

Building Efficiency in Multi-Family Housing



Setting the standard for energy-efficient homes™

Profile of Meritage Homes

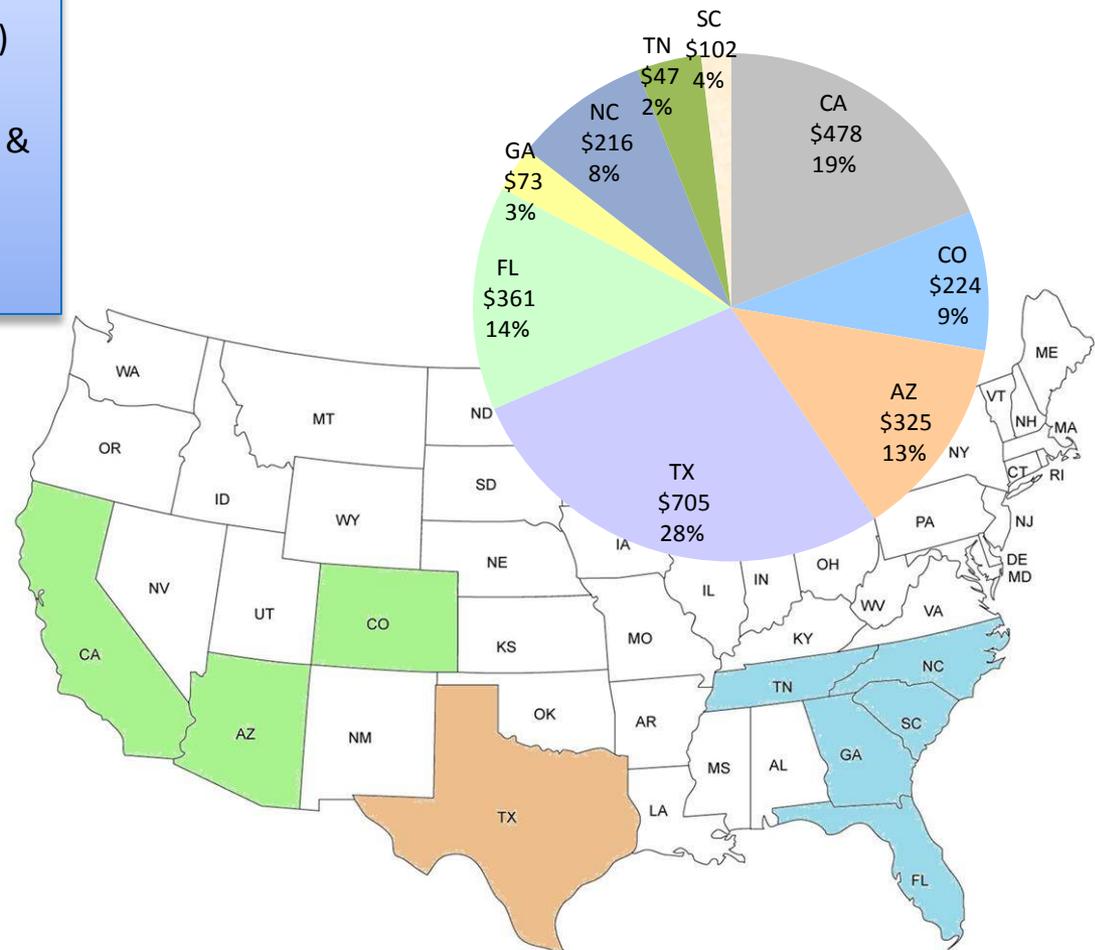
National builder with top-5 market share in some of the best long-term housing markets

- 7th largest homebuilder by 2015 U.S. closings
- 9 states, 21 markets, 254 communities
- Headquartered in Scottsdale, AZ
- NYSE: MTH since 1996 (~\$1.2B market cap)
- Leader in energy-efficient homebuilding
- Move-up buyers primarily (<25% first time & active adult)
- Best-in-class strategic market research
- Strong balance sheet and credit ratings

Key Statistics – 2015:

- 6,522 homes closed
- \$2.53B home closing revenue
- \$388,000 ASP
- \$2.1B real estate assets
- ~27,800 total lots owned or controlled

2015 Home Closing Revenue by State (\$Millions)



The Mother of Invention

US housing building permits, annual rate

2.5 million units



Quartz | qz.com

Data: FactSet

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How do typical customers buy a home?



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What They Want

- ▶ Location
- ▶ Price (Value)
- ▶ Design
- ▶ ?



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People choose Better



- ▶ Comfort
- ▶ Health
- ▶ Quiet
- ▶ Durability
- ▶ Save money
- ▶ Builder Partner

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Challenges

- ▶ Cost / Benefit
- ▶ Consumer Awareness
- ▶ Green Washing
- ▶ Transactional
- ▶ Change



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For-Sale Multi-family Marketing challenge:

- Not a long term building owner, or
- May be first time buyer with little understanding on what it means to pay utility bills

WIFM



ENERGY PERFORMANCE RATING

ENERGY SAVING FEATURES

The Salida 4032

HOW THIS SCORE IS DETERMINED.

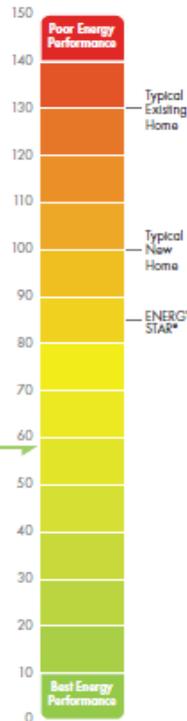
Home Energy Rating System, or simply HERS, is a scoring system set by the Residential Energy Services Network (RESNET) to measure a home's energy efficiency and determine if it meets ENERGY STAR guidelines. The lower the HERS Index, the more energy efficient a home is.*

This home exceeds ENERGY STAR® Guidelines.

59

Plan: Salida 4032

- 5 Years: >\$7,000
- 10 Years: >\$15,000
- 20 Years: >\$37,000
- 30 Years: >\$65,000



More Solar: We use a better solar platform that produces over four-times more energy, and advanced features that heat your water, heat and cool your air, manage fresh air, and allow remote energy management from anywhere in the world through a computer or smart phone.

More Health: We include EPA Indoor Air plus features such as low VOC paints and finishes, better home air filtration and circulation, a fresh air management system, and advanced thermostats. The result is reduced pollution, allergens, and dirt which make your home more comfortable, cleaner and better for the whole family.

More Comfort: We use industry leading spray foam insulation which seals the building twenty-five times better than standard insulation, reducing leaks, drafts, and wasted energy. It will also make the home quieter, more comfortable, and cleaner.

More Sustainability: We include EPA WaterSense faucets, showers, toilets, irrigation controllers, and ENERGY STAR Appliances, reducing your water consumption by 50%, with no sacrifice in lifestyle or performance.

More Savings: With an unprecedented level of energy efficiency throughout our homes, our total HERS score in this community is as low as **XX**, reducing home energy consumption by up to **XX%** in these homes.

Energy performance for The Salida 4032.

This Meritage home performs at a HERS score of **59**. This equates to a **55%** energy use reduction compared to a typical new home.

55%

ENERGY SAVINGS*

Save **\$115/mo.** in home energy bills.*



MERITAGE HOMES
2011 ENERGY STAR Partner of the Year
New Home Builder

Scan this code with your smart phone to see how Meritage is changing the way homes are built.



*Each 1-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption compared to the HERS 2006 ICC Reference Home. This a home with a HERS Index of 66 is 35% more energy efficient than the HERS Reference Home. Specifications based on the 2006 International Energy Conservation Code. For more information visit www.energystar.gov and www.energysavers.gov. Meritage Green® is a trademark of Meritage Homes Corporation, which describe certain features and criteria designated to make homes more economically sustainable over the long-term and reduce energy consumption and the resulting environmental impact. Actual savings may vary and may depend in part on occupant behavior, timing and/or fluctuating costs of energy usage, and actual climate zone conditions. All referenced energy savings, water reduction and carbon footprint reduction information is based on data published by the EPA and DOE. Plans, dimensions, features, specifications, materials and availability of homes or communities are subject to change without notice or obligation.

Better is Better

- ▶ Low Utility Costs (Energy Label)
- ▶ Healthier (VOCs, Merv 8, SPF, Sealed attic ...)
- ▶ More Comfortable (Low e2 windows, SPF, Conditioned attic, TStat...)
- ▶ Cleaner (Merv 8, SPF, sealed attic...)
- ▶ Quieter (Low e2 Windows, SPF, sealed attic ...)
- ▶ Safer (SPF, sealed attic, water management, Low Vocs)
- ▶ Not Economically Reproducible in Resale
- ▶ Municipal Partnerships (Development Time)
- ▶ Appraisal Value / Underwriting Value / Resale Value



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– Details to consider – Energy Efficient Multi-Family

DETAILS ARE THE
DIFFERENCE BETWEEN
GOOD STUFF
AND GREAT STUFF

STEPHEN BREWSTER
IN SUNDAY MAG

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Low rise, 3 story or less
FOR SALE
Front door to outside
No corridor or elevator



Spray Foam Insulation

- ▶ As codes evolve, traditional insulation products will not survive.
- ▶ SPF Per Meritage Homes Construction Standards
- ▶ Open cell 1/2 # SPF



[Why Buy Meritage?](#) [Agent Center](#) [Customer Care](#) [Monterey Homes](#) [Active Adult](#)

Why Buy Meritage?

Energy-Efficient Living

- [HERS Rating System](#)
- [Spray-Foam Insulation](#)
- [HVAC and Fresh-Air Mgmt.](#)
- [Energy-Efficient Lighting](#)
- [Low-E2 Windows](#)
- [PEX Plumbing](#)
- [Weather-Sensing Irrigation](#)
- [Solar Energy](#)
- [Remote Home Management](#)
- [Our Partners](#)
- [Sustainability Report](#)

[Full-Feature Cutaway](#)

[Video Gallery](#)

[Owning vs. Renting](#)

Spray-Foam Insulation.

When it comes to insulating your home, spray-foam insulation is one of the best to seal your home from outside air and moisture intrusion, save on energy costs, and protect your family from dangerous mold, airborne pollutants, and allergens. Spray-foam insulation is quick expanding polyurethane foam that fills internal wall spaces and seals attics, creating an energy-efficient thermal envelope.



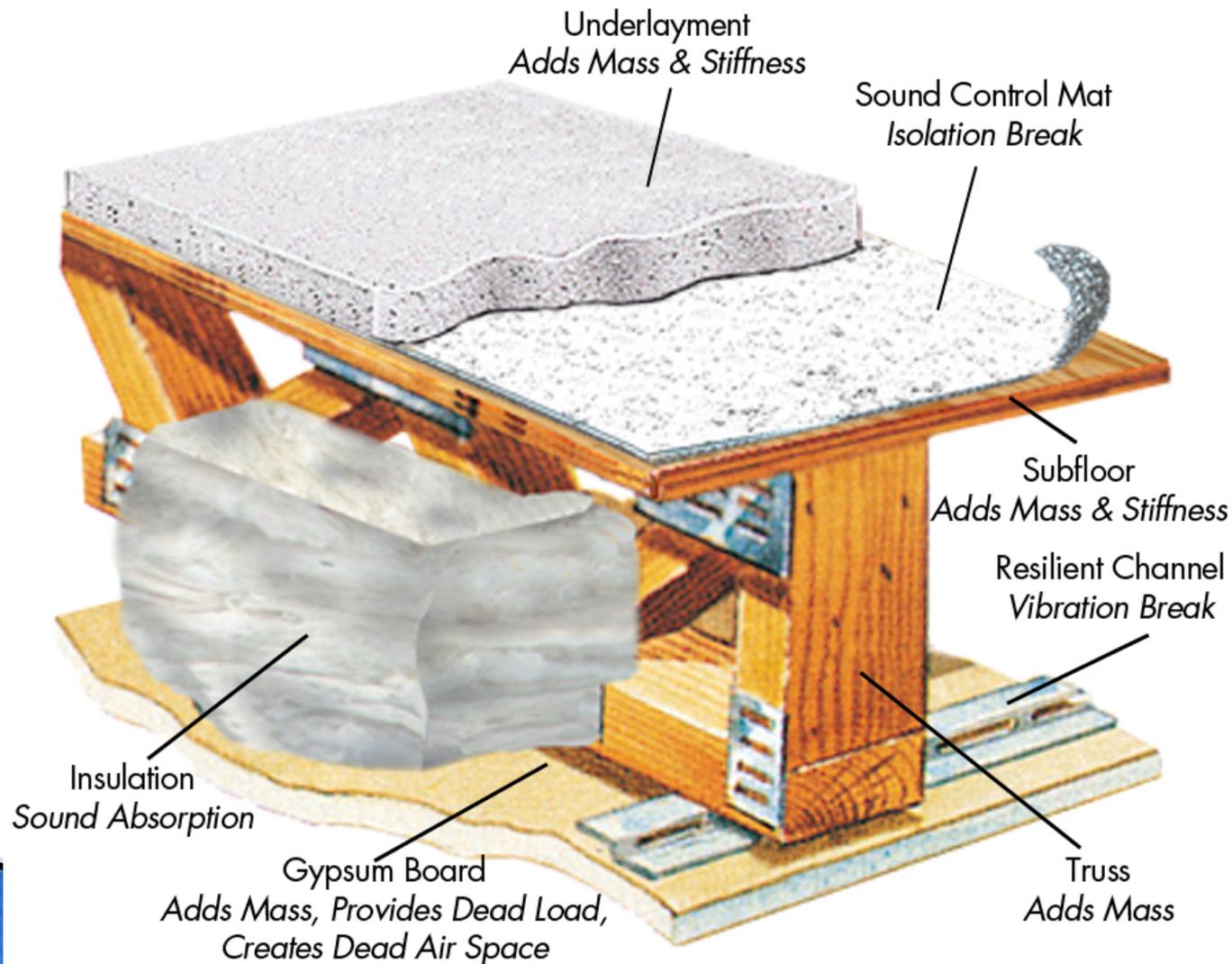
Healthier Living Environment

According to the Department of Energy, as much as 40% of a home's energy is lost due to air infiltration by way of drafts through wall sockets, attics, windows and doorways. The spray-foam insulation we use in our homes creates a thermal envelope—a superior air barrier that helps to prevent air and moisture infiltration. By minimizing air and moisture infiltration, we help stop the sources of dangerous mold and mildew growth in the home that can cause severe health problems to your family. Spray-foam insulation also provides more thermal resistance with less material than any other type of commercial insulation.

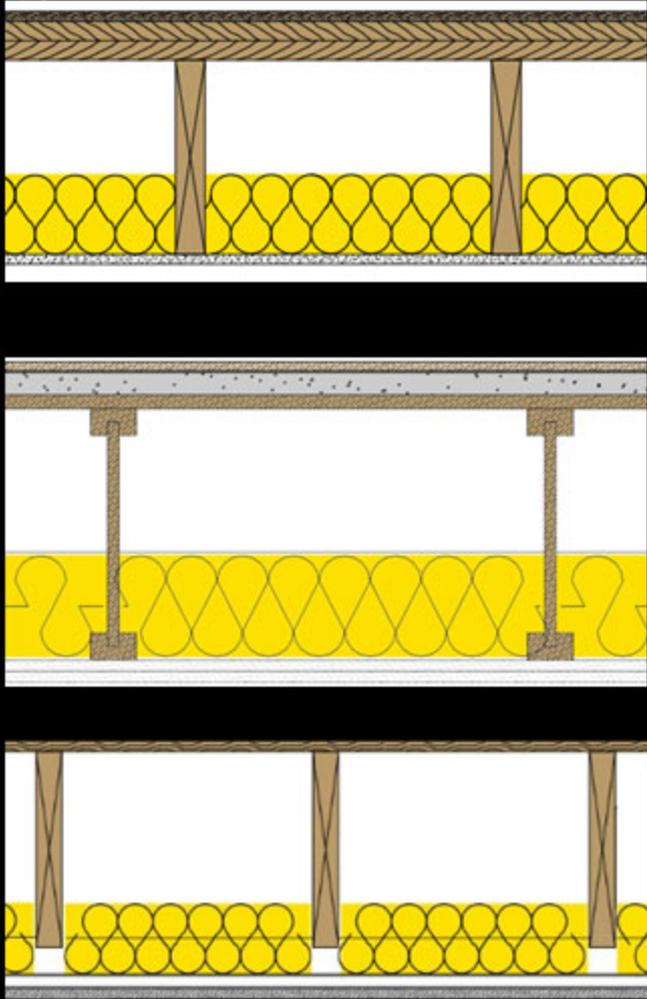
Increased Energy Savings

In addition to creating a safer living environment, spray-foam insulation, and the resulting thermal envelope, makes for a more comfortable home that is less expensive to heat in the winter and cool in the summer. Some suppliers claim that spray-foam insulation typically insulates as much as 50% better than traditional insulation, which results in your home more easily maintaining a constant temperature throughout the day and night. In fact, a monthly energy bill savings of 30% or more can be achieved with spray-foam insulation when compared to alternative insulations.

SPF in 1-hr floor assemblies



SPF in STC rated assemblies



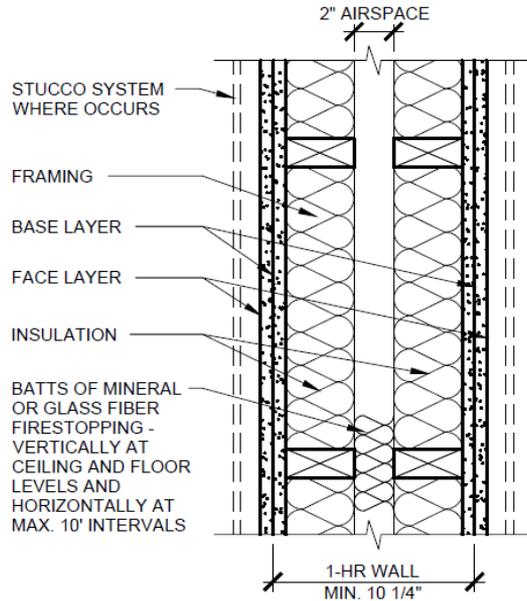
The image displays three cross-sectional diagrams of roof assemblies, each showing a different configuration of structural elements and insulation. The top diagram shows a wooden joist with a thin layer of insulation above it, followed by a layer of yellow spray polyurethane foam (SPF) with a circular pattern, and a concrete slab below. The middle diagram shows a concrete slab with a thin layer of insulation above it, followed by a layer of yellow SPF with a circular pattern, and a concrete slab below. The bottom diagram shows a wooden joist with a thin layer of insulation above it, followed by a layer of yellow SPF with a circular pattern, and a concrete slab below.

STC 31 IIC 27

STC 51 IIC 39

STC 47 IIC 45
RC Channel

SPF in 1-hr wall assemblies



FRAMING:
DOUBLE ROW OF 2x4 MIN. WOOD STUDS AT 16" O.C. ON SEPARATE PLATES 2" APART - SEE STRUCTURAL DRAWINGS FOR SHEAR AND ADDITIONAL REQUIREMENTS

BASE LAYER:
BASE LAYER 5/8" TYPE 'X' GYPSUM BOARD APPLIED AT RIGHT ANGLES TO EACH SIDE OF DOUBLE ROW OF WOOD STUDS WITH 6d COATED NAILS, 1-7/8" LONG, 0.0915" SHANK, 1/4" HEADS, 7" O.C. MAX.; JOINTS STAGGERED 16" O.C. EACH LAYER AND SIDE; HORIZONTAL BRACING REQUIRED AT MID-HEIGHT

ADDITIONAL FACE LAYER:
FACE LAYER 5/8" TYPE 'X' GYPSUM BOARD APPLIED AT RIGHT ANGLES TO EACH SIDE WITH 8d COATED NAILS, 2-3/8" LONG, 0.100" SHANK, 1/4" HEADS, 8" O.C.

INSULATION:
3-1/2" GLASS FIBER INSULATION STAPLED TO STUDS

NOTE:
USE WATER-RESISTANT, FIRE CODE 'C' GYPSUM BOARD IN LIEU OF TYPE 'X' AT TUBS AND SHOWERS, AND RESTROOM WALLS

GA FILE: WP 3370
FIRE TEST: UL R4024, 10-31-68
SOUND TEST: NGC 3056, 4-7-70 (55 - 59 STC) FOR GA WP 3820

1 1-HOUR DWELLING UNIT SEPARATION WALL

SCALE: 1 1/2" = 1'-0"



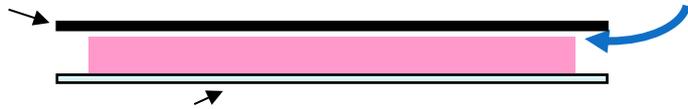
Walls supporting 1-hr floors must also be 1-hr rated

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SPF vs Porous insulation

Floors between conditioned and un-conditioned space



Requires insulation to be in contact with FLOOR of conditioned space above.

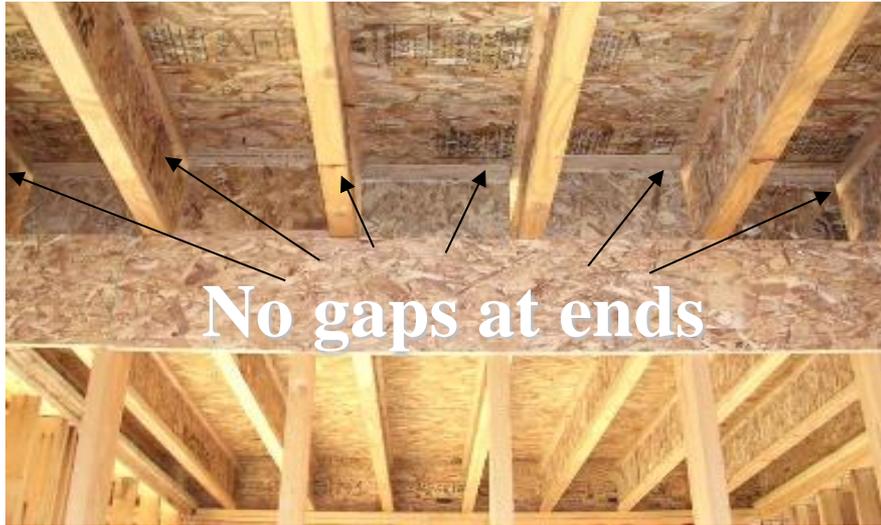
Foam insulation sprayed upside down against bottom of floor sheathing.



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SPF vs Porous insulation

Gap between garage and conditioned space



**Expensive backing material.
Difficult to install without gaps.**



**Backing material can be
inexpensive materials such as
cardboard, netting, T-ply, etc.**

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SPF vs Porous insulation

Wall adjoining porch roof



**Expensive backing material.
Difficult to install without gaps.**



**Backing material can be
inexpensive materials such as
cardboard, netting, T-ply, etc.**

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SPF vs Porous insulation

Insulation / air barrier alignment at rim joists / band joists

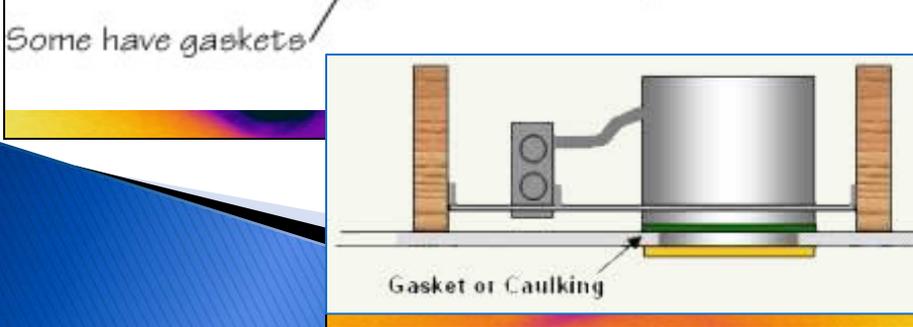
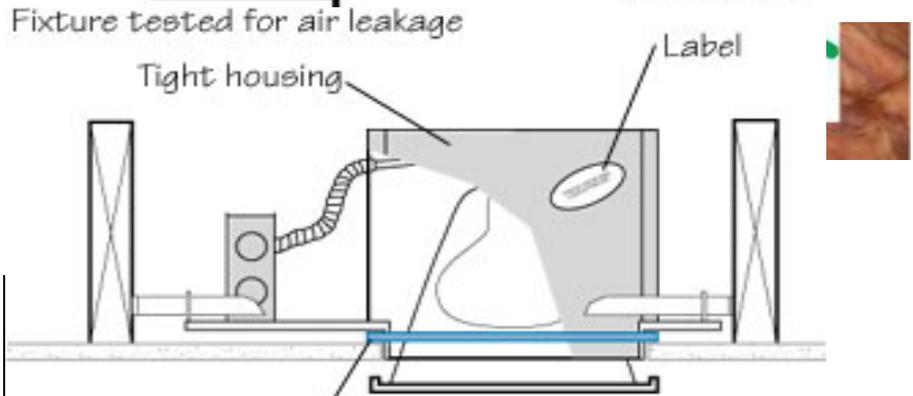
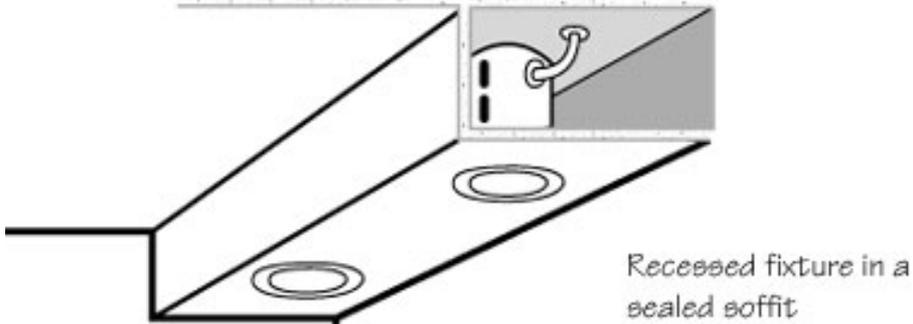


No air barrier adversely affects performance



SPF Attics

Recessed Can Lighting



Recessed cans can be Non-Air tight (less expensive). Thermal envelope has been moved to roof deck.



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Efficient Lighting

- ▶ Can lights ... move to jboxes w LED
- ▶ Easier to comply with 1-hr ratings



VS



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SPF Attics

Continuous or Sealed Top Plates

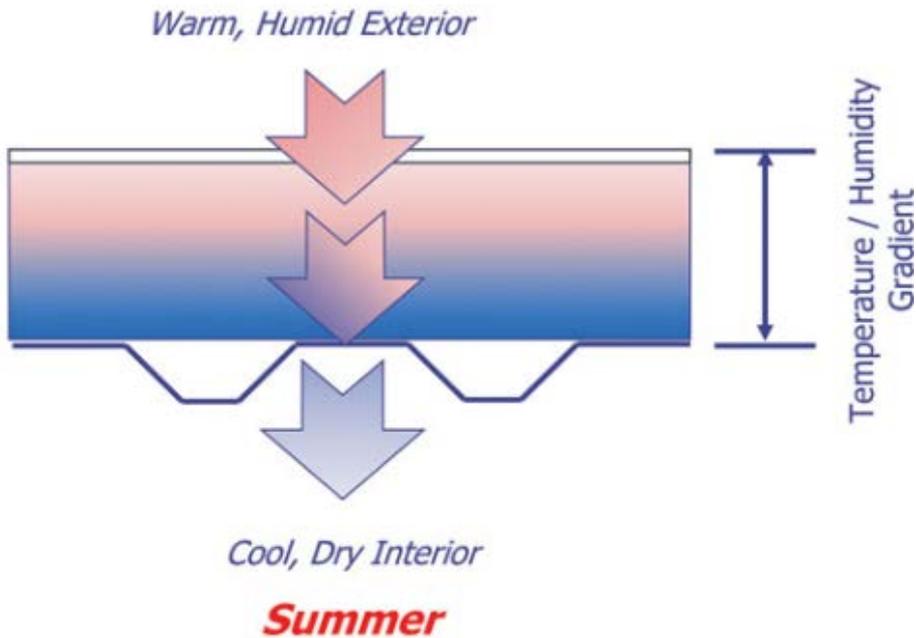


**Spray Foam seals the entire system.
Top Plate sealing is not required.**



Roofs

- ▶ Underlayment Standard – TX, FL, SC, NC, GA, TN
 - Vapor Drive Mitigation



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Window Performance

- ▶ Dual pane, Low E windows to meet high performance standards:
 - Aluminum windows – durable, but performance suffers.
 - Vinyl has improved substantially
 - *End units – greater importance*



National Fenestration Rating Council® CERTIFIED		NFRC CPD #: GRE-A-4 LE366 • WHITE N • ARGON N TEMP	
ENERGY PERFORMANCE RATINGS			
U-Factor (U.S. / I-P)		Solar Heat Gain Coefficient	
0.33		0.23	
ADDITIONAL PERFORMANCE RATINGS			
Visible Transmittance		Air Leakage (U.S. / I-P)	
0.52		-	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>			

- ▶ Why: SHGC > 80% of BTU gain in a home

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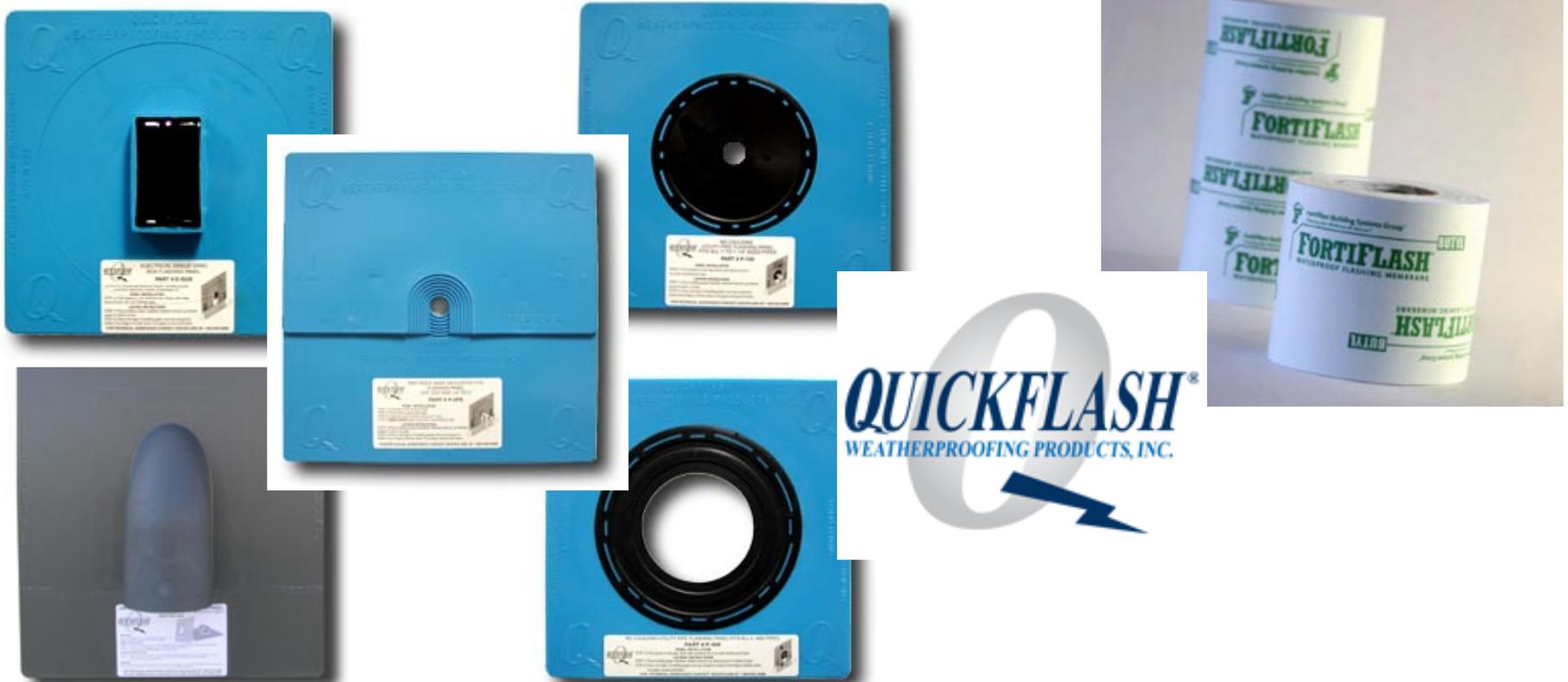
Moisture Management

- ▶ Critically important in super low air loss buildings



Treat the WALL as if it was a ROOF

- Electrical Penetrations (Ext Recepts, Low Volt, etc)
- Windows Doors
- HVAC Penetrations (Refrigerant, Vents, Condensate, etc)
- Plumbing Penetrations (Cleanouts, Hose Bibs, T&P, etc)
- Mounted Equipment (Landscape Timers, Elect Gear, etc)

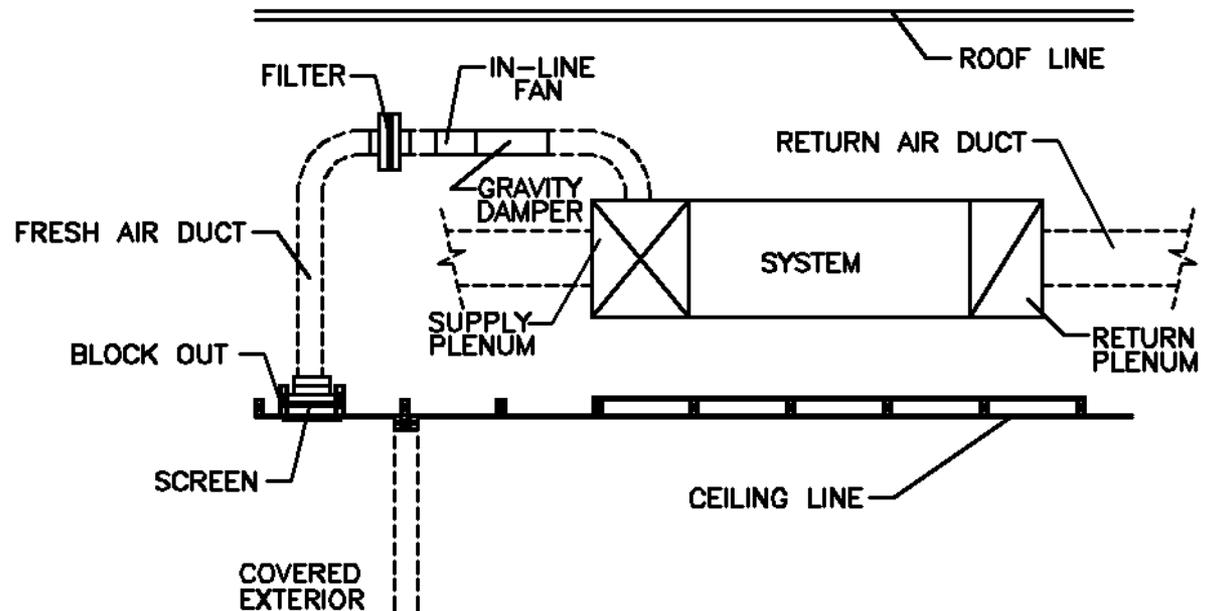
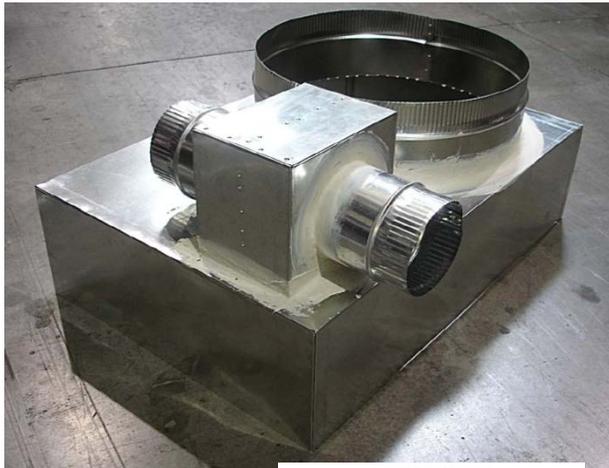


Fresh Air

Supply side (pressurized) **Positive vs negative pressure**

Ventilation access – **early in design phase!**

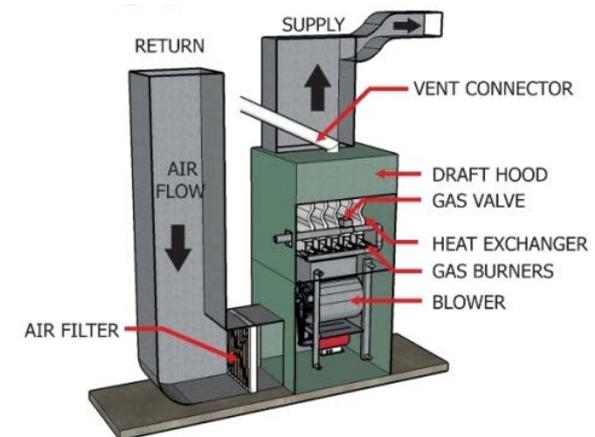
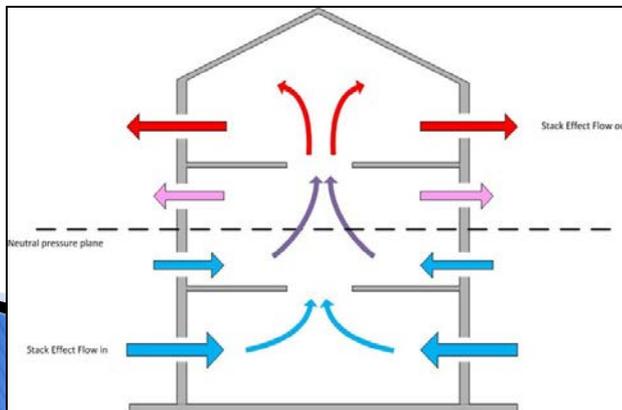
All ventilation cutoff switches, as required by Energy Star, shall be located and labeled adjacent to the HVAC air handler



FRESH AIR INTAKE IN-LINE FILTER DETAIL
N.T.S.

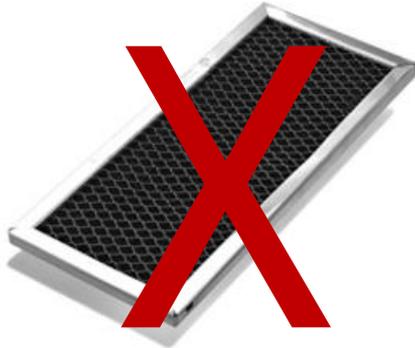
HVAC design considerations for MF

- ▶ Noise – ducted return vs return below unit
- ▶ Fresh air fan and filter access
- ▶ Heat Pumps vs Gas Furnace
- ▶ Line-set length varies
- ▶ Small units – 2 tons may be too much
- ▶ Dehumidification/air cycling (part time residents)
- ▶ Attic spaces with cathedral insulation
- ▶ 3 story air flow – stack effect



Exhaust Fans

****No recirc microwaves****

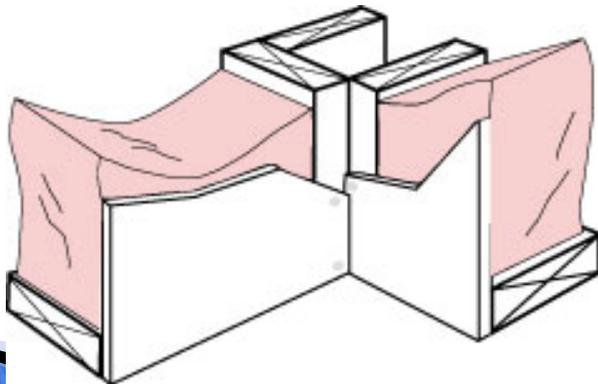
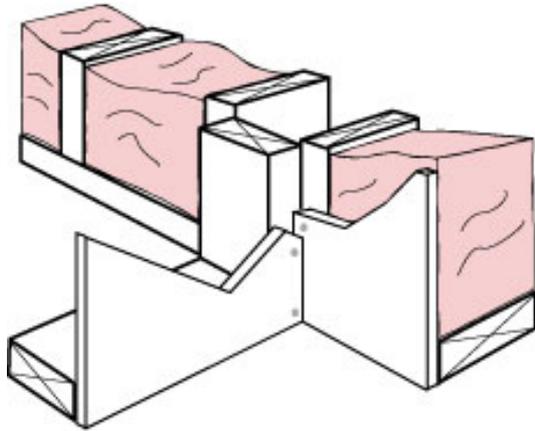


•Required at all kitchens and baths

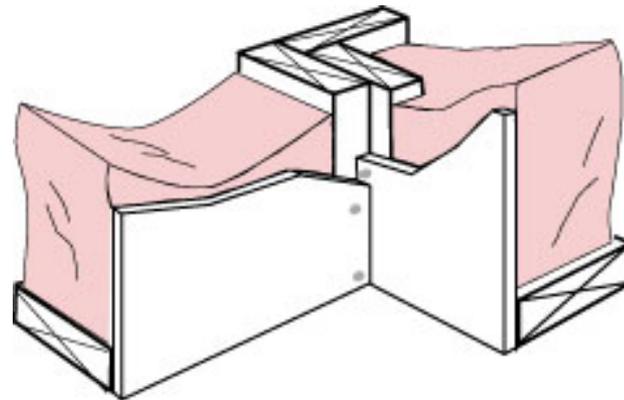
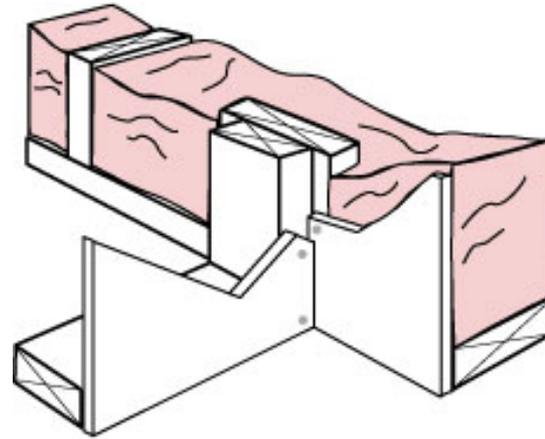


Advanced Framing

STANDARD



ADVANCED



lomes®

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Cost Control

- ▶ 2–4x more expensive to insulate with foam
- ▶ Labor Force, Volume, Speed
- ▶ ESR Reports
- ▶ Can we sell energy efficiency?



VS



Custom to Production

- ▶ Builder Commitment
- ▶ Scale
- ▶ Opportunity

- ▶ Production Economics

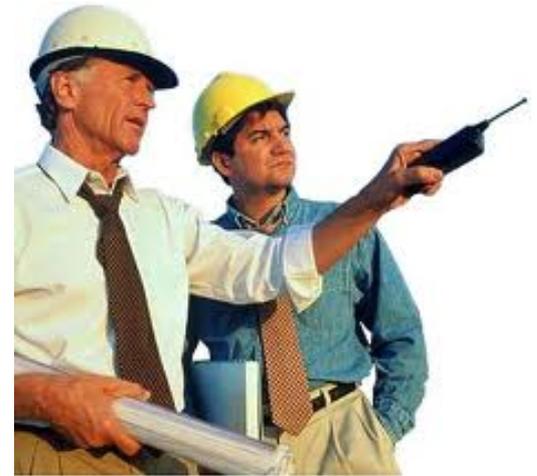


VS



Installing Contractor Base

- ▶ Various levels of expertise
- ▶ Training
- ▶ # of suppliers varies by market
- ▶ The bidding table



Thank you!

Michael Mancini

*National Vice President of Purchasing
Meritage Homes*



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