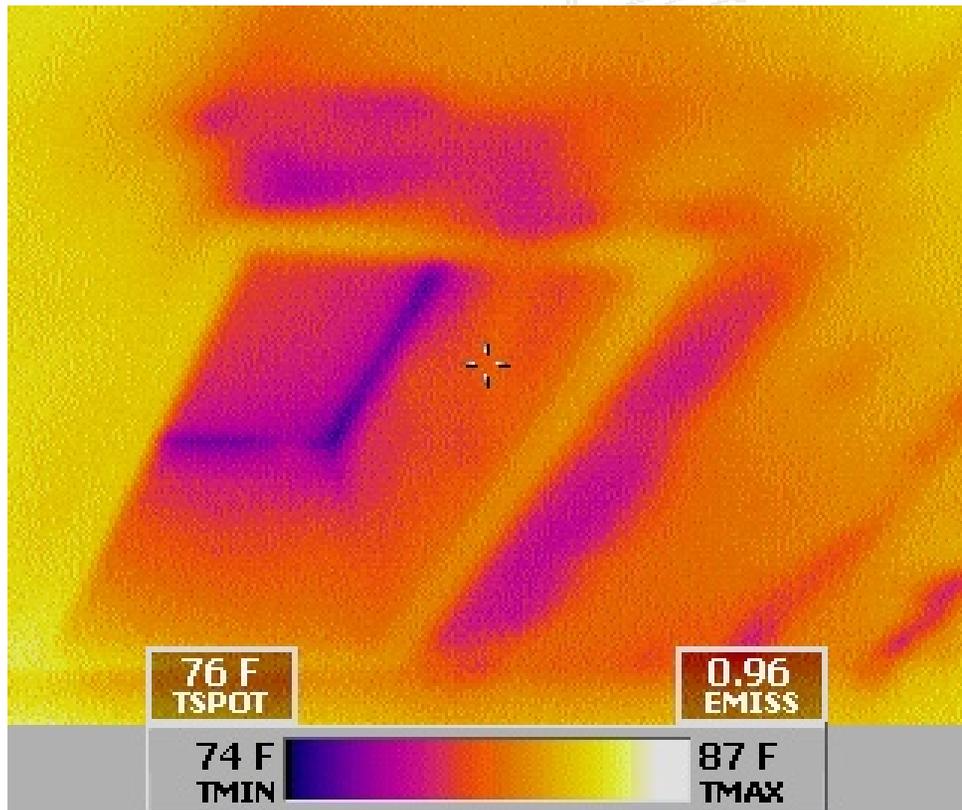
White MFD panel, 1/8" (3mm)

Foam core polystyrene insulation
1-1/2" thick cover door : 1-1/4" (30 mm),
1" thick cover door: 3/4" (20 mm)

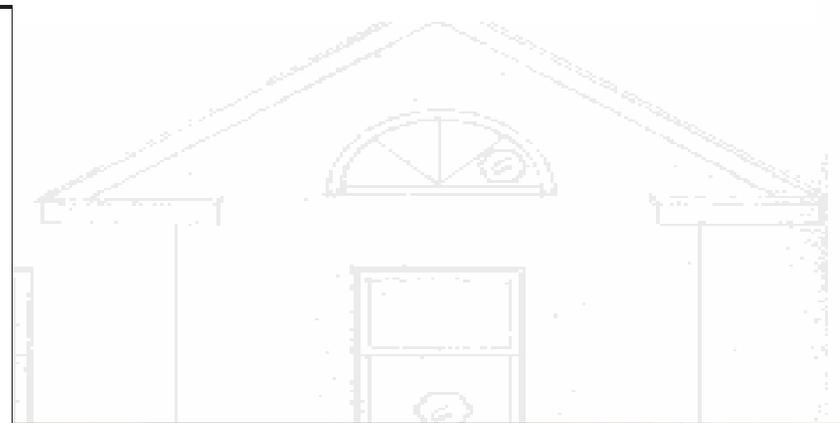
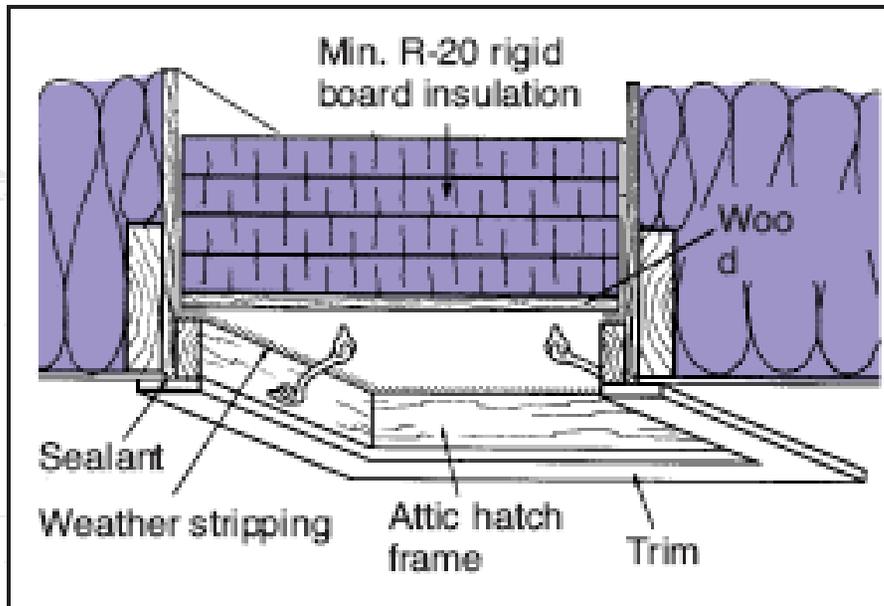
Solid wood edge, 3-1/2" (80 mm)

White MFD panel, 1/8" (3mm)

COMPLETE AIR BARRIER ATTIC ACCESS PANEL PROBLEM

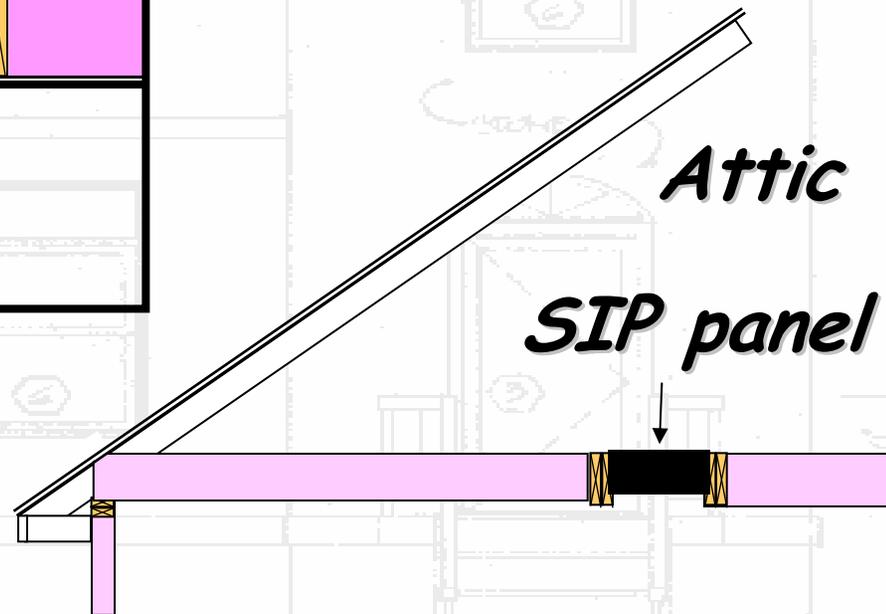
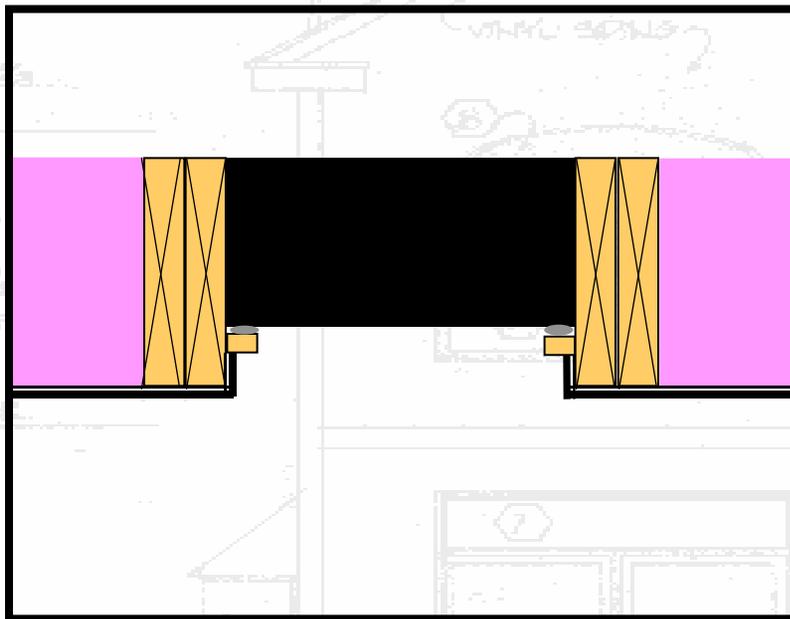


COMPLETE AIR BARRIER ATTIC ACCESS PANEL SOLUTION

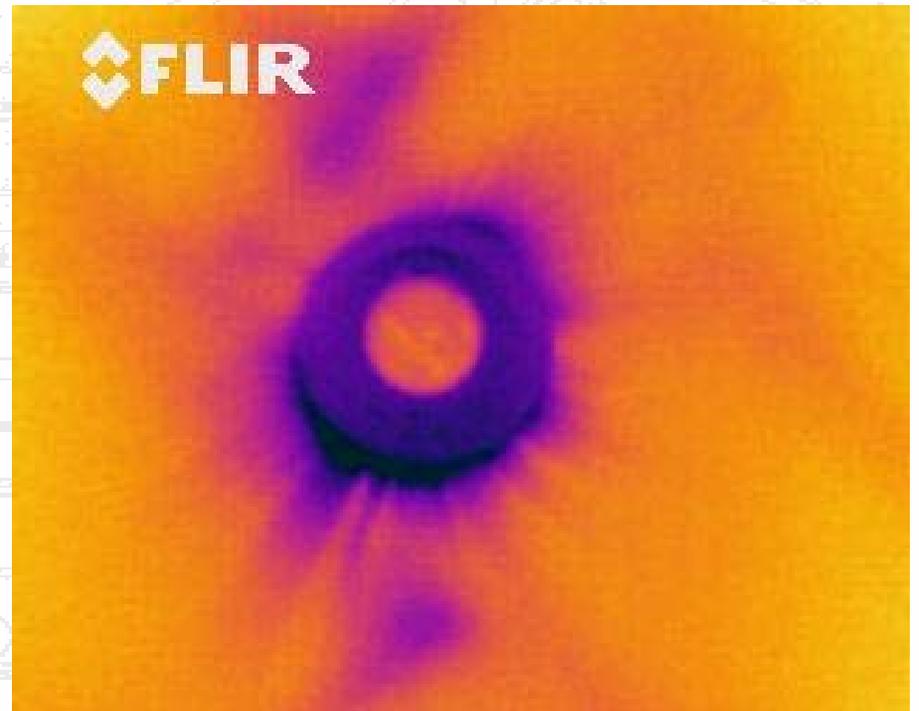
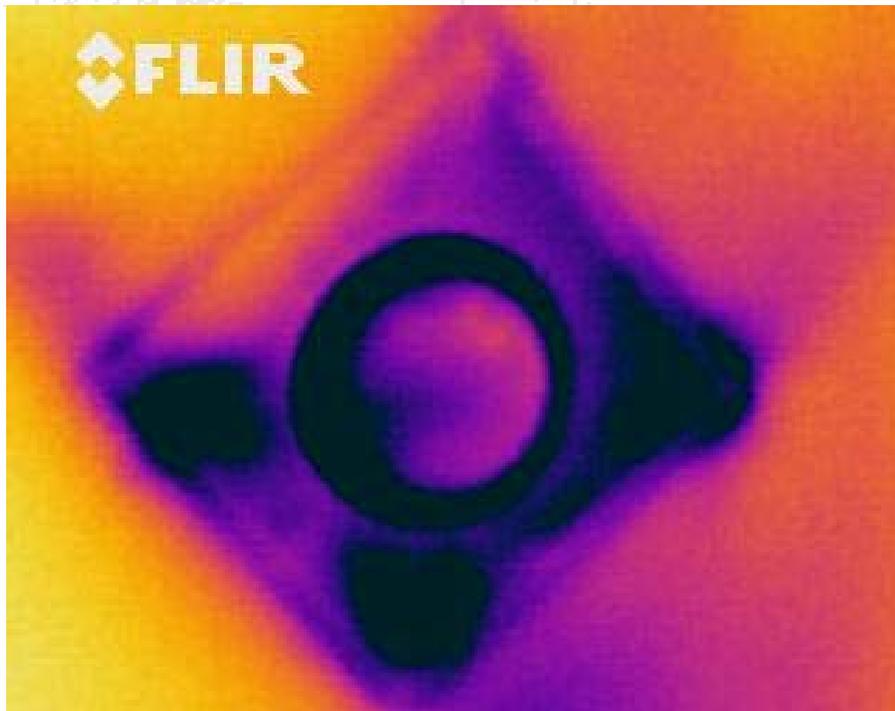


*Factory-
installed
weather-
stripping*

COMPLETE AIR BARRIER ATTIC ACCESS PANEL SOLUTION

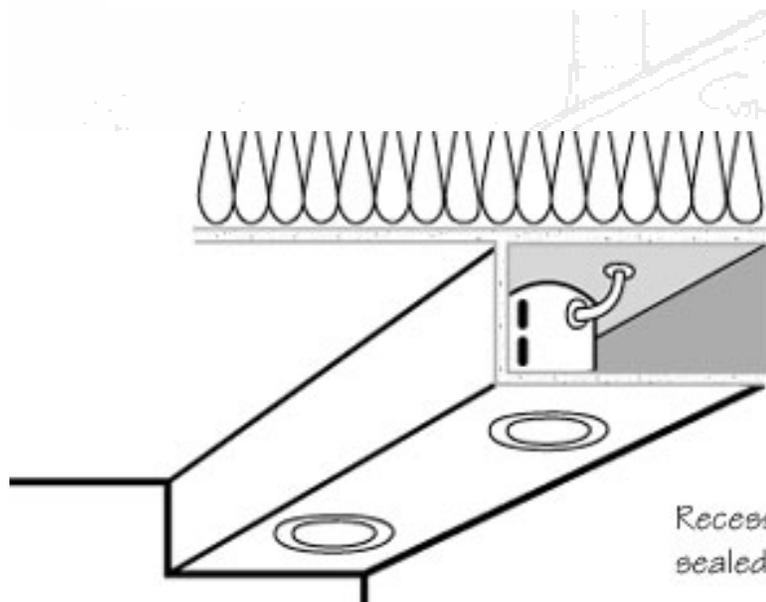


COMPLETE AIR BARRIER RECESSED LIGHTING PROBLEM

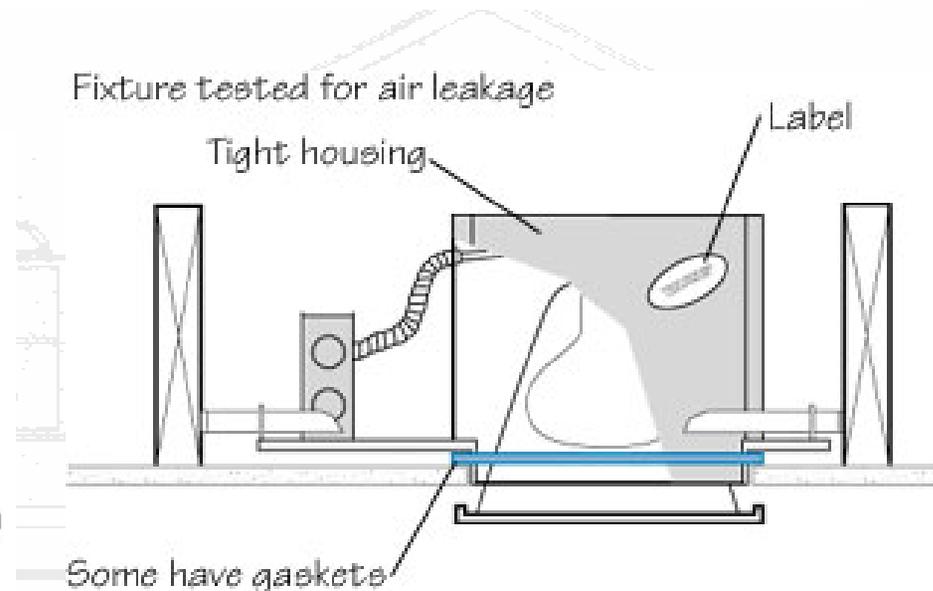


Courtesy of Energy Services Group

COMPLETE AIR BARRIER RECESSED LIGHTING SOLUTIONS



Recessed fixture in a sealed soffit



Fixture tested for air leakage

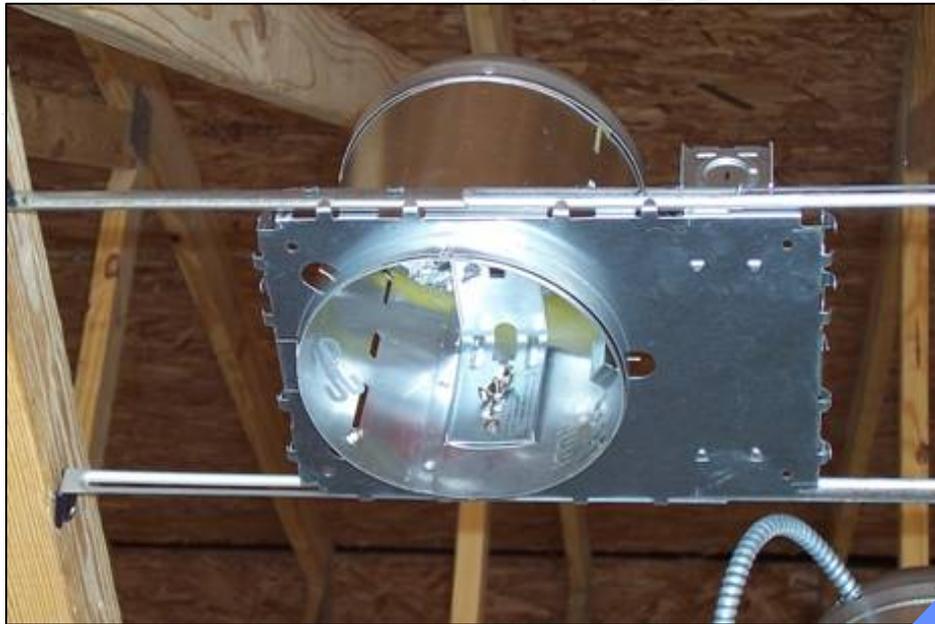
Tight housing

Label

Some have gaskets

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

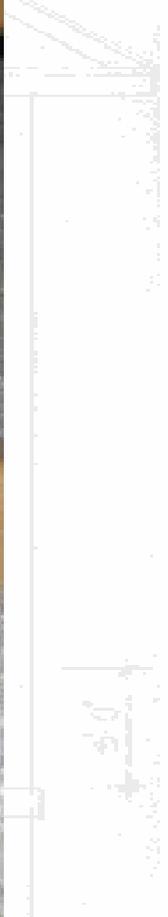
COMPLETE AIR BARRIER RECESSED LIGHTING



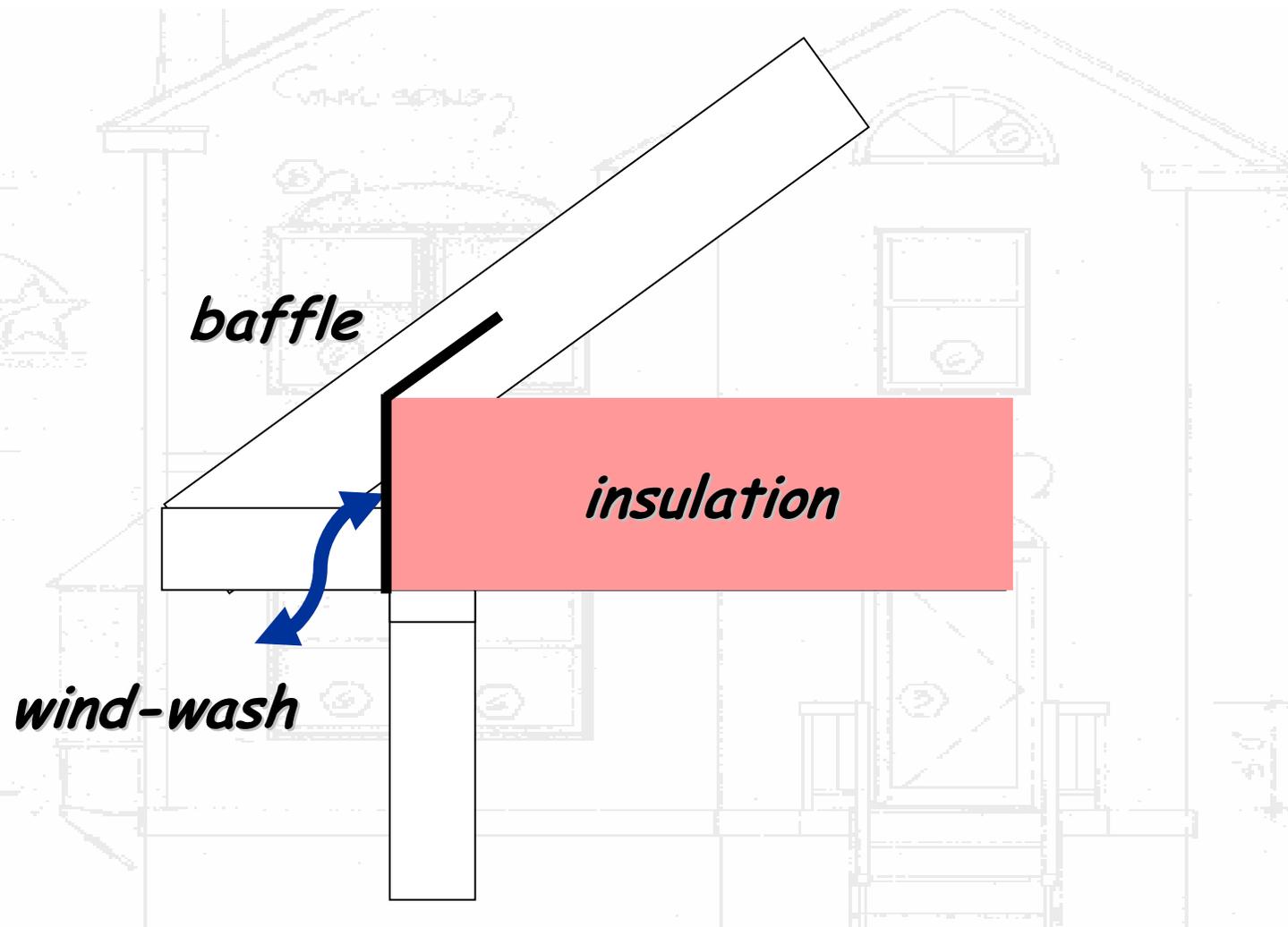
***Unacceptable.
Does not meet most
codes because of
multiple holes.***

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

COMPLETE AIR BARRIER ATTIC EAVE PROBLEM



COMPLETE AIR BARRIER ATTIC EAVE SOLUTION



COMPLETE AIR BARRIER ATTIC EAVE SOLUTION



Baffles at every bay

Image courtesy of MaGrann Associates

COMPLETE AIR BARRIER COMMON WALLS

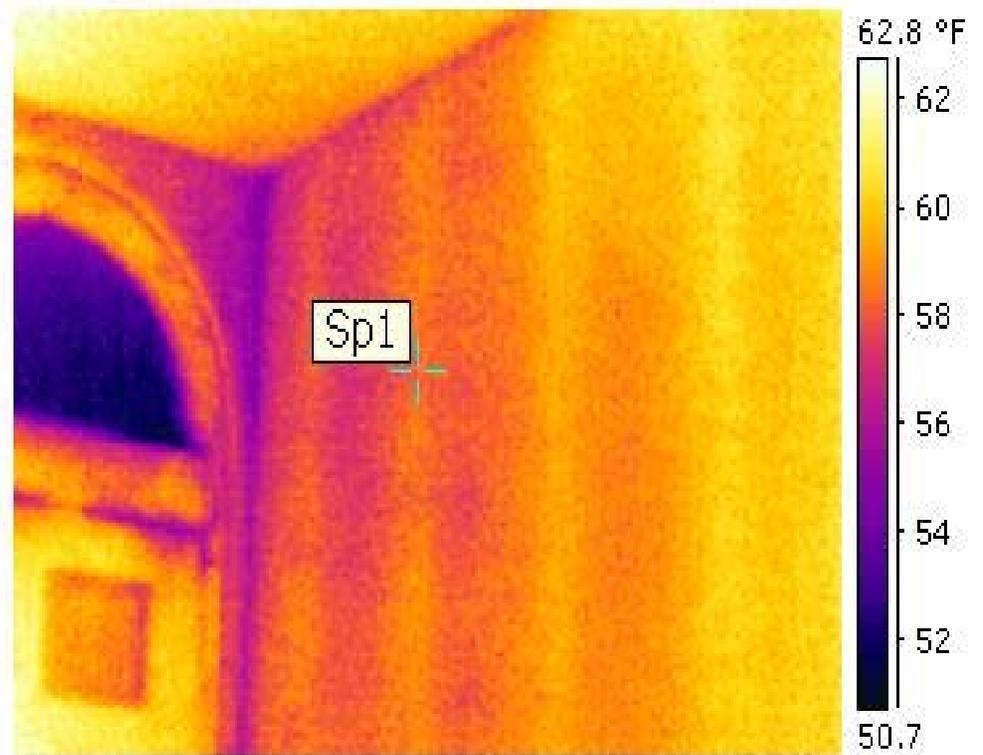


COMPLETE AIR BARRIER COMMON WALLS



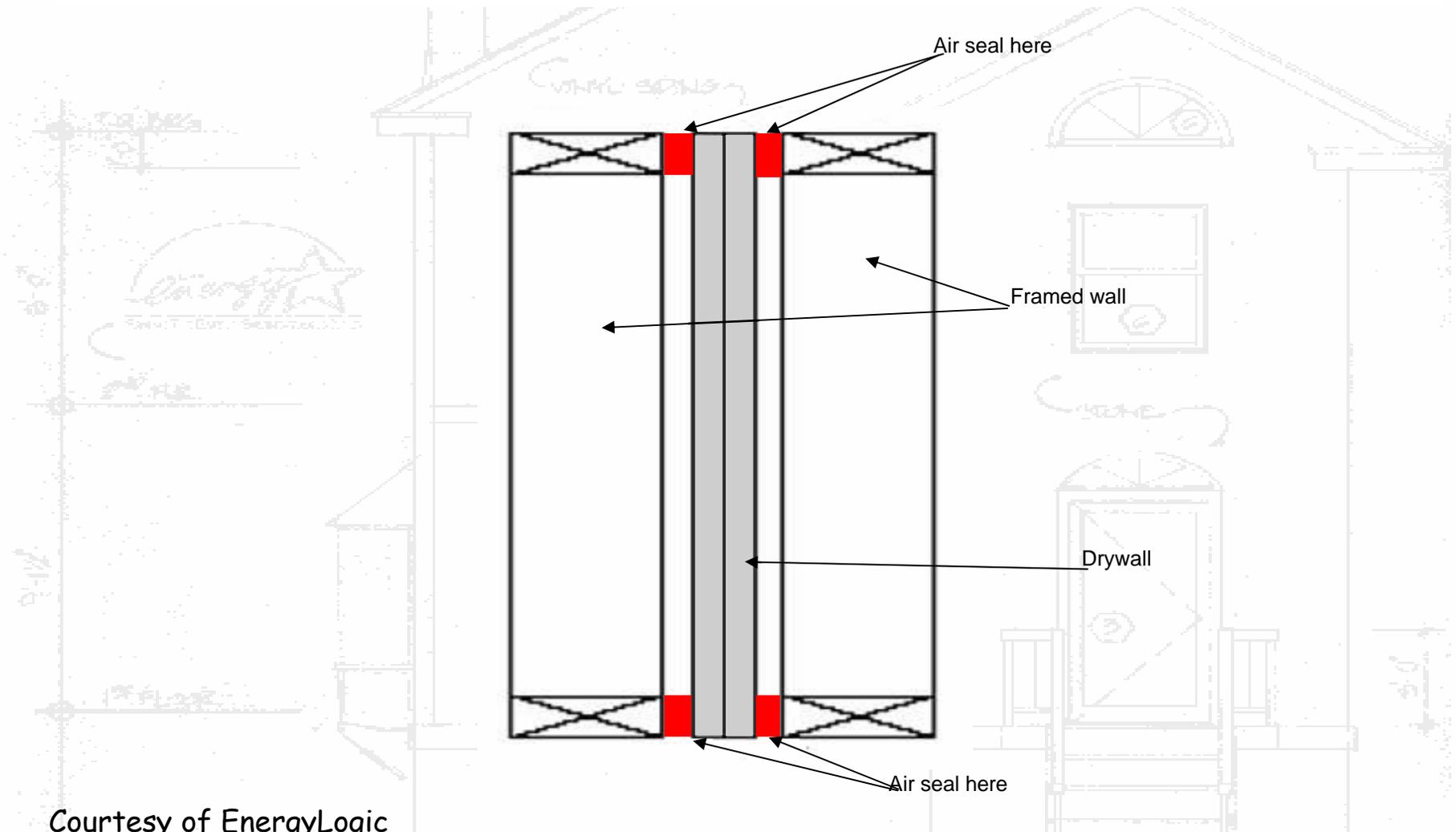
Courtesy of Energy Services Group

COMPLETE AIR BARRIER COMMON WALLS



Courtesy of Energy Services Group

COMPLETE AIR BARRIER COMMON WALLS



Courtesy of EnergyLogic

COMPLETE AIR BARRIER COMMON WALLS



Courtesy of Energy Services Group

COMPLETE AIR BARRIER COMMON WALLS BEST PRACTICES



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



Courtesy of MaGrann Associates

PROPERLY INSTALLED INSULATION INSULATION INSTALLATION PROBLEM



PROPERLY INSTALLED INSULATION INSULATION INSTALLATION PROBLEM

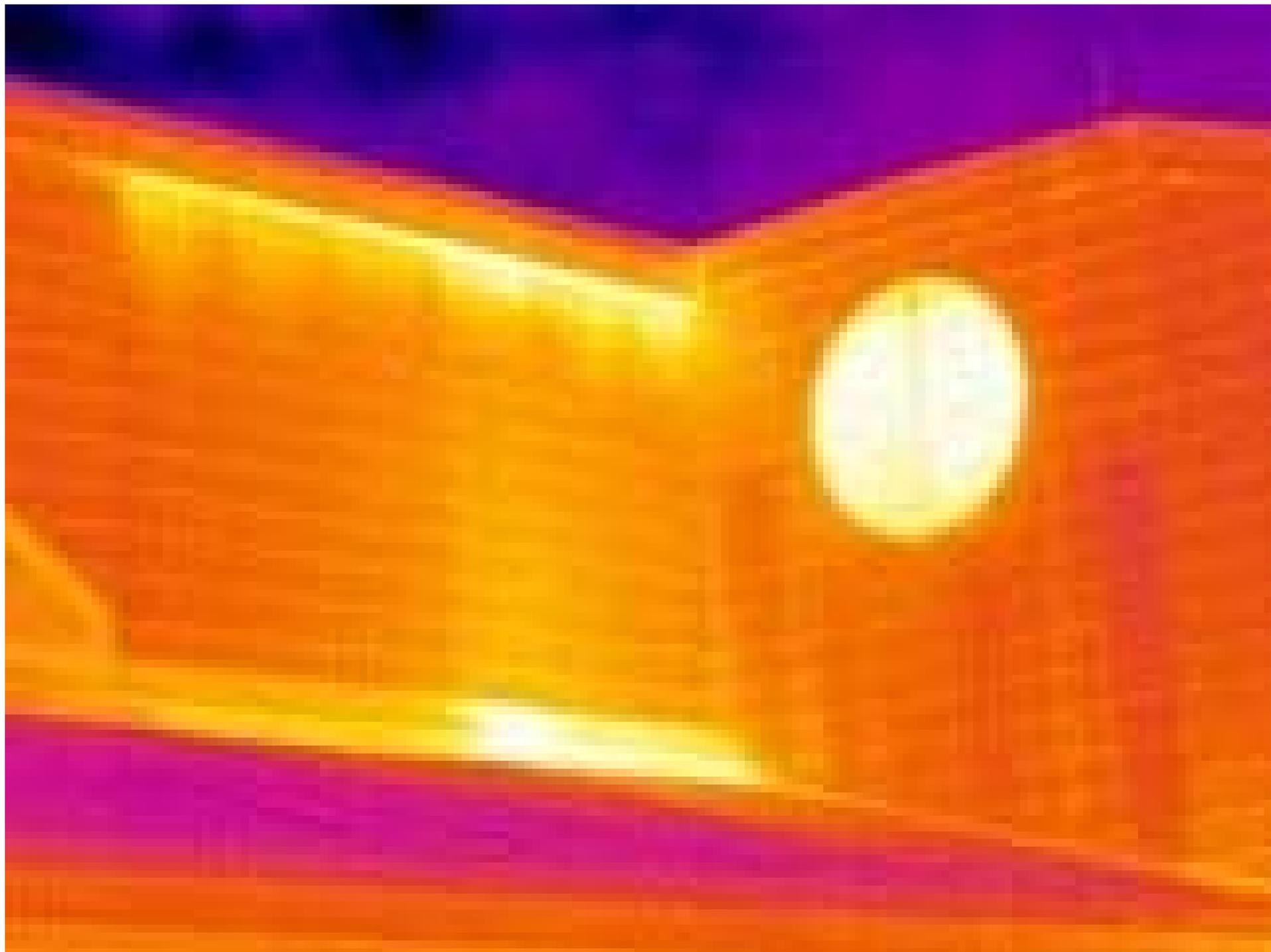


PROPERLY INSTALLED INSULATION PROBLEM: INSET STAPLING



PROPERLY INSTALLED INSULATION PROBLEM: INSET STAPLING





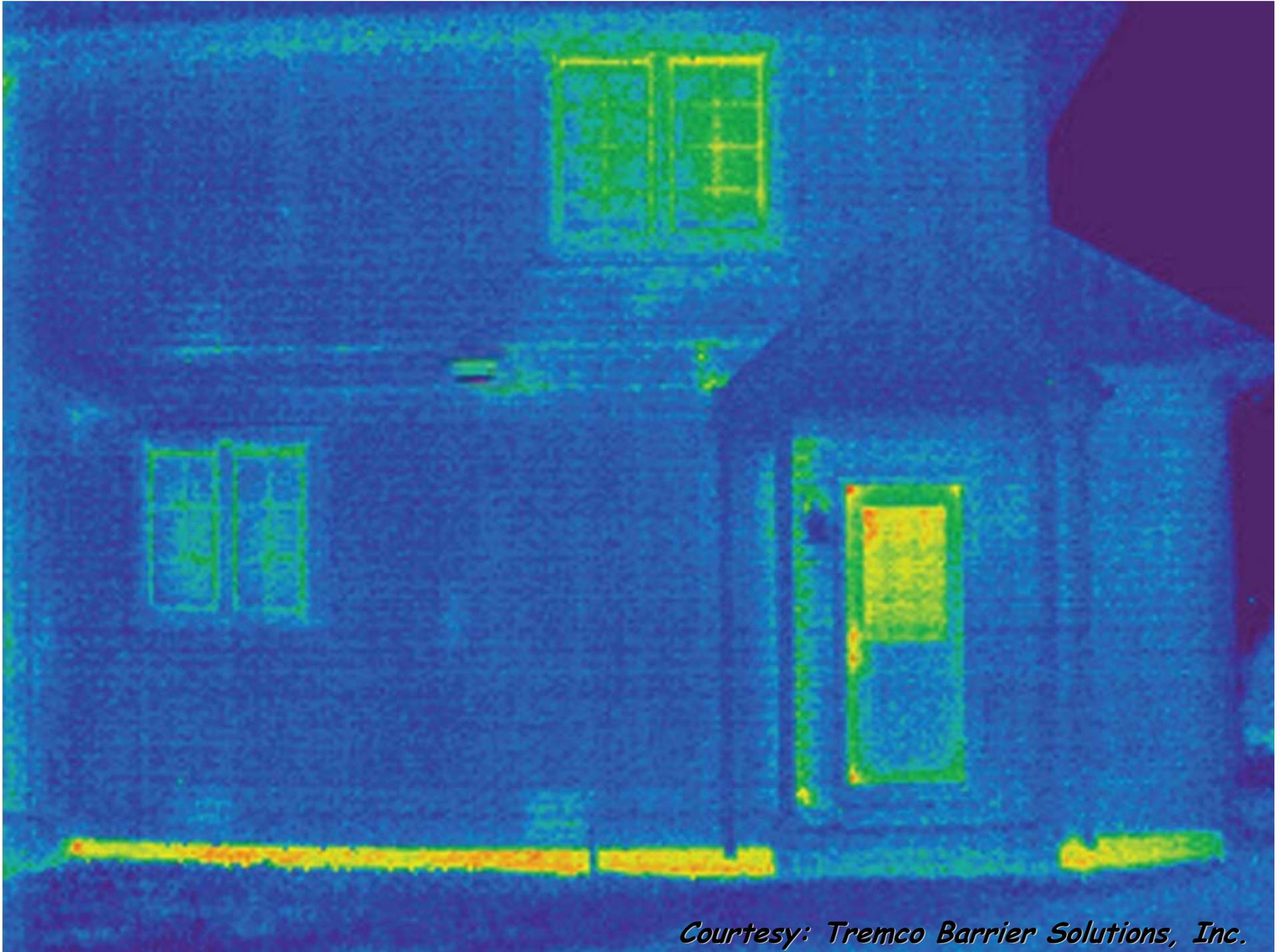
PROPERLY INSTALLED INSULATION
PROBLEM: POOR ALIGNMENT



PROPERLY INSTALLED INSULATION INSULATION INSTALLATION PROBLEM

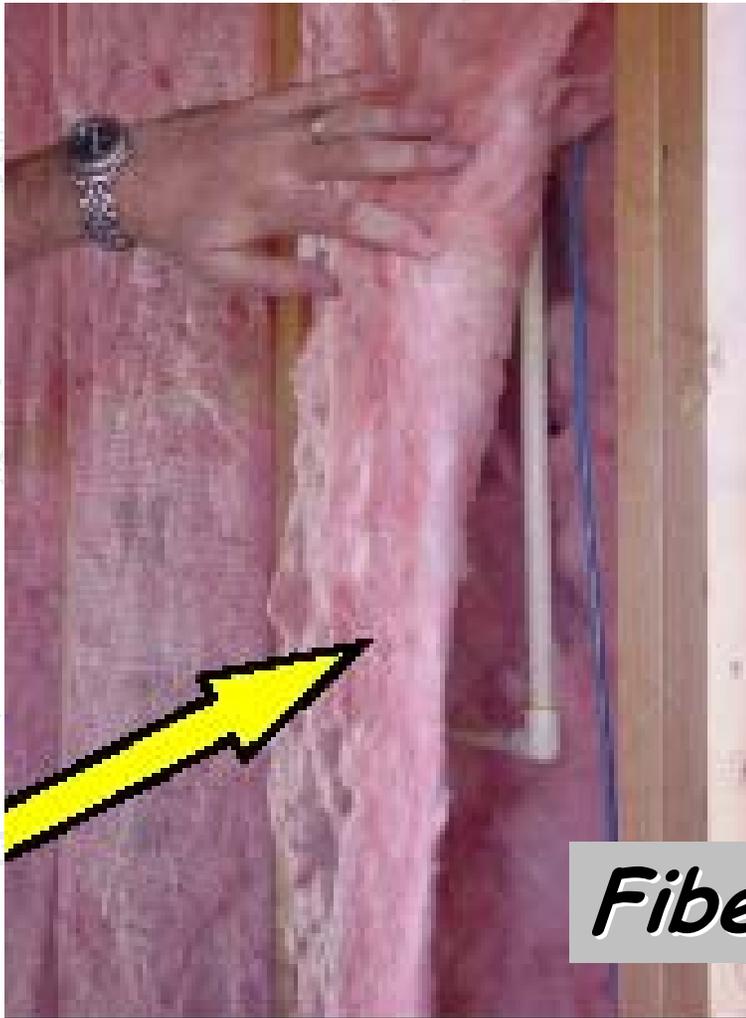


No Slab Edge Insulation



Courtesy: Tremco Barrier Solutions, Inc.

PROPERLY INSTALLED INSULATION BATT INSULATION



Fiberglass



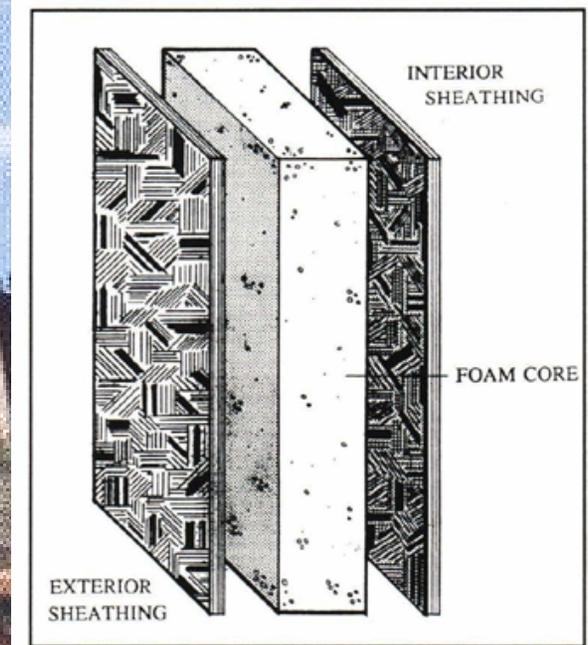
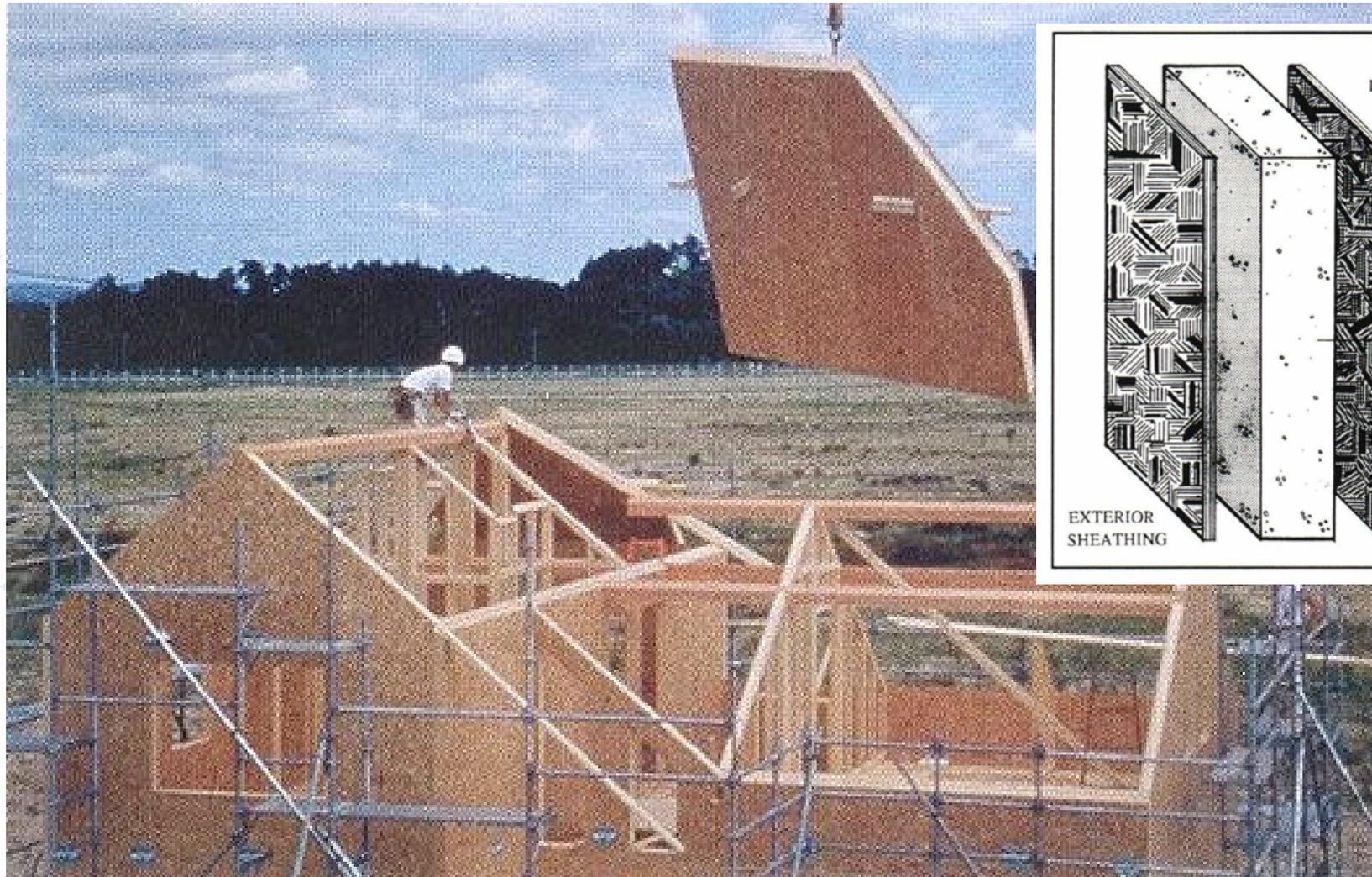
PROPERLY INSTALLED INSULATION BLOWN-IN INSULATION



PROPERLY INSTALLED INSULATION SPRAY FOAM

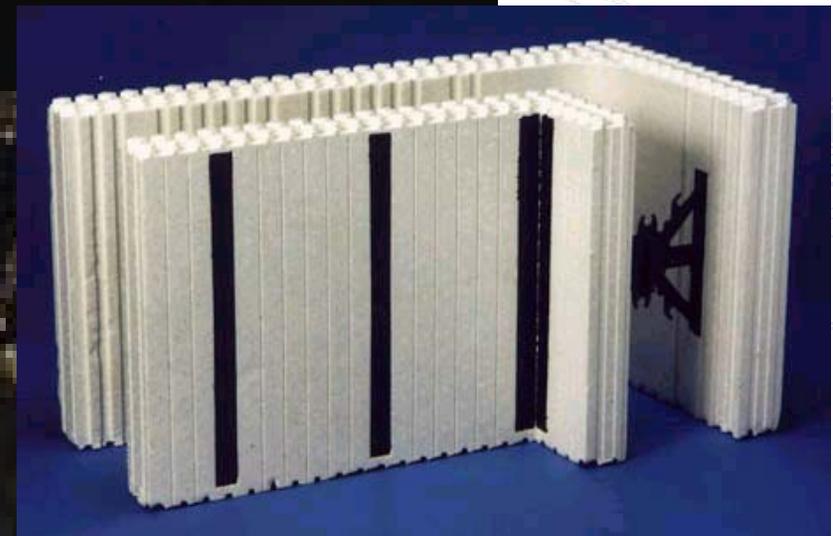


PROPERLY INSTALLED INSULATION STRUCTURAL INSULATED PANELS (SIPs)



10/10/10

PROPERLY INSTALLED INSULATION
INSULATED CONCRETE FORMS (ICF)

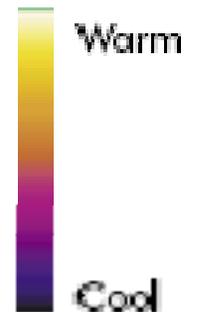
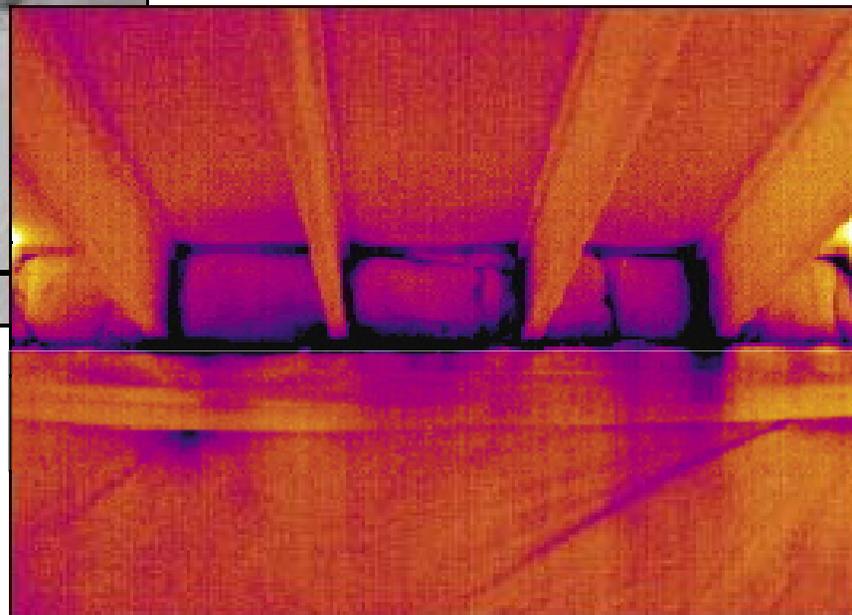
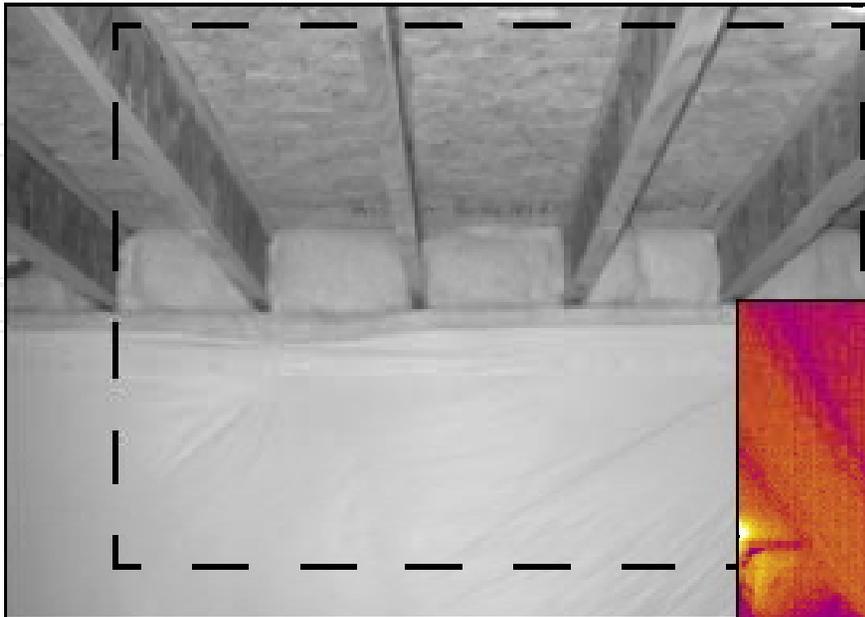


Insulated Concrete Forms (ICFs)

PROPERLY INSTALLED INSULATION INSULATION PROBLEM



PROPERLY INSTALLED INSULATION RIM JOIST PROBLEM



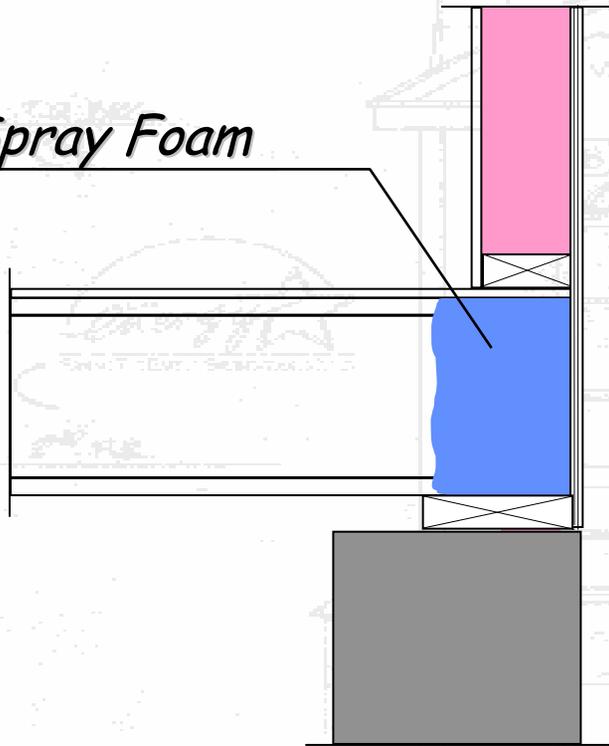
The infrared photo (right) shows the symptoms of compressed insulation and air leakage at the rim joist.

Courtesy of Fort Collins Utilities

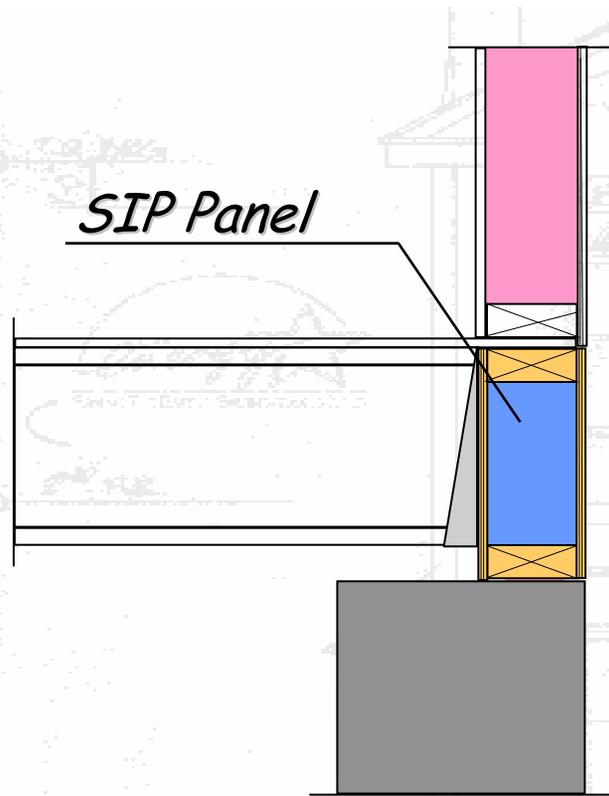
PROPERLY INSTALLED INSULATION BAND JOIST BEST PRACTICES



Spray Foam



PROPERLY INSTALLED INSULATION BAND JOIST BEST PRACTICES



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Floors

▶ Insulated Rimboard

Cantilever Soffit
Insulated Panels

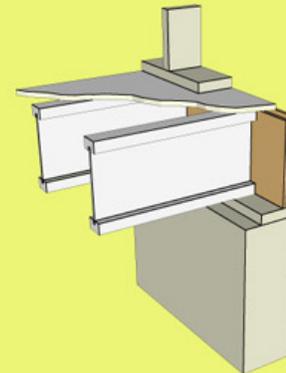
Exterior Walls

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.

PROPERLY INSTALLED INSULATION FRAMING PROBLEM



*Where 4
is good;*



*5 must
be better;*



*and 9 is
Great!*



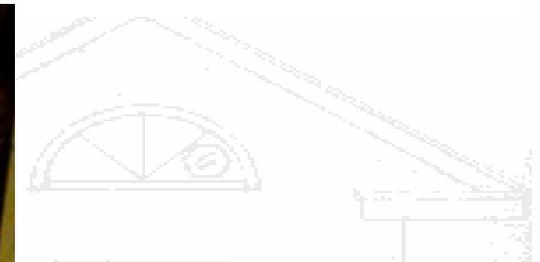
Courtesy of Building Science Corp.







PROPERLY INSTALLED INSULATION FRAMING SOLUTION

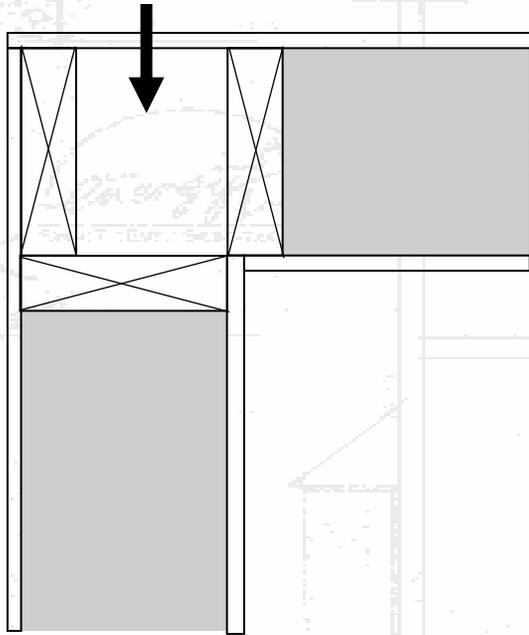


Courtesy of Building Science Corp.

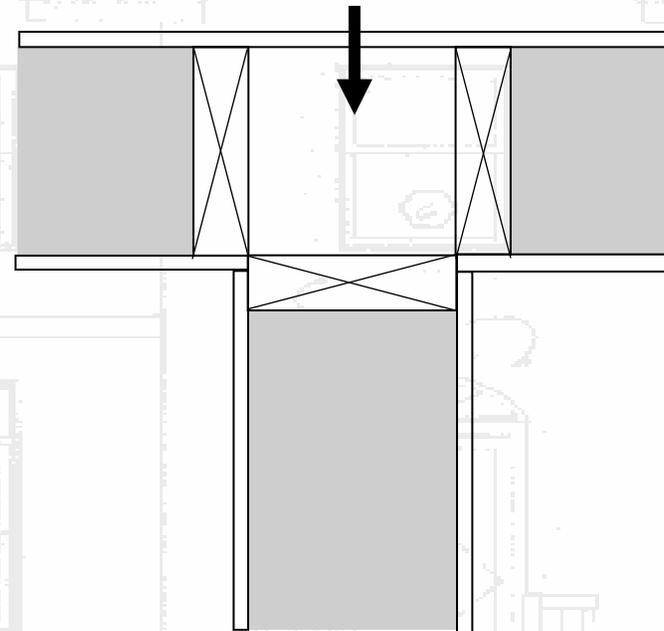
PROPERLY INSTALLED INSULATION FRAMING PROBLEM



uninsulated corner



uninsulated wall intersection







PROPERLY INSTALLED INSULATION FRAMING PROBLEM



~48 wall corners and intersections

= 12-80 feet uninsulated wall!



PROPERLY INSTALLED INSULATION ADVANCED FRAMING SOLUTION

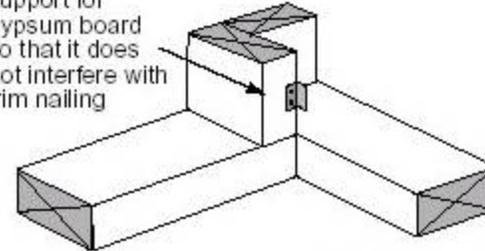


Courtesy of Building Science Corp.

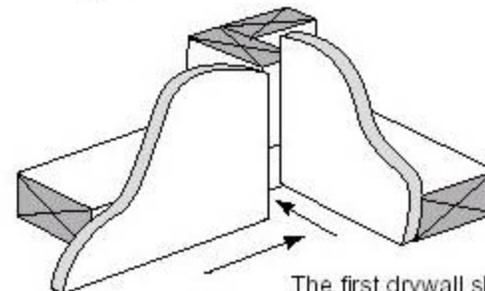
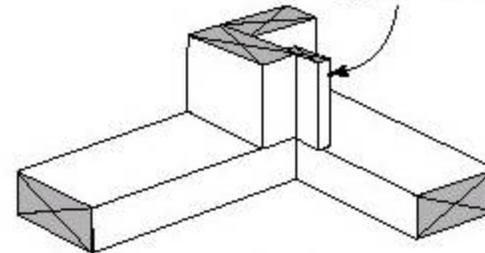
Courtesy of Southface Institute

INSIDE "TWO-STUD" CORNERS

Position clip support for gypsum board so that it does not interfere with trim nailing



Backer support for gypsum board



The first drywall sheet is installed against side with clip or backer

PROPERLY INSTALLED INSULATION
ADVANCED FRAMING SOLUTIONS



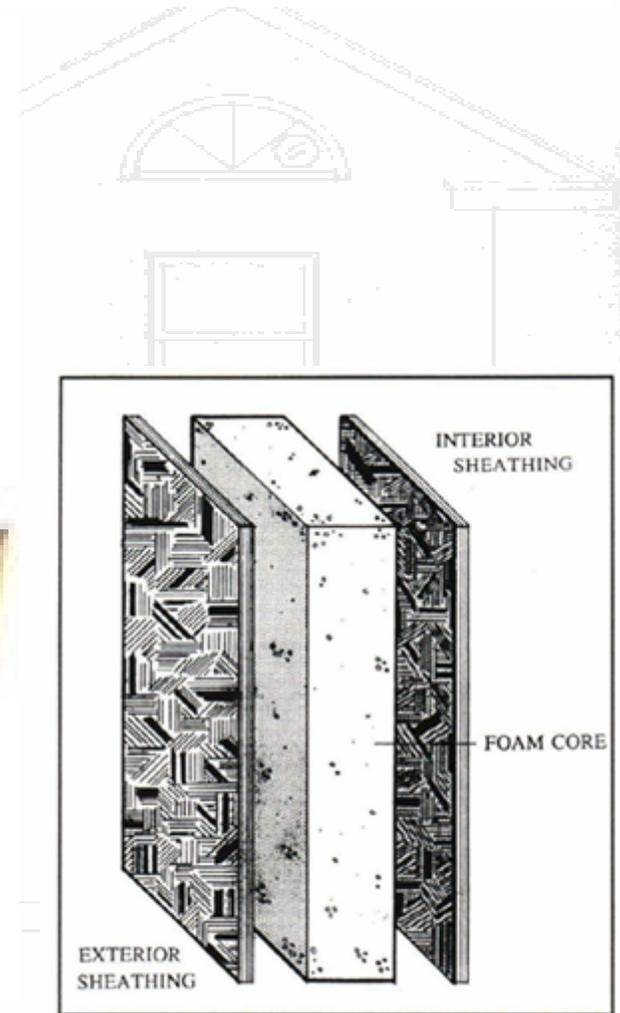
*Ladder T -
Allows insulation
in exterior wall
cavity at wall
intersections*



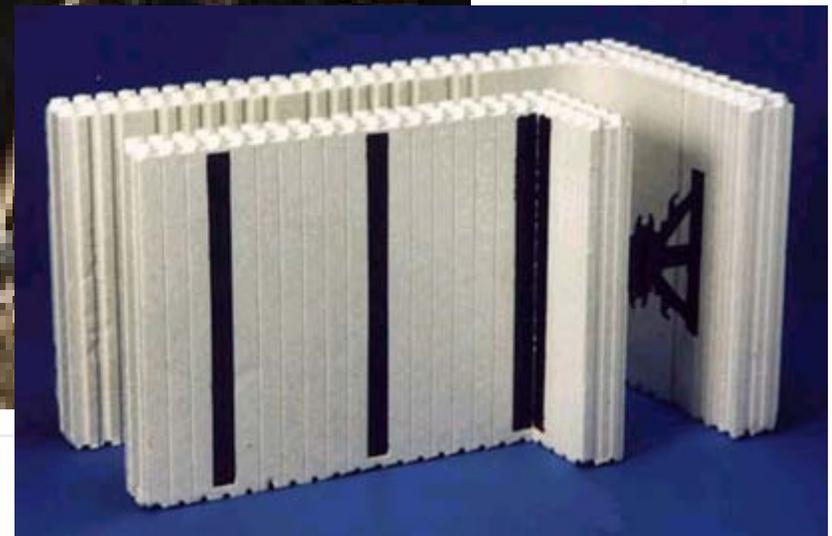
PROPERLY INSTALLED INSULATION RIGID INSULATION SHEATHING

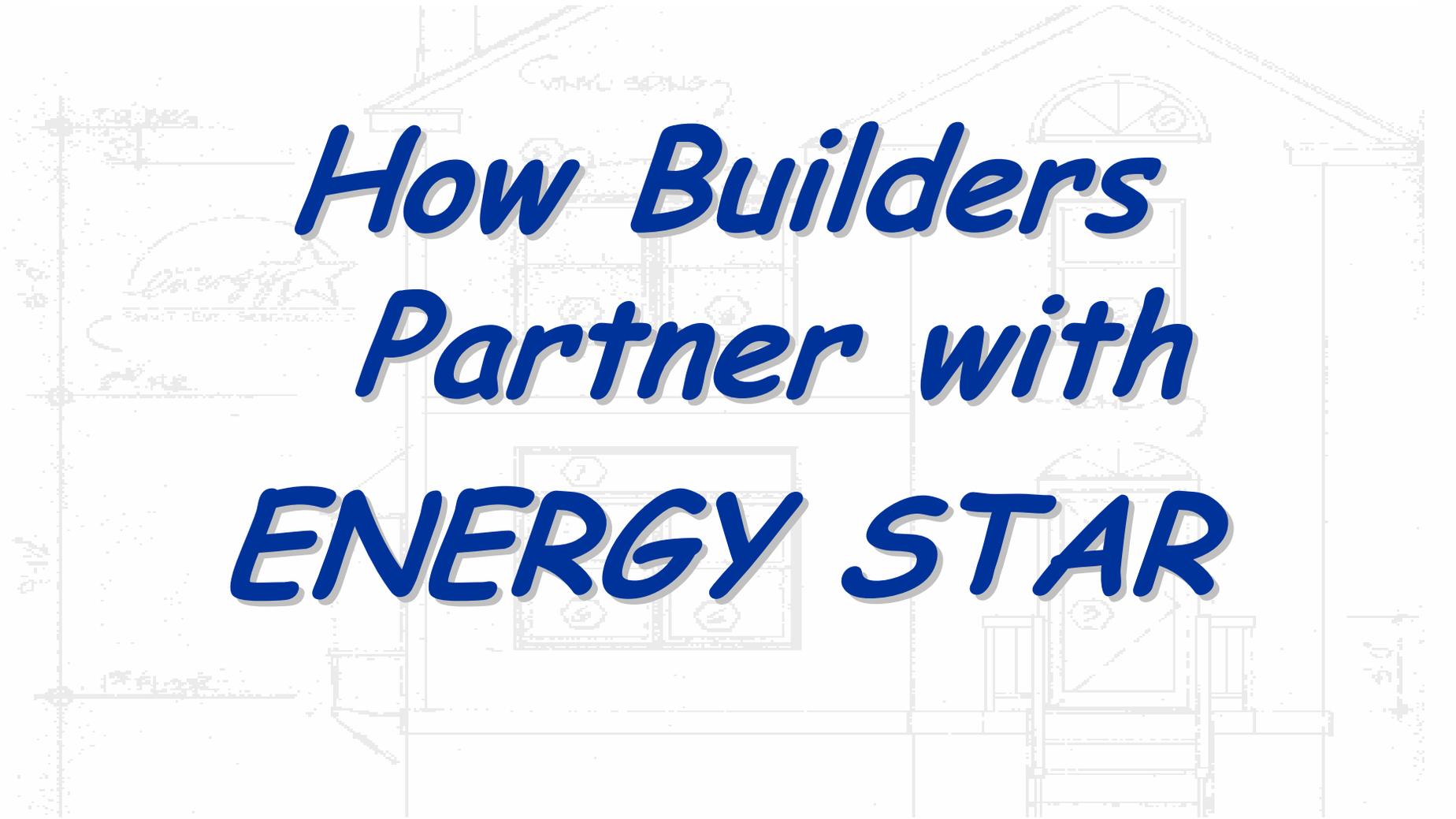


PROPERLY INSTALLED INSULATION STRUCTURAL INSULATED PANELS (SIPs)



PROPERLY INSTALLED INSULATION INSULATED CONCRETE FORMS (ICFs)



A faint, light gray architectural drawing of a house is visible in the background. It shows the outline of the house, including the roof, windows, and a front door with a small porch. There are some handwritten notes and dimensions scattered around the drawing, such as "VINYL SIDING" near the roofline and "10'-0\"/>

How Builders Partner with ENERGY STAR

STEP ONE: SELECT A HERS RATER



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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

Name ▾	Service Area/Phone	Partner Since	Homes Labeled (Oct 2006-Sep 2007)*	Homes Labeled (Grand Total)*	Homes Labeled (State Total)*
Advanced Building Science, Inc.	Richmond, VA 804-427-7777	2003	5	10	0
Affordable Energy Enterprises LLC	VA 330-351-2584	2007	New Partner	New Partner	0
Airflow Diagnostic Institute	Charlottesville, VA 434-817-1133	2001	13	32	32
Bill Warren-Energy Services	VA 919-933-8151	1999	8	20	1
Building Knowledge-Professional Inspection Services	Rockingham, Shenandoah, Augusta Counties, VA 540-246-4889	2007	New Partner	New Partner	0
CGE Solutions, Inc. EXIT ↕	VA 703-574-4365	2001	1490	4227	1941
Clean Air Concepts, Inc.	VA 804-423-6918	2007	1	1	1
Commonwealth Sustainability Works EXIT ↕	Northern and Central Virginia, VA 540-219-8912	2007	New Partner	New Partner	0
Community Housing Partners	Christiansburg, VA 540-382-5327	2002	1	7	7
EAM Associates Inc. EXIT ↕	VA 732-556-9190	2000	1881	8241	0
EarthCraft Virginia, LLC	Statewide, VA 804-225-9843	2007	New Partner	New Partner	0
EIC Inc. / Comfort Home Corporation	Norfolk, VA 717-581-8848 Richmond, VA 717-581-8848 Ashland, VA 804-798-4775	1996	2560	20402	0
Elysian Energy, LLC	Washington, D.C., VA 312-217-2121	2007	New Partner	New Partner	0
Energy Design Technology	Spotsylvania, VA 540-891-0007	1997	1	319	319
Energy Management Consulting	VA 716-909-8006	2007	New Partner	New Partner	0
Energy Services Group EXIT ↕	VA 800-908-7000	1997	916	8546	0
Environments for Living/Masco	VA 866-912-7233	2002	15180	50537	0
Green Power Living, LLC	Northern Virginia, 301-861-0201	2007	New Partner	New Partner	0

ALSO CHECK SPONSOR PROGRAMS



HOME IMPROVES OUR ENVIRONMENT

U.S. Environmental Protection Agency

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New Homes Partner Results in Virginia

Printable:
[Results 1 - 5](#)

Utilities and other regional energy efficiency program sponsors play a key role in promoting the construction and sales of ENERGY STAR qualified new homes. Utilities, state energy offices, and other sponsors listed here have partnered with ENERGY STAR and offer various incentives to homebuyers and businesses involved with building and marketing ENERGY STAR qualified new homes, including technical assistance, marketing support, home energy performance verification, and financial incentives. Please contact the utilities/sponsors directly for more details and current information. 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:

Utilities/Sponsors

Select another location:

Virginia

Results 1 - 5 of 5

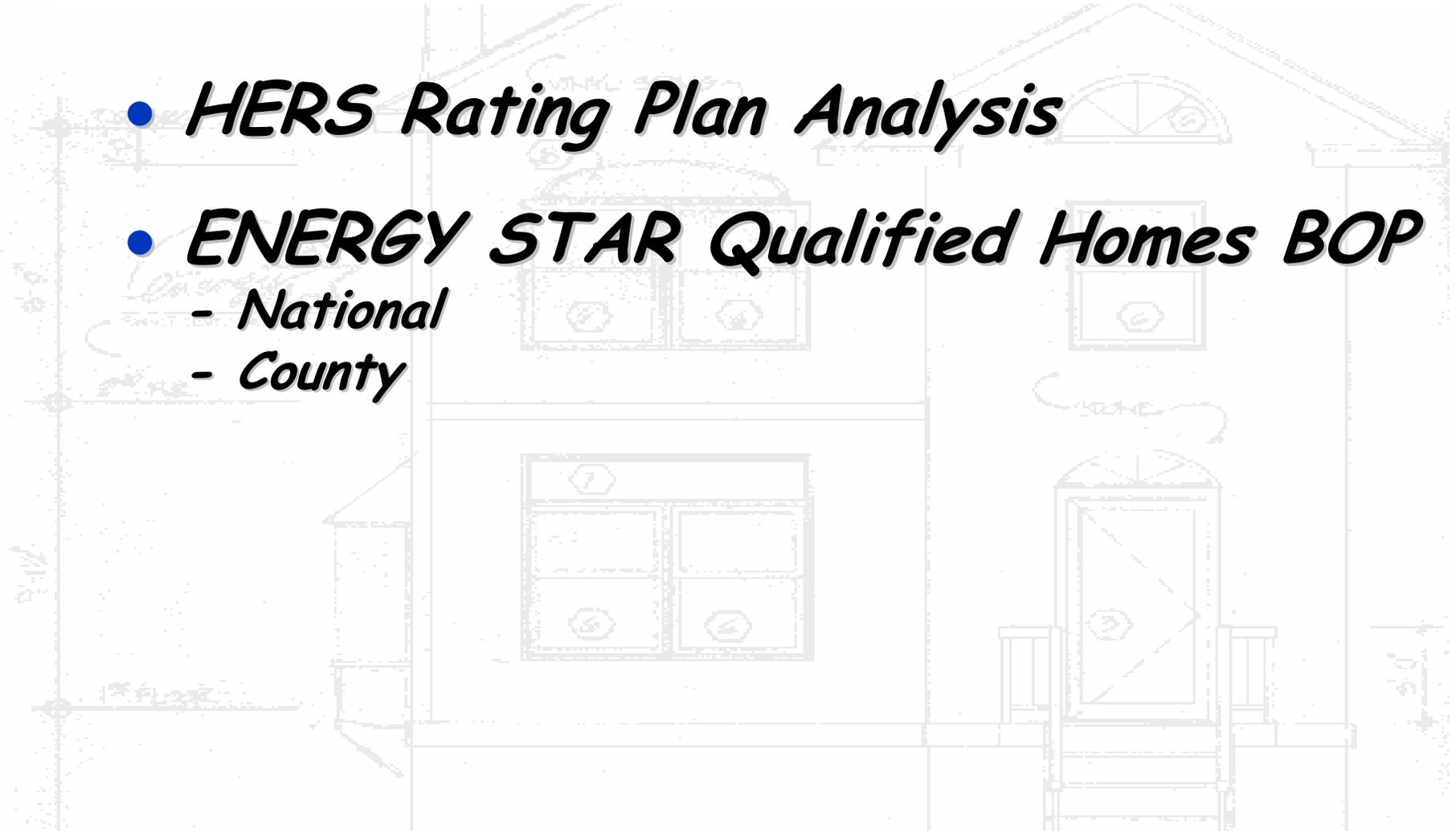
All # [A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

Name <input type="button" value="v"/>	Service Area/Phone	Partner Since	Homes Sponsored (Oct 2006-Sep 2007)*	Homes Sponsored (Grand Total)*	Homes Sponsored (State Total)*	Incentive Type (call partner for more info)
Building America <input type="button" value="EXIT"/> <input type="button" value="↔"/>	VA 303-384-7433	2006	4316	21400	1	
Dominion Virginia Power	VA, Northeastern NC, VA 888-667-3000	2007	New Partner	New Partner	0	
Environments for Living/Masco	VA 866-912-7233	2002	2609	17173	0	

STEP TWO: BENCHMARK



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





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 : <ul style="list-style-type: none"> ENERGY STAR qualified A/C (14 SEER / 11.6 EER); <u>OR</u> ENERGY STAR qualified heat pump³ (14 SEER / 11.6 EER / 8.2 HSPF) 	Right-Sized ² : <ul style="list-style-type: none"> 13 SEER A/C; <u>OR</u> ENERGY STAR qualified heat pump³ (14 SEER / 11.6 EER / 8.6 HSPF)
Heating Equipment	<ul style="list-style-type: none"> 80 AFUE gas furnace; <u>OR</u> ENERGY STAR qualified heat pump^{3,4} (14 SEER / 11.6 EER / 8.2 HSPF); <u>OR</u> 80 AFUE boiler; <u>OR</u> 80 AFUE oil furnace 	<ul style="list-style-type: none"> ENERGY STAR qualified gas furnace (90 AFUE); <u>OR</u> ENERGY STAR qualified heat pump^{3,4} (See Note 3 for specifications); <u>OR</u> ENERGY STAR qualified boiler (86 AFUE); <u>OR</u> ENERGY STAR qualified oil furnace (86 AFUE)
Thermostat⁵	ENERGY STAR qualified thermostat (except for zones with radiant heat)	
Ductwork	Leakage ⁶ : ≤ 4 cfm to outdoors / 100 sq. ft.; <u>AND</u> R-6 min. insulation on ducts in unconditioned spaces ⁸	
Envelope	<ul style="list-style-type: none"> 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; <u>AND</u> Insulation levels that meet or exceed the 2004 IRC⁶; <u>AND</u> Completed Thermal Bypass Inspection Checklist⁹ 	
Windows	ENERGY STAR qualified windows or better (additional requirements for CZ2 and CZ4) ^{10, 11, 12}	
Water Heater¹³	Gas (EF): 40 Gal = 0.61 60 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 R1101.2 from the 2004 International Residential Code (IRC).



ENERGY STAR Qualified Homes Builder Option Package Notes

2004/2008 IECC Climate Zone ¹ – 4	ENERGY STAR Window Zone ¹⁰ – All
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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 ⁷ ≥13 SEER A/C; <u>OR</u> Right-sized ⁷ ≥14 SEER/ 11.5 EER/ 8.5 HSPF ENERGY STAR qualified heat pump ⁸																						
Heating Equipment	≥90 AFUE ENERGY STAR qualified gas furnace; <u>OR</u> ≥14 SEER/ 11.5 EER/ 8.5 HSPF ENERGY STAR qualified heat pump ^{8, 9} ; <u>OR</u> ≥90 AFUE ENERGY STAR qualified boiler; <u>OR</u> ≥85 AFUE ENERGY STAR qualified oil furnace																						
Thermostat ⁸	ENERGY STAR qualified thermostat (except for zones with mass radiant heat)																						
Ductwork	Leakage ⁸ : ≤ 4 cfm to outdoors / 100 sq. ft.; <u>AND</u> Insulation ⁸ : ≥ R-6 insulation on ducts in unconditioned spaces																						
Envelope	<table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">≤ 6 ACH50</td> <td style="width: 70%;">Infiltration ^{9, 11}</td> </tr> <tr> <td>≤ Reference UA</td> <td>UA Alternative Approach ⁹; <u>OR</u></td> </tr> <tr> <td>≥ 38 R-Value</td> <td>Ceiling Insulation ⁹; <u>AND (if applicable)</u></td> </tr> <tr> <td>≥ 30 R-Value</td> <td>Cathedral Ceiling Insulation ⁹; <u>AND (if applicable)</u></td> </tr> <tr> <td>≥ 13 R-Value</td> <td>Wood Frame Wall Insulation ⁹; <u>AND (if applicable)</u></td> </tr> <tr> <td>≥ 19 R-Value</td> <td>Floor Over Unconditioned Space Insulation ⁹; <u>AND (if applicable)</u></td> </tr> <tr> <td>≥ 10 R-Value</td> <td>Crawlspace Wall Insulation Continuous ⁹; <u>OR (if applicable)</u></td> </tr> <tr> <td>≥ 13 R-Value</td> <td>Crawlspace Wall Insulation Framed ⁹; <u>AND (if applicable)</u></td> </tr> <tr> <td>≥ 10 R-Value</td> <td>Basement Wall Insulation Continuous ⁹; <u>OR (if applicable)</u></td> </tr> <tr> <td>≥ 13 R-Value</td> <td>Basement Wall Insulation Framed ⁹; <u>AND (if applicable)</u></td> </tr> <tr> <td>≥ 10 R-Value</td> <td>Slab Insulation at 2 feet Depth ⁹; <u>AND</u></td> </tr> </table> <p>Completed Thermal Bypass Inspection Checklist ⁹</p>	≤ 6 ACH50	Infiltration ^{9, 11}	≤ Reference UA	UA Alternative Approach ⁹ ; <u>OR</u>	≥ 38 R-Value	Ceiling Insulation ⁹ ; <u>AND (if applicable)</u>	≥ 30 R-Value	Cathedral Ceiling Insulation ⁹ ; <u>AND (if applicable)</u>	≥ 13 R-Value	Wood Frame Wall Insulation ⁹ ; <u>AND (if applicable)</u>	≥ 19 R-Value	Floor Over Unconditioned Space Insulation ⁹ ; <u>AND (if applicable)</u>	≥ 10 R-Value	Crawlspace Wall Insulation Continuous ⁹ ; <u>OR (if applicable)</u>	≥ 13 R-Value	Crawlspace Wall Insulation Framed ⁹ ; <u>AND (if applicable)</u>	≥ 10 R-Value	Basement Wall Insulation Continuous ⁹ ; <u>OR (if applicable)</u>	≥ 13 R-Value	Basement Wall Insulation Framed ⁹ ; <u>AND (if applicable)</u>	≥ 10 R-Value	Slab Insulation at 2 feet Depth ⁹ ; <u>AND</u>
≤ 6 ACH50	Infiltration ^{9, 11}																						
≤ Reference UA	UA Alternative Approach ⁹ ; <u>OR</u>																						
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≥ 13 R-Value	Crawlspace Wall Insulation Framed ⁹ ; <u>AND (if applicable)</u>																						
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≥ 13 R-Value	Basement Wall Insulation Framed ⁹ ; <u>AND (if applicable)</u>																						
≥ 10 R-Value	Slab Insulation at 2 feet Depth ⁹ ; <u>AND</u>																						
Windows ^{10, 11, 12}	≤ 0.40 U-Value ≤ 0.45 SHGC																						
Water Heater ¹³	Gas (EF): 40 Gal = 0.61 60 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



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*

A blue Energy Star Qualified Home label. The top left corner features the Energy Star logo. The top right corner contains the text "AN ENERGY STAR® QUALIFIED HOME". The label is divided into several sections with white backgrounds and blue borders. The "Address:" section contains "9722 Main Street" and "Green Springs, CO 80935". The "Built by:" section contains "Quality Homes". The "Verified by:" section contains "HERS are Us, LLC". The "Date:" section contains "May 3, 2006". The "Optional information:" section contains "HERS INDEX - 80". At the bottom, there is a paragraph of text explaining the verification process and the website "www.energystar.gov".

Address:
**9722 Main Street
Green Springs, CO 80935**

Built by:
Quality Homes

Verified by:
HERS are Us, LLC

Date:
May 3, 2006

Optional information:
HERS INDEX - 80

This home has been independently verified through an EPA-approved sampling protocol to meet ENERGY STAR's strict guidelines for energy efficiency. Each ENERGY STAR qualified home can keep 4,500 lbs of greenhouse gases out of our air each year.

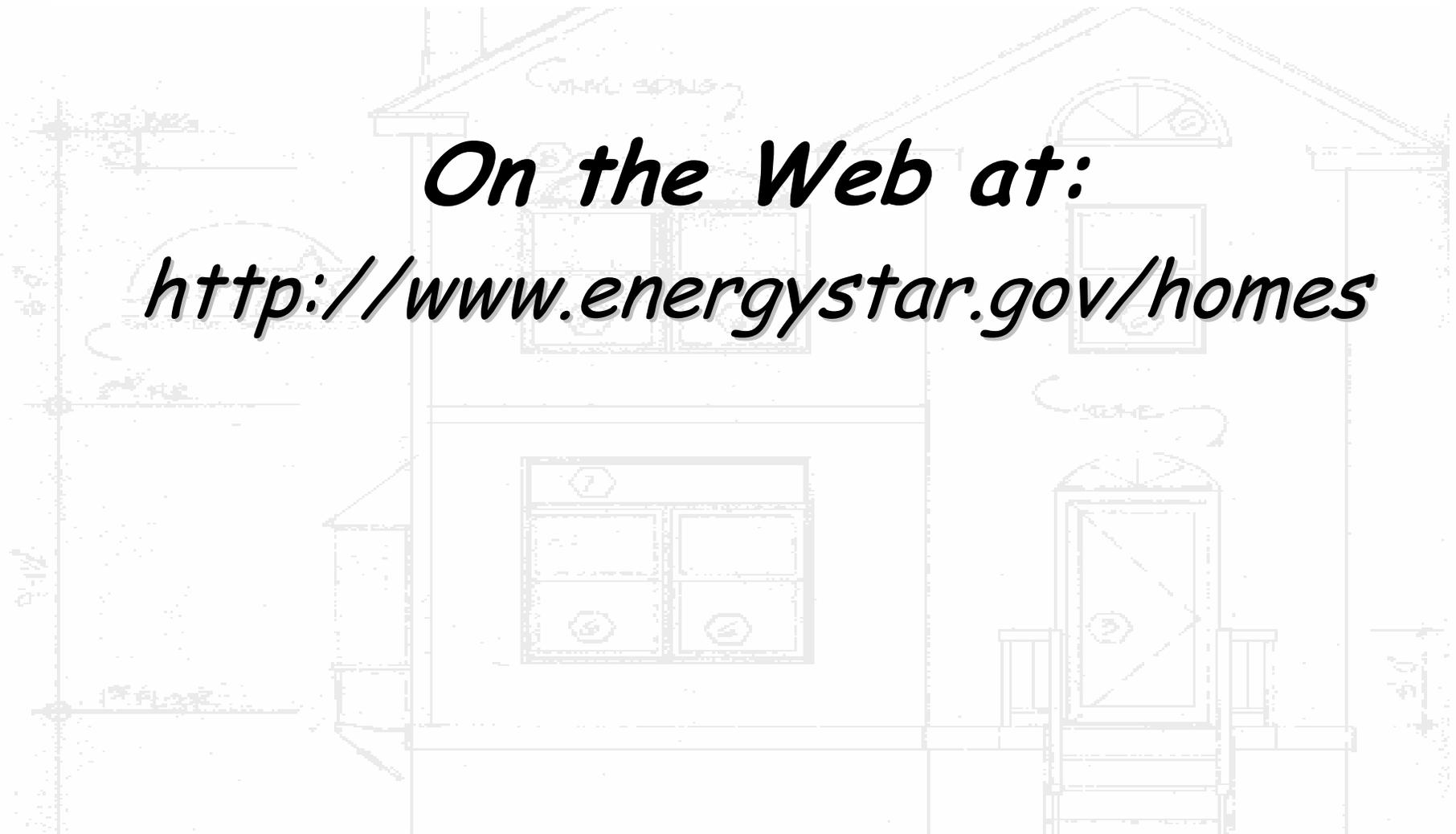
www.energystar.gov

HOW TO GET MORE INFORMATION



On the Web at:

<http://www.energystar.gov/homes>



ENERGY STAR OUTREACH PARTNERSHIP OLD EXAMPLES



Before you break ground on your new home,
do a little digging here:
www.energystar.gov

AN ENERGY STAR® QUALIFIED HOME IS BETTER FOR YOU AND THE ENVIRONMENT.

Compared with standard homes, ENERGY STAR qualified homes use substantially less energy for heating, cooling, and water heating—delivering \$200 to \$400 in annual savings.

ENERGY STAR Builder Partners in San Antonio

Armadillo Homes
210-662-0066

David Weekley Homes David Weekley Homes
210-479-8260

GREENBORO Greenboro Homes 
210-694-9302

KB HOME KB Home
210-342-5122

LEGACY HOMES Legacy Homes
210-402-6045

Medallion Homes Medallion Homes 
years for life 210-494-2555

Meritage Homes Meritage Homes
210-402-6045

Newmark homes Newmark Homes 
210-489-8484
a member of the Toussaint family

PERRY HOMES Perry Homes 
1-800-24PERRY

WILSHIRE HOMES Wilshire Homes 
210-493-0892



To earn the government's ENERGY STAR, a home must meet strict energy efficiency guidelines set by the U.S. EPA. ENERGY STAR qualified homes are quieter and more comfortable, have lower utility bills, and help protect the environment by reducing greenhouse gas emissions. To find participating home builders near you, visit energystar.gov.



ENERGY STAR OUTREACH PARTNERSHIP HOW IT WORKS



- At least three partners work together and provide:
 - Funds to run an 8-13 week placement of an EPA-developed ad or radio spot (or equivalent alternate media plan)
- EPA provides:
 - Funds to run a complementary ad campaign

ENERGY STAR OUTREACH PARTNERSHIP 2007 PARTICIPANTS



West

Colorado Springs, CO
Denver, CO
Las Vegas, NV
Reno/Sparks, NV
Salt Lake City, UT

Pacific Northwest

Boise, ID
Klamath Falls, OR
Medford, OR
Eugene, OR
Spokane, WA
Tri-Cities, WA

Midwest

Indianapolis, IN
Cincinnati, OH

Mid-Atlantic

Baltimore, MD
Eastern Shore, MD
Montgomery
County, MD

Northeast

New Jersey
Long Island, NY
New York City, NY
Westchester, NY

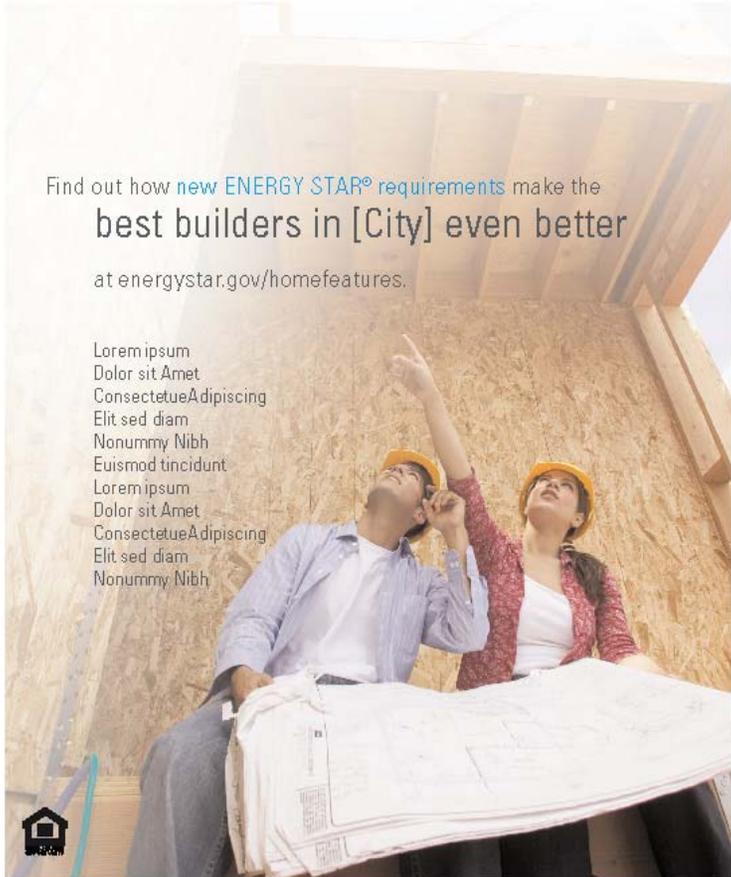
South

Oklahoma City, OK
Houston, TX
San Antonio, TX

Southeast

Okaloosa, FL
Columbus, GA
NE Georgia
Charlotte, NC
Greensboro, NC
Wilmington, NC
Myrtle Beach, SC

ENERGY STAR OUTREACH PARTNERSHIP NEW EXAMPLES

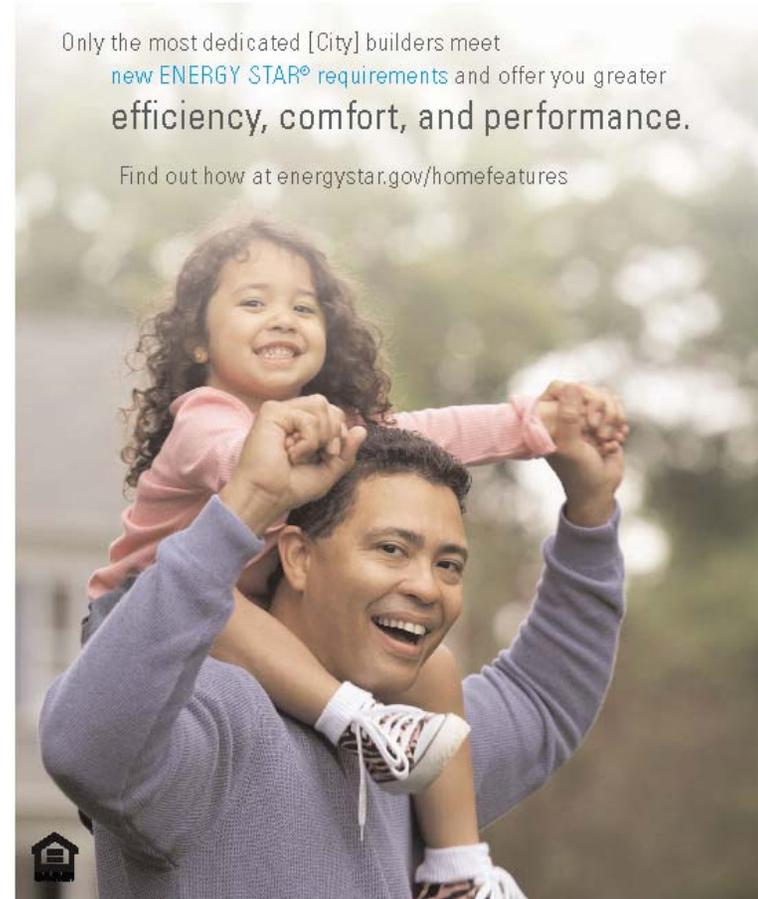


Find out how **new ENERGY STAR® requirements** make the **best builders in [City] even better** at energystar.gov/homefeatures.

Lorem ipsum
Dolor sit Amet
Consectetue Adipiscing
Elit sed diam
Nonummy Nibh
Euismod tincidunt
Lorem ipsum
Dolor sit Amet
Consectetue Adipiscing
Elit sed diam
Nonummy Nibh



To earn the government's ENERGY STAR, a home must be independently verified to meet new and more rigorous guidelines set by the U.S. Environmental Protection Agency. ENERGY STAR qualified homes are quieter and more comfortable, have lower utility bills, and help protect the environment by reducing greenhouse gas emissions. Learn more. Visit energystar.gov.



Only the most dedicated [City] builders meet **new ENERGY STAR® requirements** and offer you greater **efficiency, comfort, and performance.**

Find out how at energystar.gov/homefeatures



To earn the government's ENERGY STAR, a home must be independently verified to meet new and more rigorous guidelines set by the U.S. Environmental Protection Agency. ENERGY STAR qualified homes are quieter and more comfortable, have lower utility bills, and help protect the environment by reducing greenhouse gas emissions. Learn more. Visit energystar.gov.

