

The Importance of A Roofing System

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Specialty Product Director

GAF

Location, Location, Location



Climate

The image is a horizontal composite. The left side shows a vibrant, healthy green field of grass under a bright blue sky with scattered white clouds. The right side shows a starkly different scene: a parched, cracked earth in shades of brown and orange, with a heavy, dark orange and red sky suggesting a sunset or a storm. The word 'Climate' is centered in a large, bold, black serif font, bridging the two contrasting environments.



Environmental Factors





Roofing Systems Must Deliver A Lot

- **Durability & Aesthetics**
- **Affordable Cost to Homeowners & Building Owners**

Durability

- Rain
- Hail
- Snow & Ice
- Wind
- UV Exposure
- Temperature Extremes
- Trees
- People / Animals

du·ra·bil·i·ty

/ˌd(y)ʊərəˈbɪlədē/

noun

noun: **durability**

the ability to withstand wear, pressure, or damage.

"the reliability and durability of plastics"

synonyms: imperishability, durableness, longevity; *More*

antonyms: fragility



Aesthetics

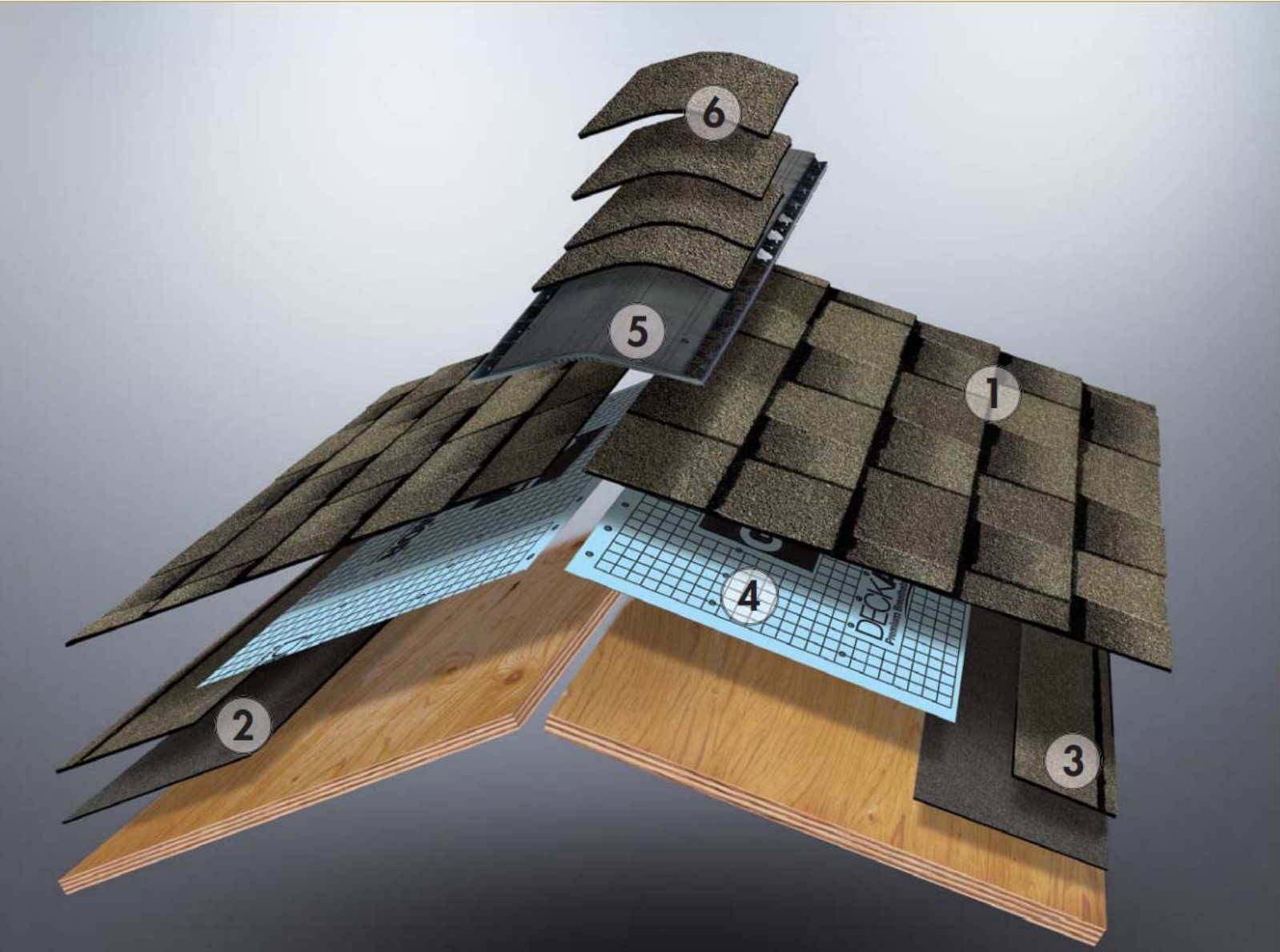
- Color/Shape
- Modern-
Contemporary
- Integration with
homes siding,
exterior surfaces
- Neighborhood



So Where Does it Start? – Steep Slope

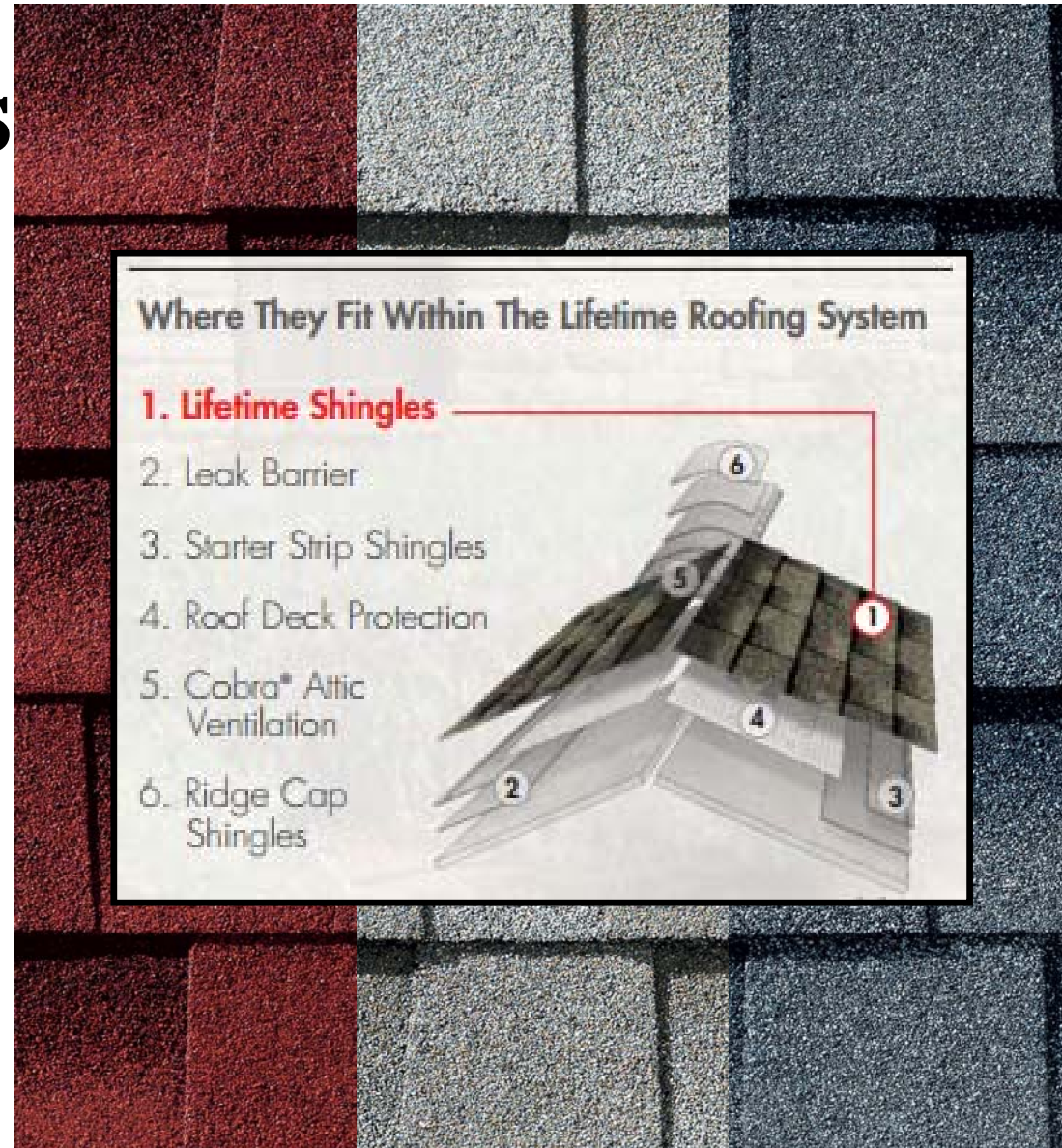


Understanding the Basics of What the Components Do



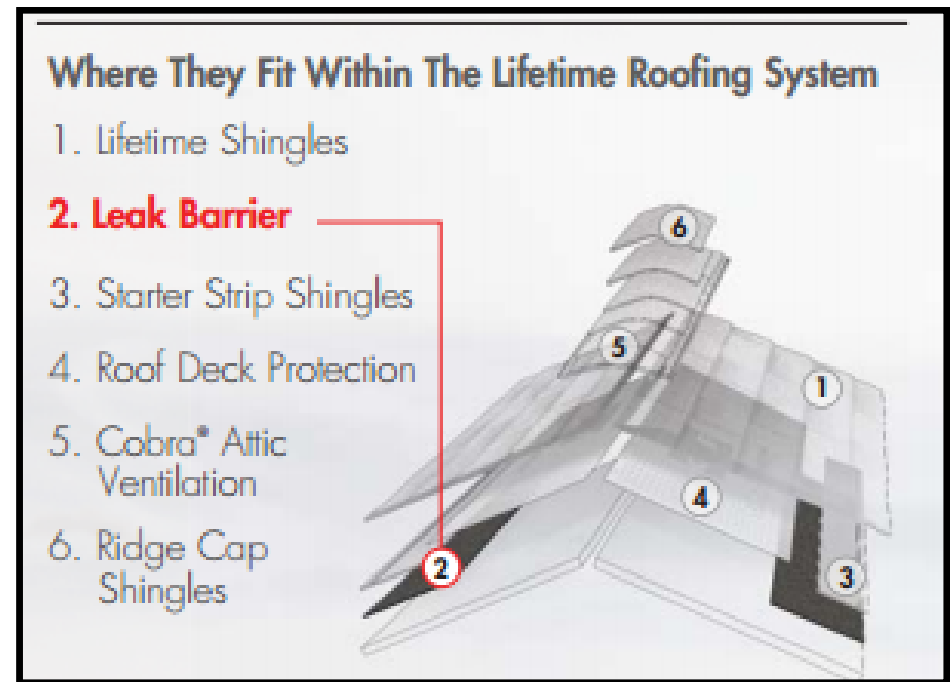
1 Lifetime Shingles

- Impact Resistant, Wind Resistance, Algae Resistance, and Fire Resistance
- Primary weather protection
- Aesthetics
- NRCA recommends – ASTM D3462 for fiberglass shingles
- Metal, wood, synthetics, and concrete



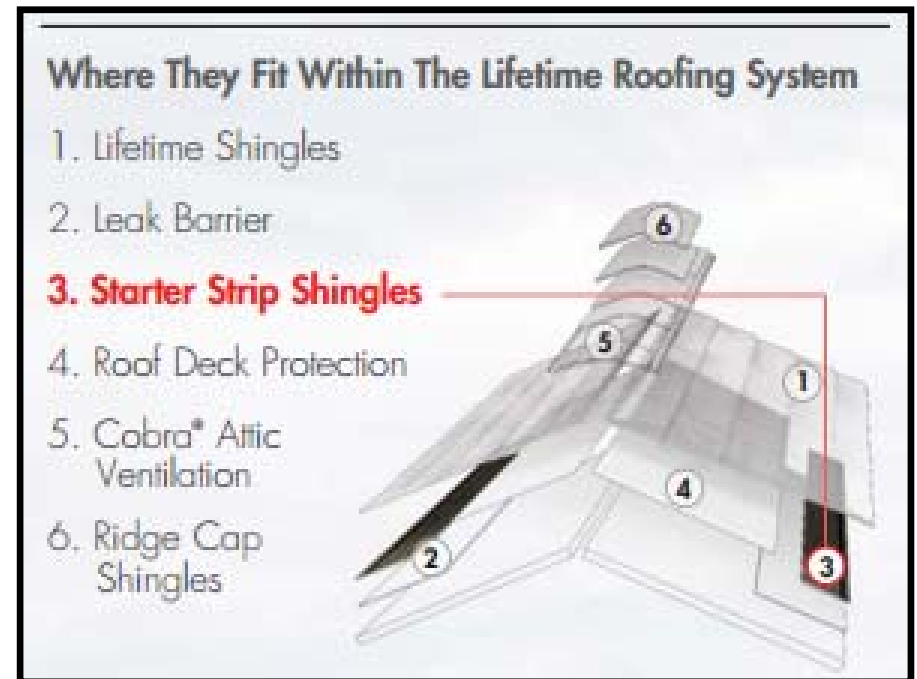
2 Leak Barrier (Peel & Stick)

- Provides excellent protection against leaks caused by roof settling and extreme weather. Ideal upgrade at all vulnerable areas
- Meet – ASTM D1970



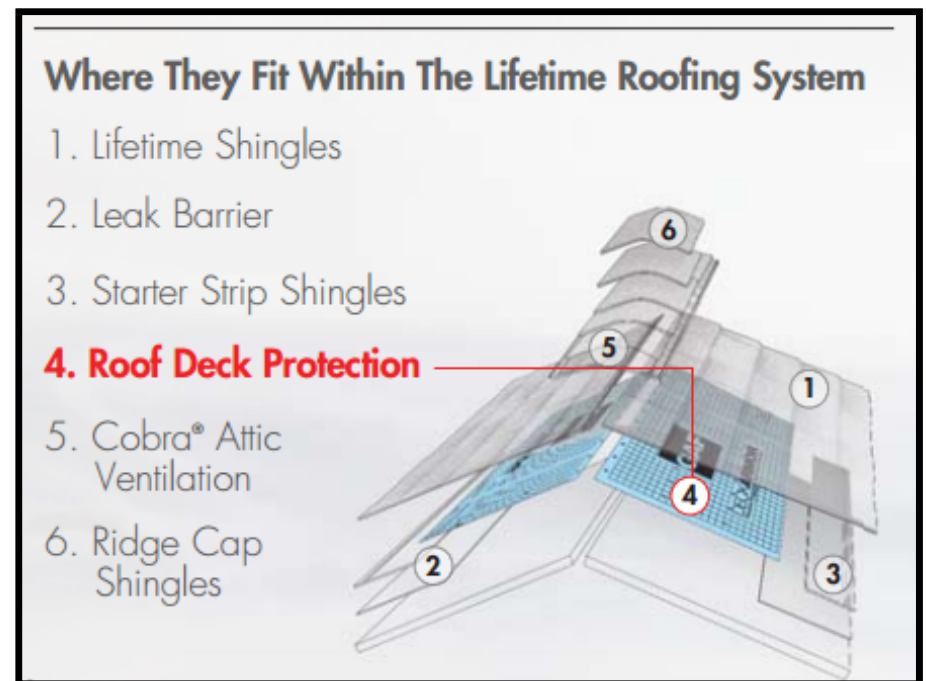
3 Starter Strip Shingles

- Helps lock down the 1st course of shingles – prevents blow-offs
- Saves time, eliminates waste, and helps reduce risk of shingle blow-off...and may help qualify for upgraded wind warranty coverage



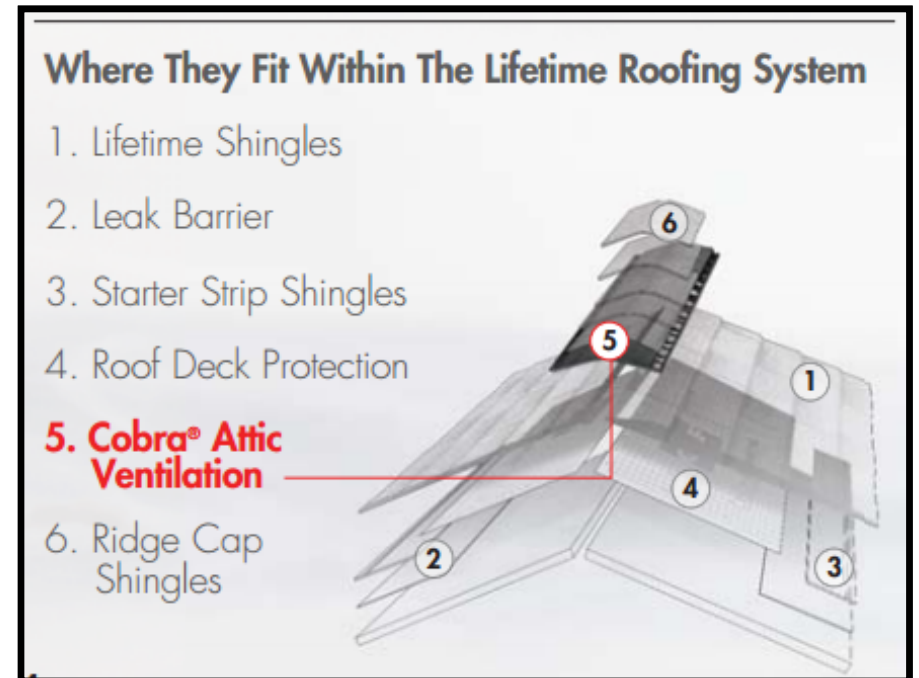
4 Roof Deck Protection (Underlayment)

- Provides a strong layer of protection against wind-driven rain and moisture infiltration
- Provides temporary protection & secondary weather proofing barrier



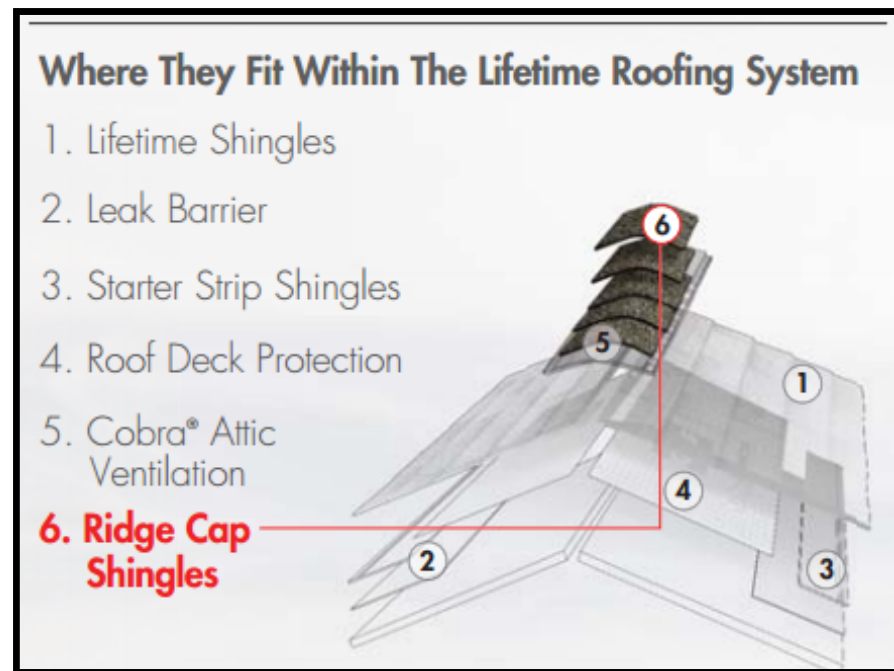
5 Attic Ventilation

- Helps remove excess heat and moisture from your attic to promote energy efficiency in your home and help extend the life of your roof
- Reduce heat and moisture build-up in attic spaces work with intake vents
- Solar / Electric / Passive



6 Ridge Cap Shingles

Enhances the beauty of your home while helping guard against leaks at the hips and ridges



Flashing

Sheet metal or other materials, that protect the system's joints or valleys to prevent water intrusion



Low Slope



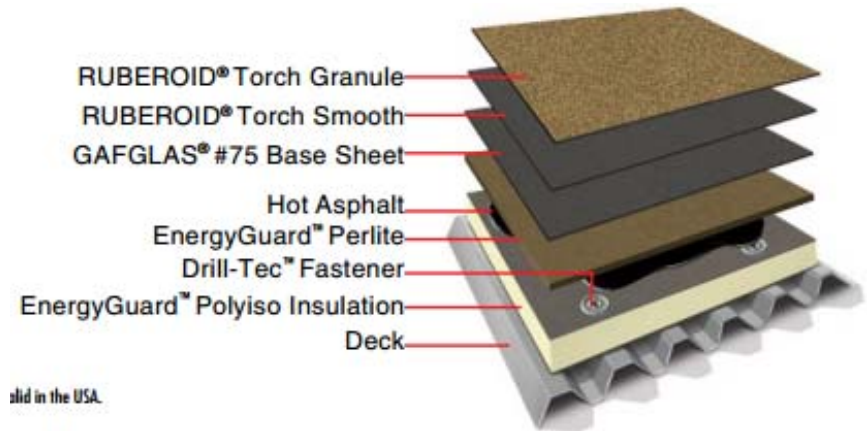
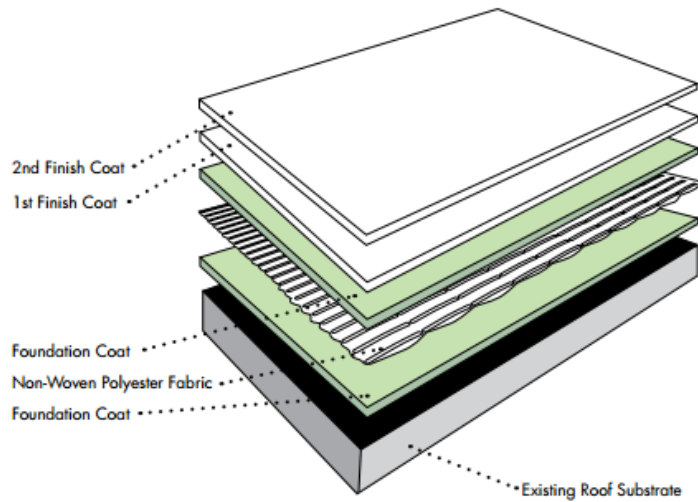
There are Multiple Components to a Low Slope System

Low Slope Systems

Multiple
Functions
Needed



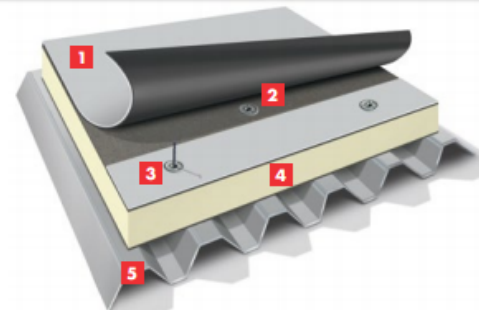
Some Examples



Mechanically Attached Application

For a quick and cost-effective system that can be installed practically year-round.

1. EverGuard® TPO
2. Drill-Tec™ Insulation Fastener and Plate(s)
3. Drill-Tec™ Fastener and Membrane Plate(s)
4. EnergyGuard™ Polyiso Insulation
5. Structural Deck



Reinforcement / Insulation

- Gives Strength, resistance to punctures, etc.
- Insulation, Adds R-Value to a system



Surfacing / Coatings

- Protects components from the elements
- Other benefits like traction, solar reflectivity, hail, foot traffic, etc.

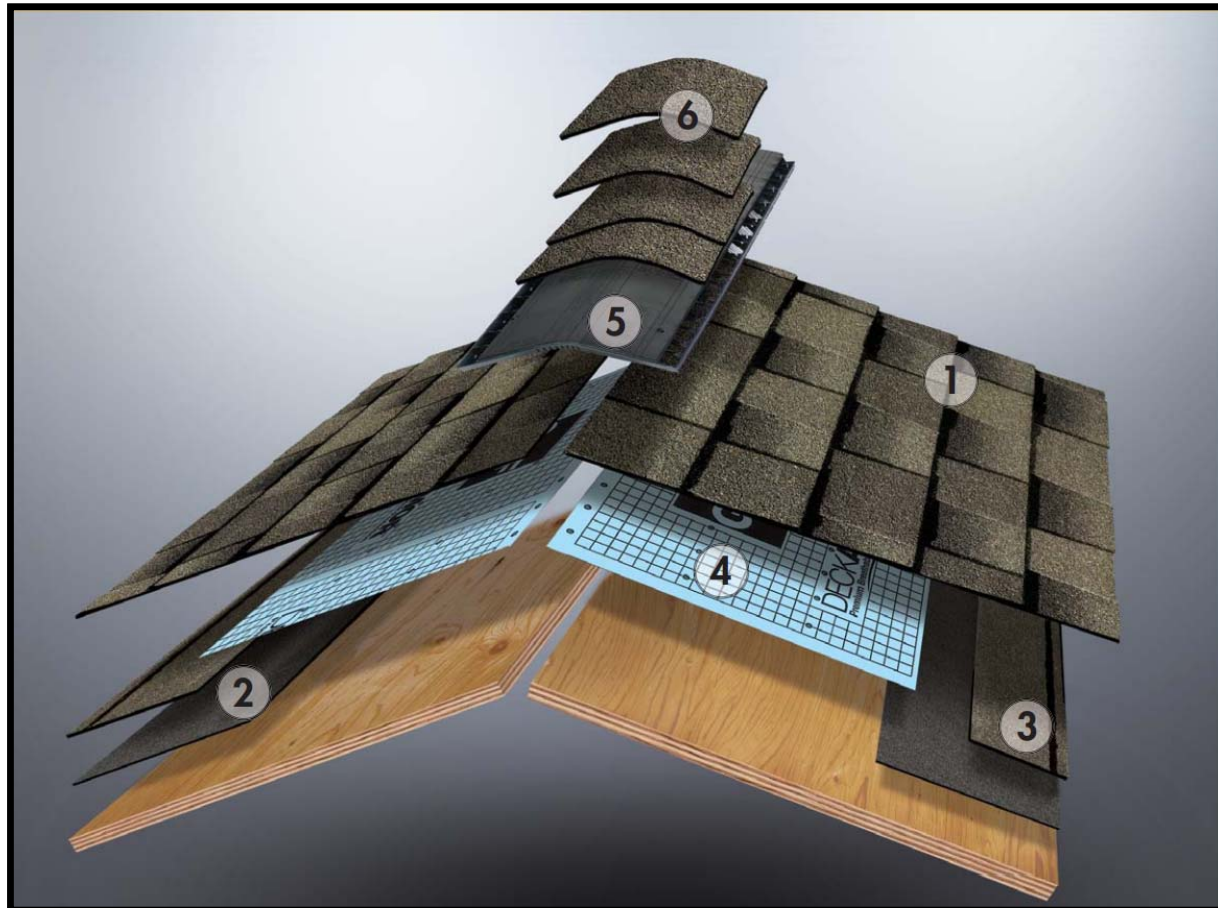


Weatherproofing Layer or Layers

- Will typically have to provide many functions
- Walkability, Weather Resistance, - Heat and UV Resistance, Reflectivity and Aesthetics



Benefits of Roofing System





Peace of Mind

Knowing that the products used were designed and intended to be installed together

One Reliable Source

- Product Reliability and Track Record are important
- One Company to deal with if any issues arise
- Extended warranty from a single manufacturer that covers all parts of the roofing system – peace of mind



Extended Warranties & Guarantees

Extended warranty from a single manufacturer that covers all parts of the roofing system



Saves Time & Money In The Long Run

Get a System that is
built to work together



Product Reliability in the System is Key

How Do You Know the Products Work Together?



Roofing Product Testing

- Short Term and Long Term
- Work with manufacturers that do extensive testing and are code compliant!



What Is Important?

- Keeping Weather Out!
- Long Term Durability



Testing



Water Resistance – TAS-100 Wind Driven Rain Test



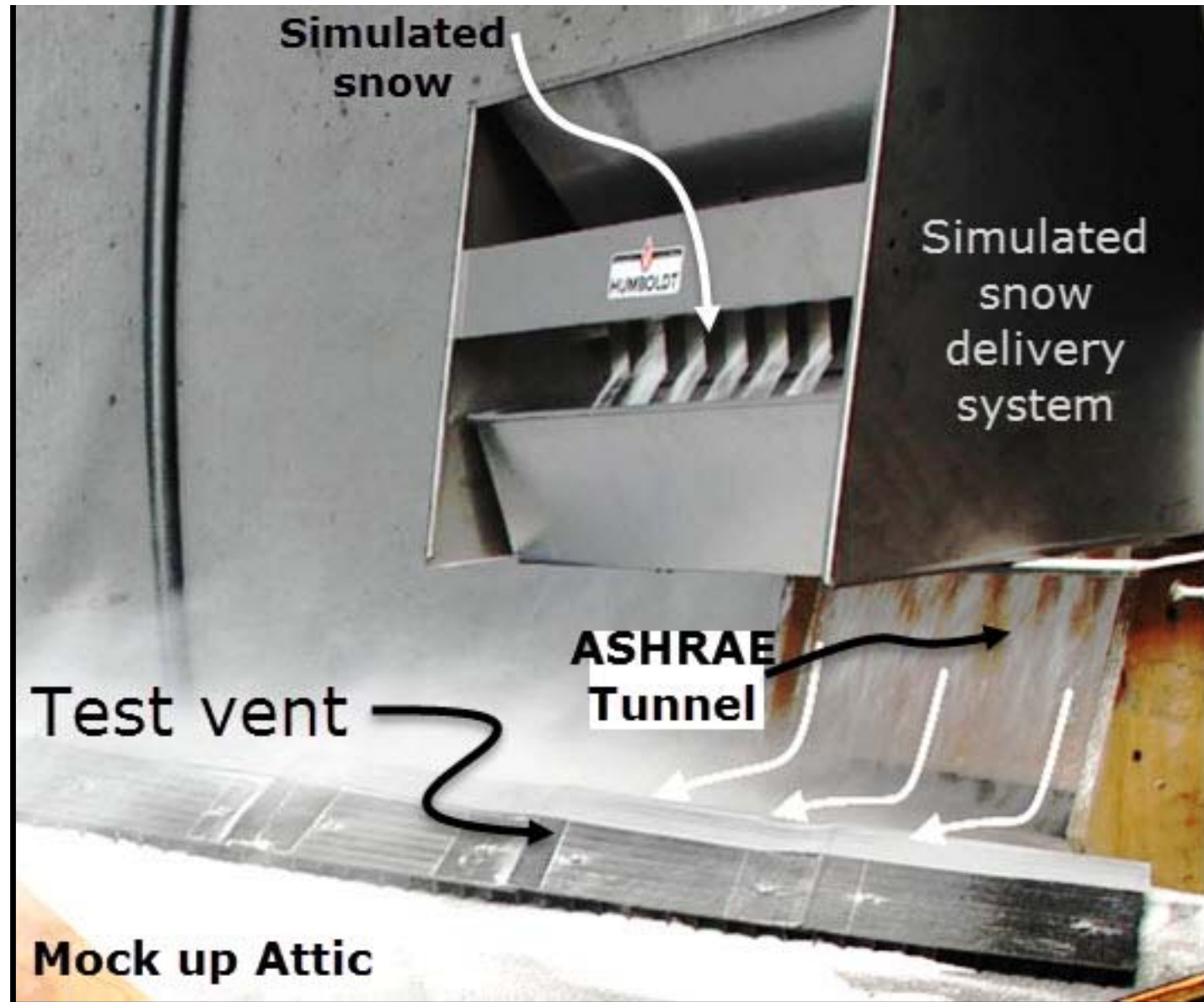
110 MPH @ 90° Angle
ATI – York, PA - TAS 100 Wind-Driven Rain Test



Hail Testing



Snow Simulation Test



Ice Damming Test



Dust Loading Test



**Wind
Testing –
ASTM
D3161
Class F
110mph
Wind
Test**



**Fire
Resistance
– UL 790
Class A
Burning
Brand
Test**



**Fire
Resistance
– ASTM
E108
Spread of
Flame
Test**



Air Flow Testing



Accelerated Aging – Weatherometer - UV / Heat / Humidity



UV Resistance



UV Resistance – QUV Testing



Heat Testing



**So How Do These Products
Work in a System?**



ORNL-South Carolina Exposure Farm

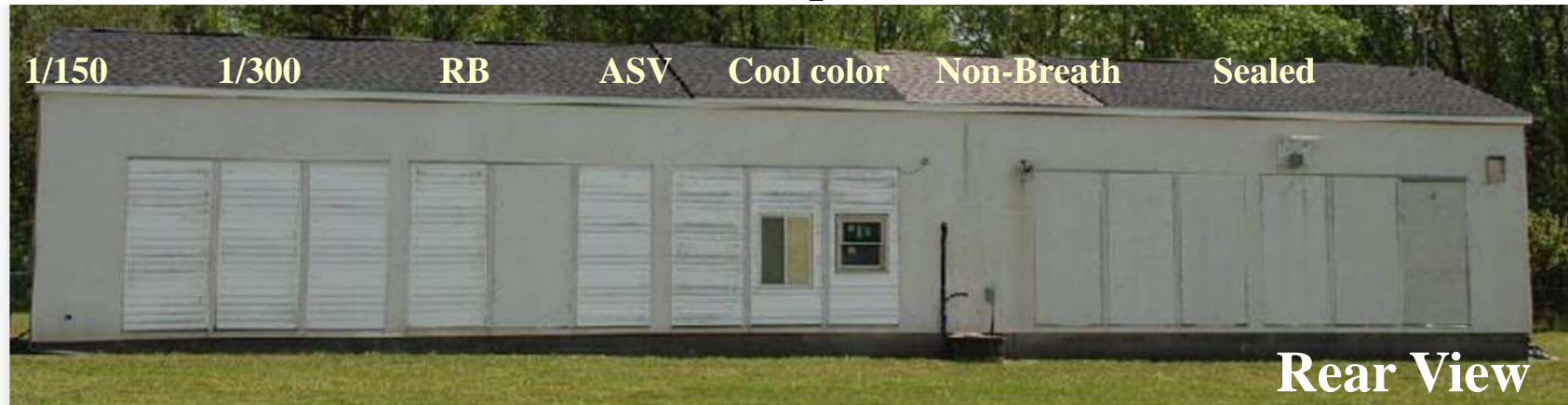


Roof Plane Facing South East

Sealed NB Cool color ASV RB 1/300 1/150

Attic 25 ft x 80 ft

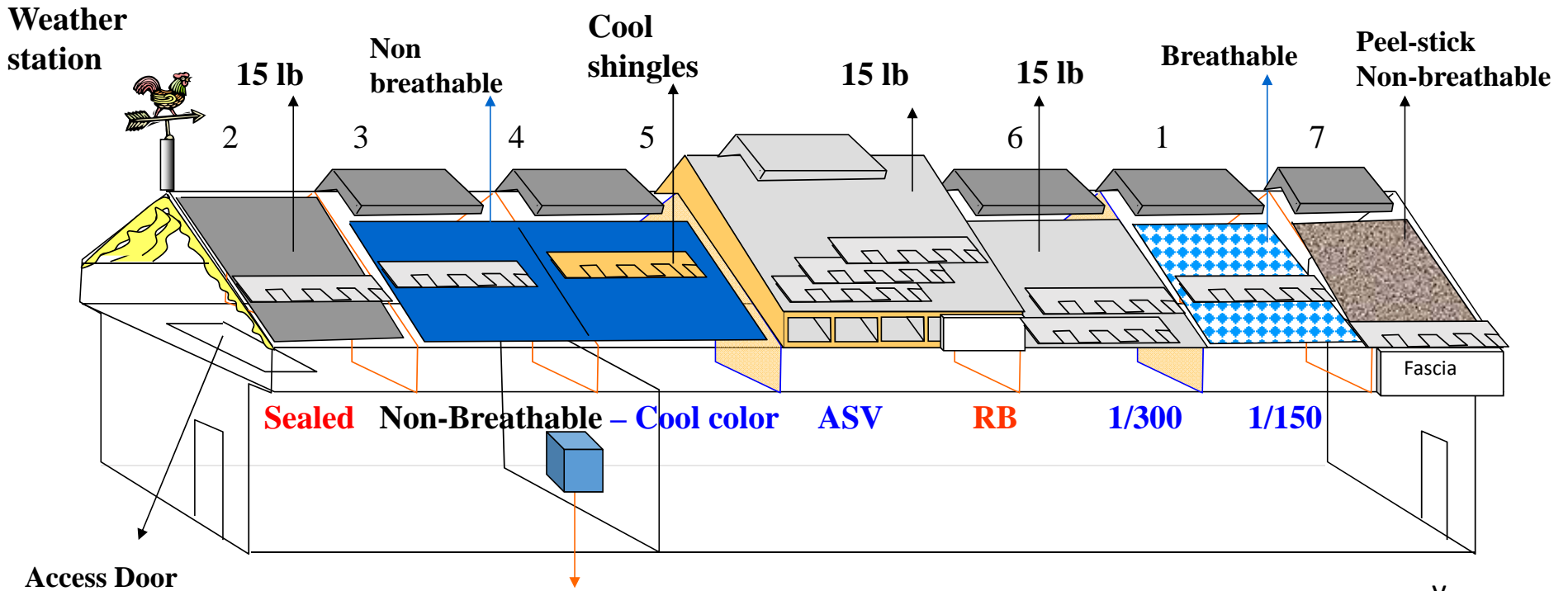
Roof pitch – 3:12



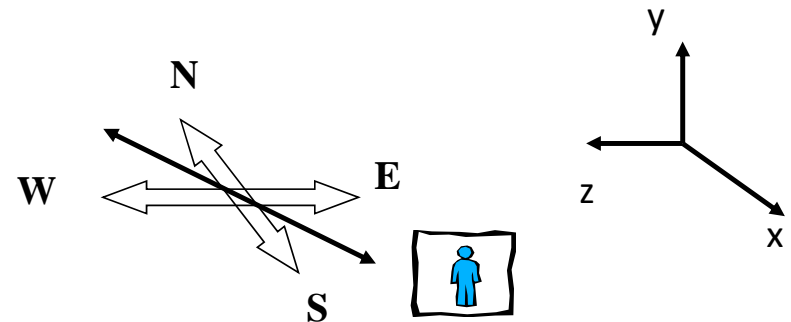
Rear View

1/150 1/300 RB ASV Cool color Non-Breath Sealed

ATTIC SYSTEMS – ORNL-South Carolina Exposure Farm



Each Bay Width ~ 11 ft



Deck Installation



Soffit – Narrow Overhang



Ridge Slot

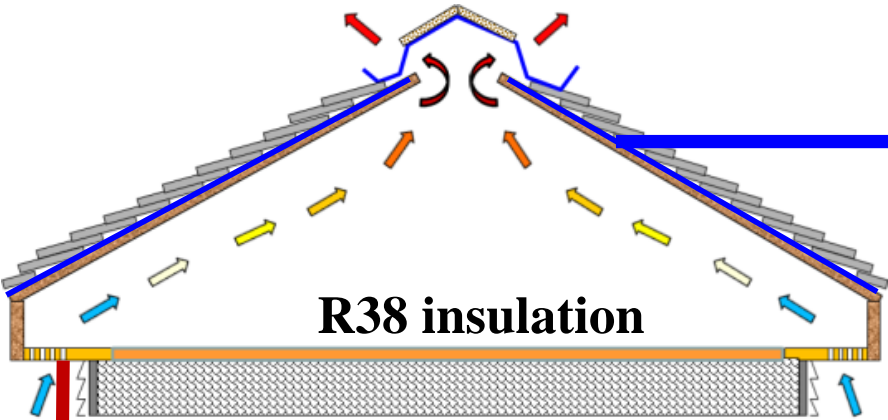
Underlayment and Shingle Installation



Ridge Vent and Ridge-cap Installation



Soffit-Ridge 1:300 Ventilated Attic

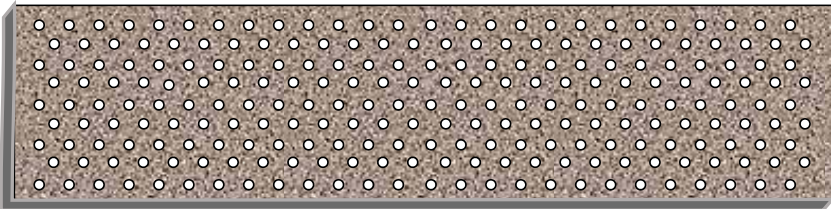


**Breathable Underlayment
16 perm**



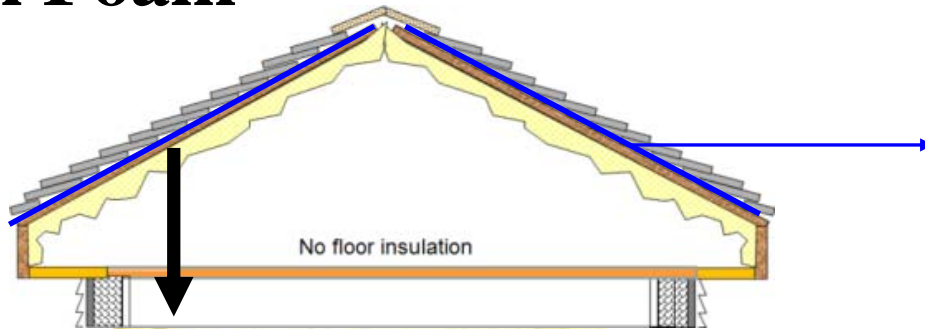
**Reduced opening
Ridge NFVA = 9 in²/ft**

Perforated Intake vent NFVA = 3 in²/ft



Attic 2 : Sealed attic – Spray Foam Insulation

Open Cell Foam



**Underlayment 15 lb paper
8 perm**



5.5" Open cell foam

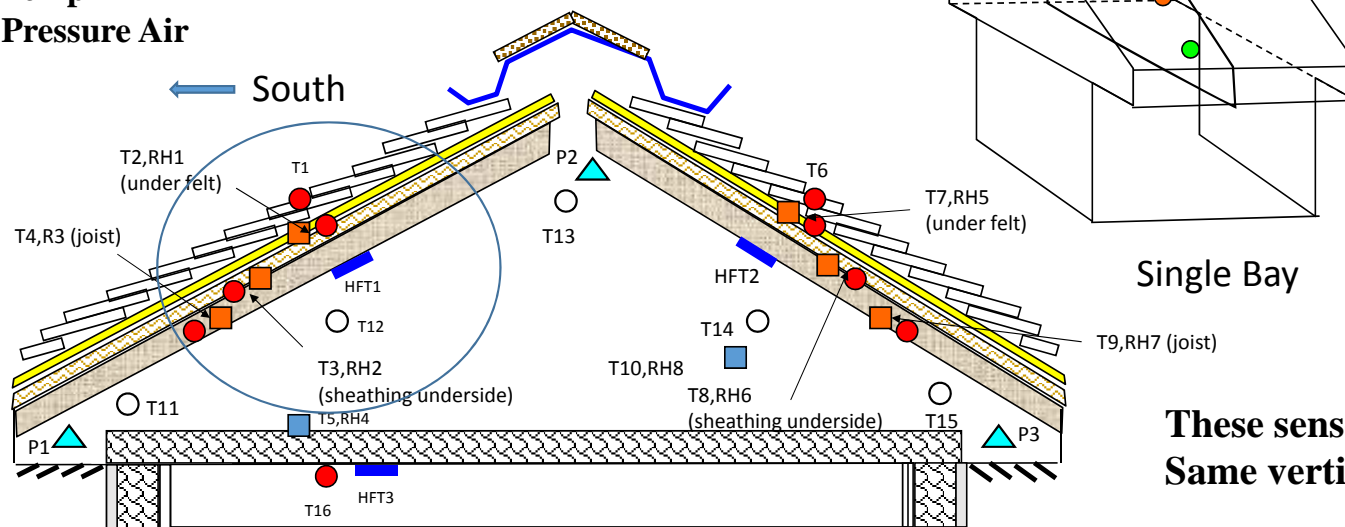


Experimental Setup Sensors



ORNL-South Carolina Exposure Farm Sensor C/S View

- Temp Roof surface, Underlayment, deck
- Rh Underlayment, deck, Rafters, Insulation
- Heat flux Roof deck, attic floor
- Temp Air
- ▲ Pressure Air

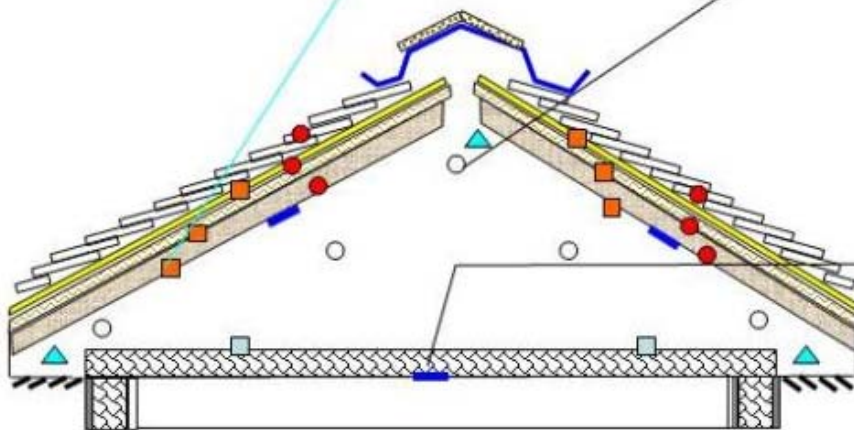
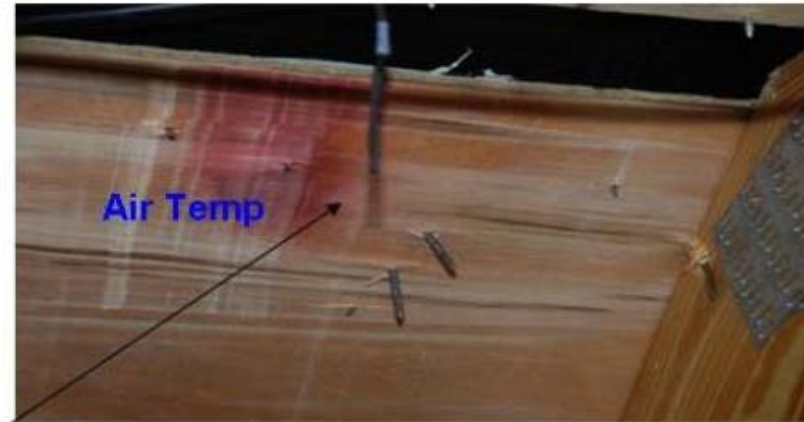


These sensors are all in the Same vertical plane, both sides

- Each bay has total 25 sensors
- 6 temperature, 6 Rh, 3 Heat flux
- 5 for air temperature 3 attic pressure, 2 for insulation

Sensors

- Temp Roof surface, Underlayment, deck
- Rh Underlayment, deck, Rafters, Insulation
- Heat flux Roof deck, attic floor
- Temp Air
- ▲ Pressure Air

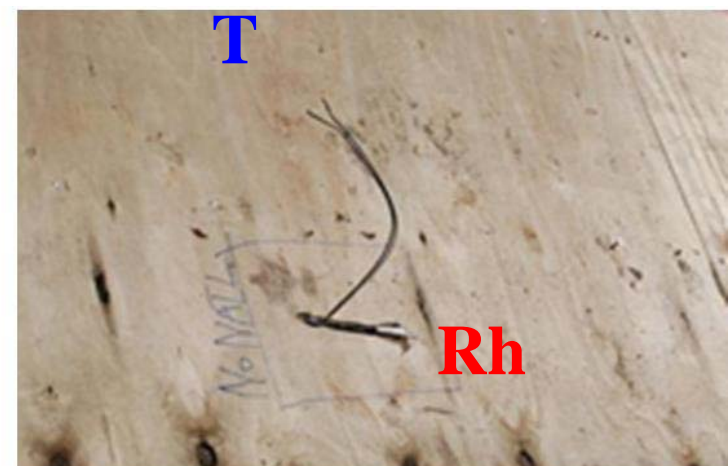


Instrumentation

Weather Station



Sensors on Deck



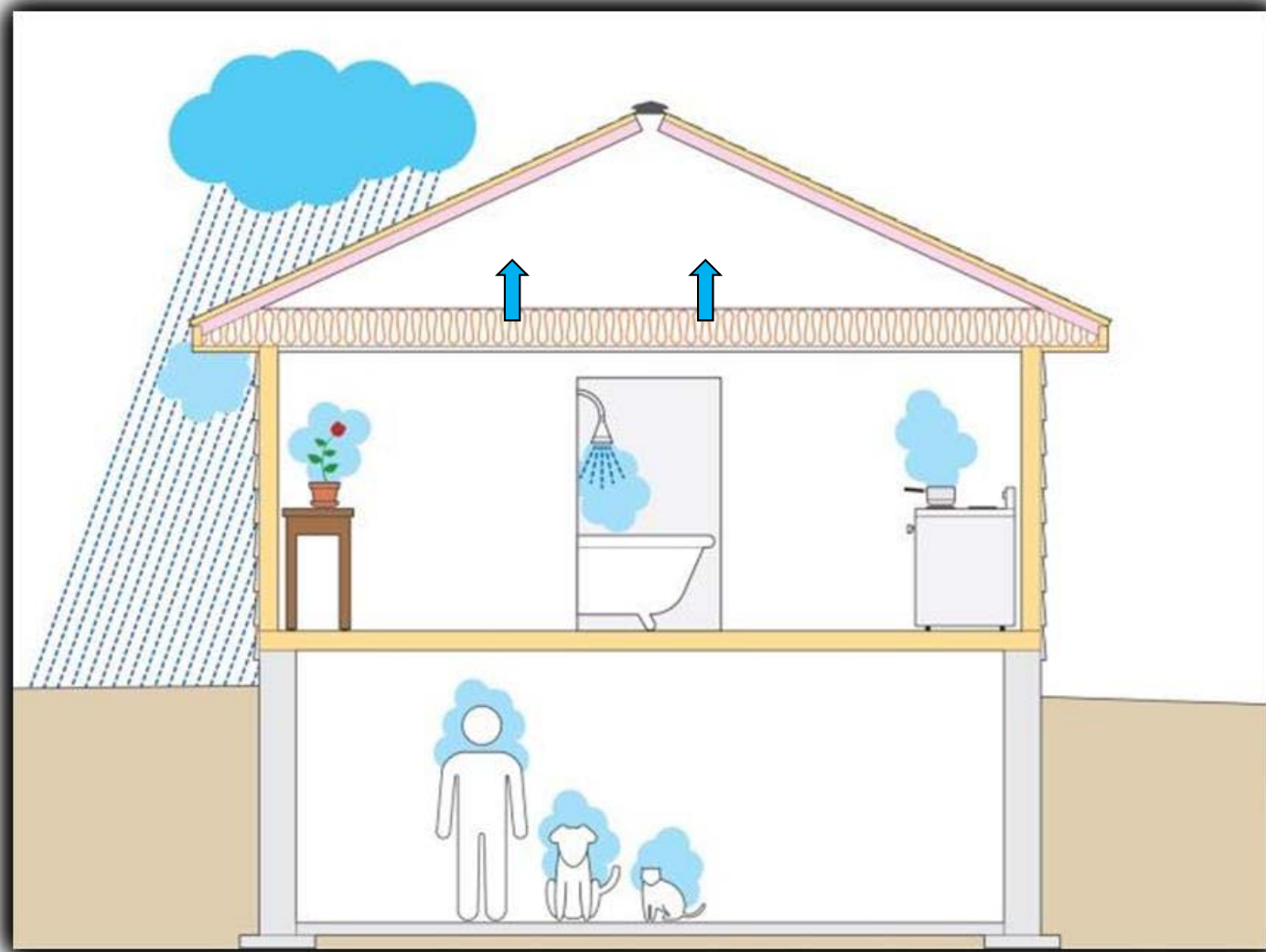
Inside Attic



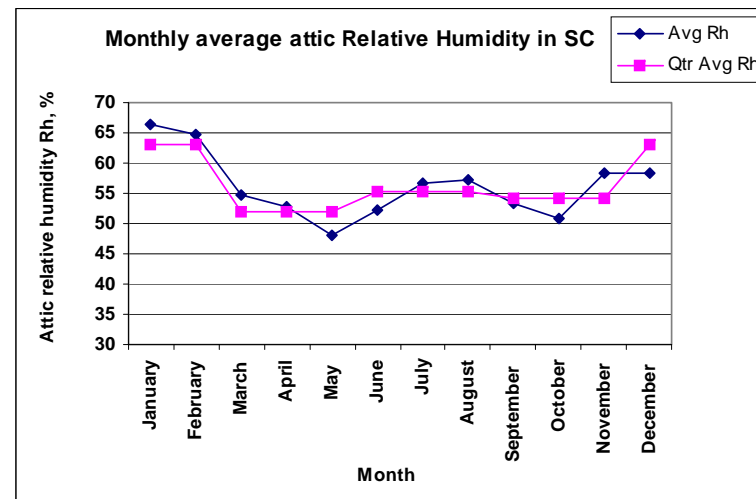
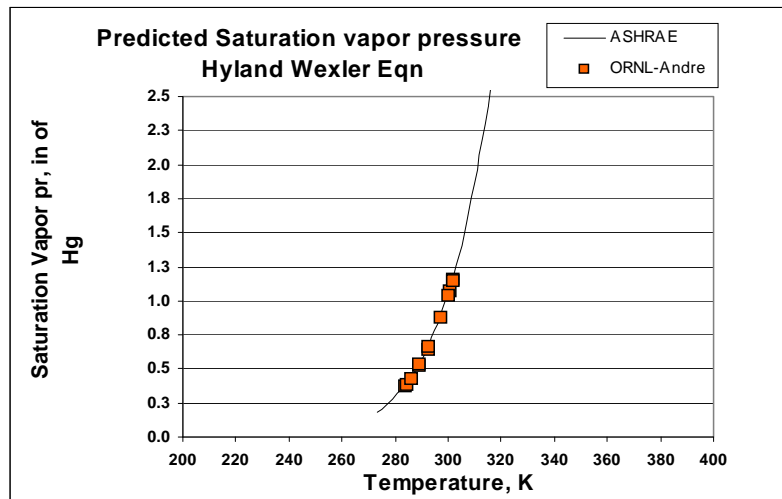
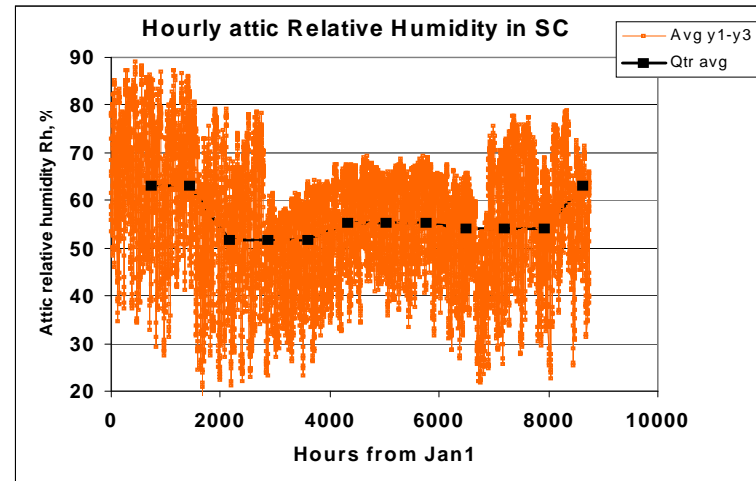
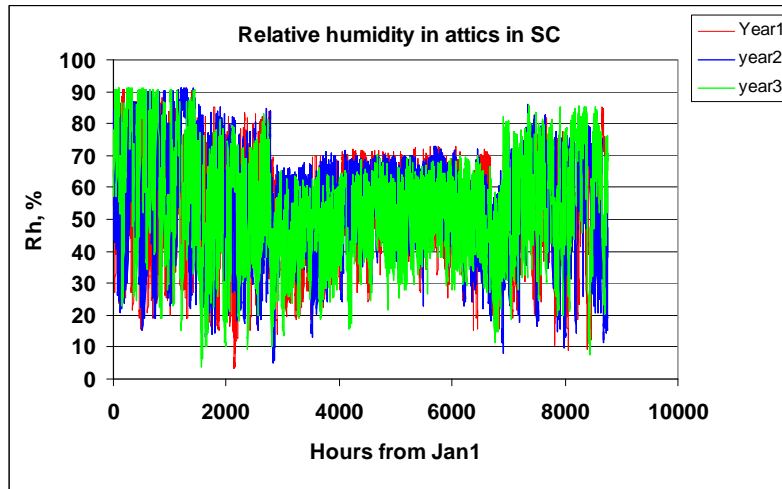
Data Acquisition




Moisture Intrusion



Attic Humidifiers – Humidity Control Charts - To Simulate Living Conditions

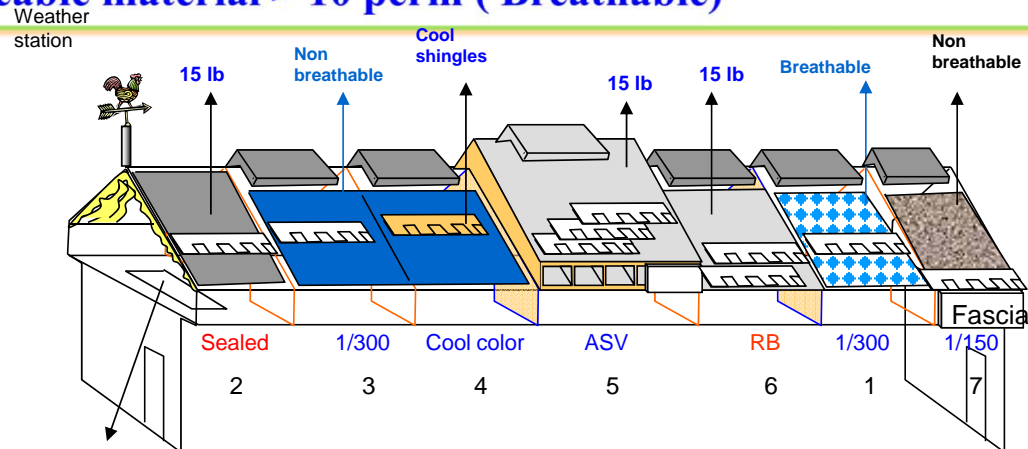


Permeance (Defining Breathability)

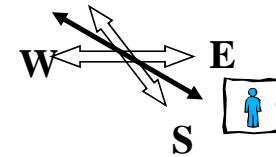
 Vapor permeable membrane has a permeance rating of 5 perms or greater
(2009 International Residence Code)

- Vapor impermeable material < 0.1 perm (Non breathable)
- Vapor semi-impermeable between 0.1 and 1.0 perm
- Vapor semi-permeable between 1.0 and 10.0 perm
- Vapor permeable material > 10 perm (Breathable)

Attic Cavity	Acronym
Attic 03	NB (0.04 Perm) Vapor impermeable
Attic 04	CC (0.04 Perm) Vapor impermeable
Attic 07	FF (0.10 Perm) Vapor semi impermeable
Attic 02	SLD (8 Perm) Semi permeable
Attic 05	ASV (8 Perm) Semi permeable
Attic 06	RB (8 perm) Semi permeable
Attic 01	CTRL (16 Perm) Vapor permeable underlayment

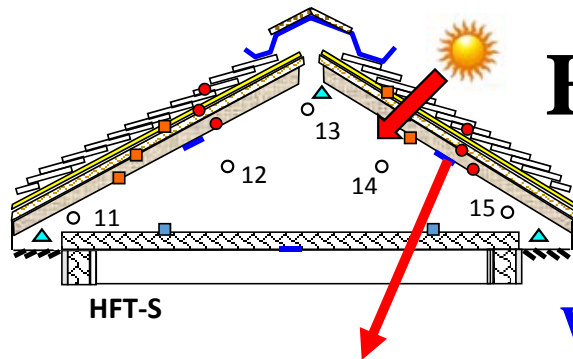


Access door



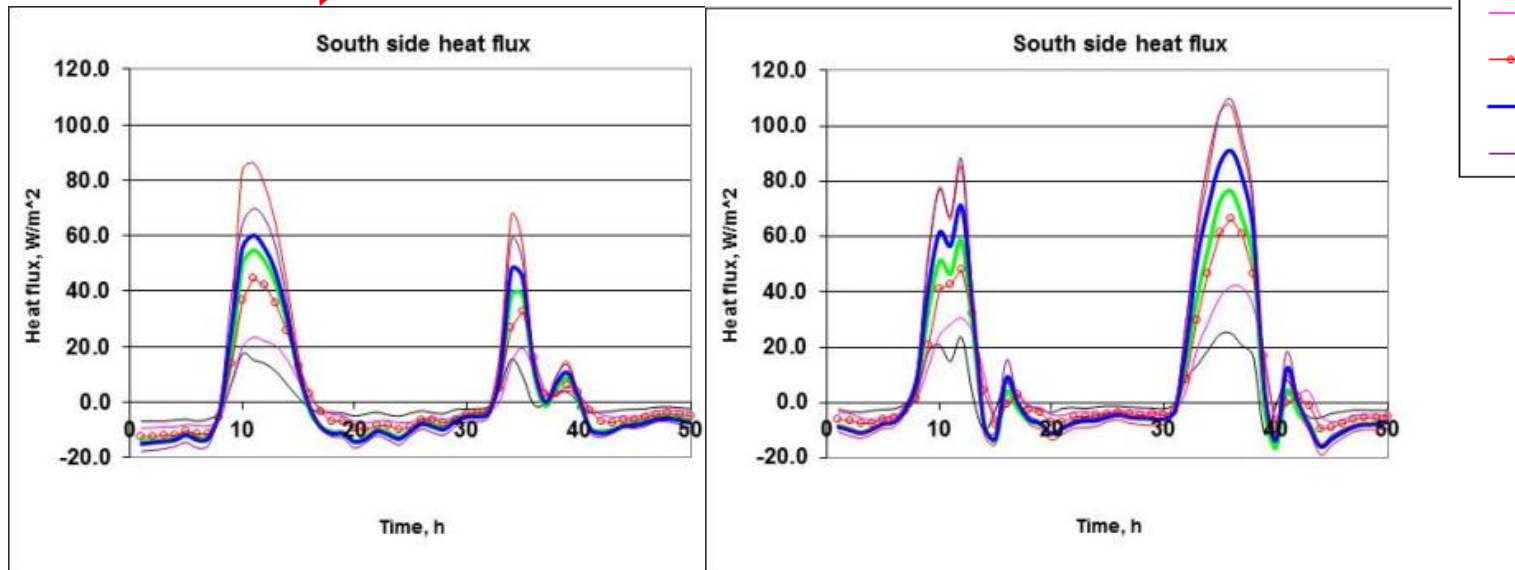
Heat Flux Measurements





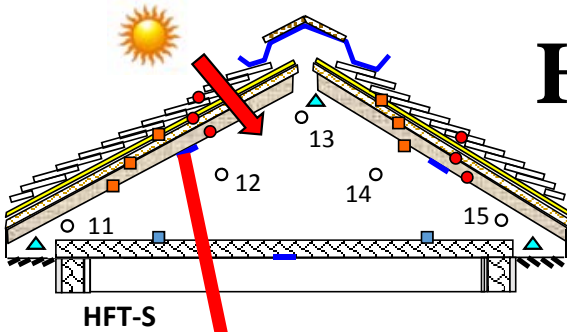
Heat Entering South Roof Plane

Winter Summer



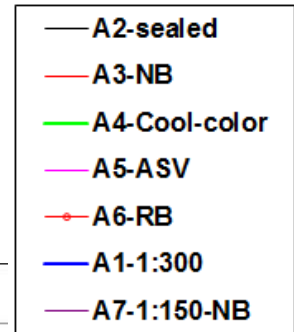
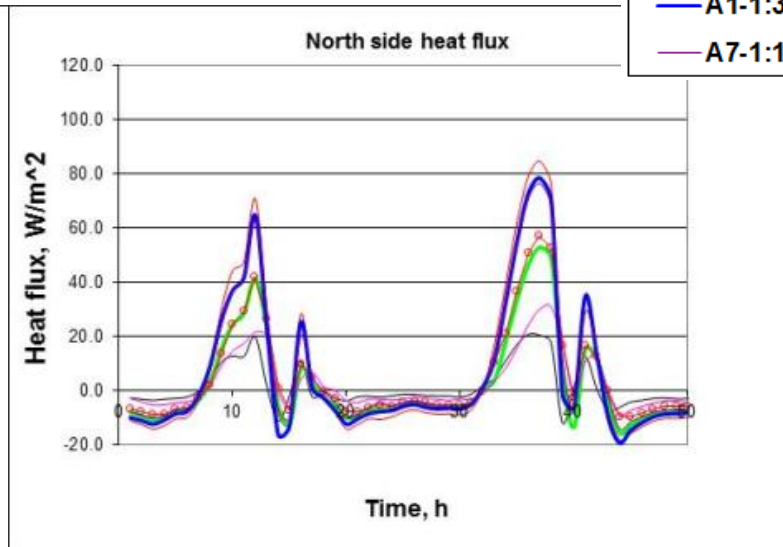
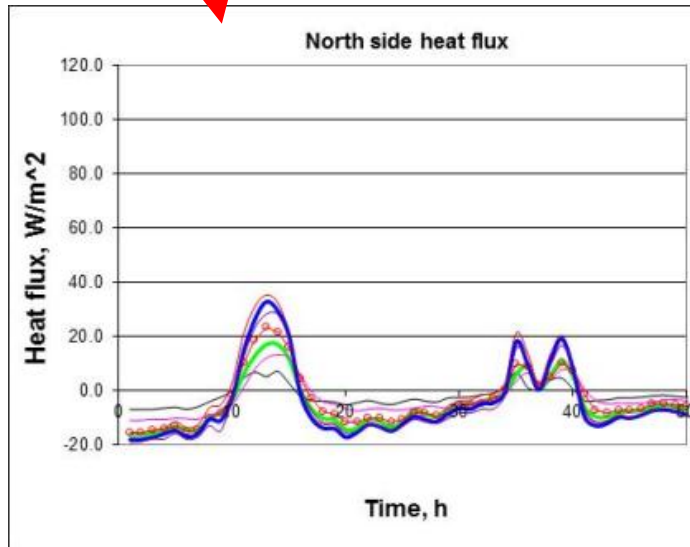
- Heat flux entering South facing roof deck is strong function of vent strategy
- Non-breathable > breathable-1:300 > Cool-color > RB > ASV > sealed attic

Heat Entering North Roof Plane



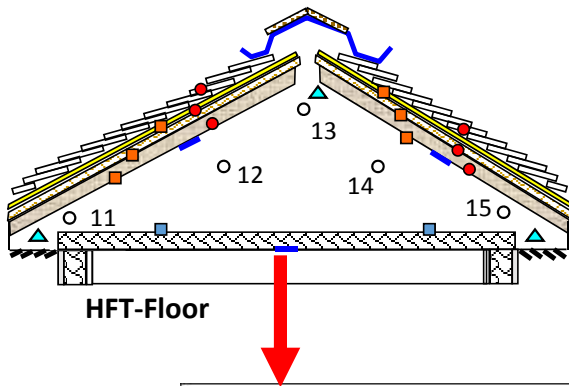
Winter

Summer



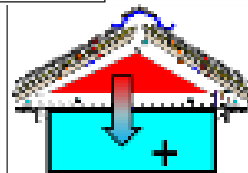
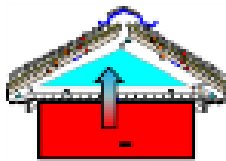
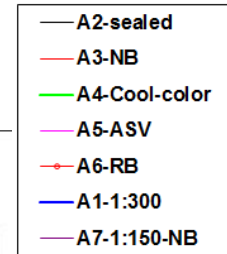
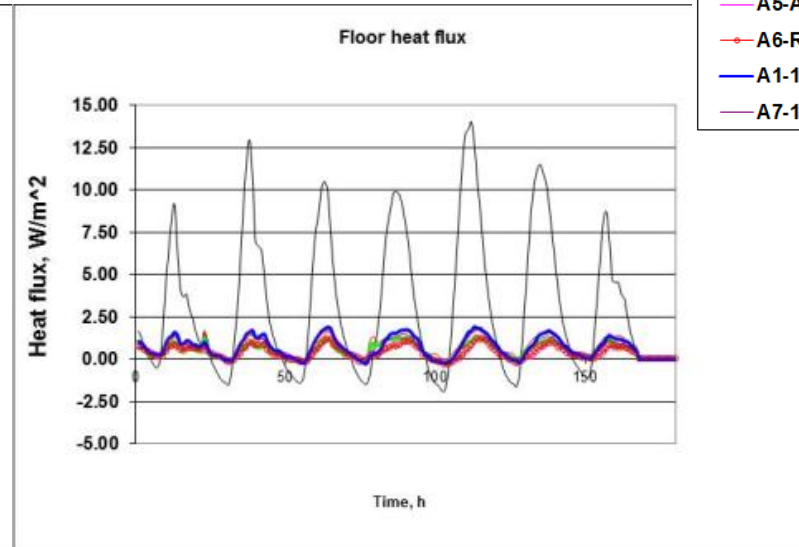
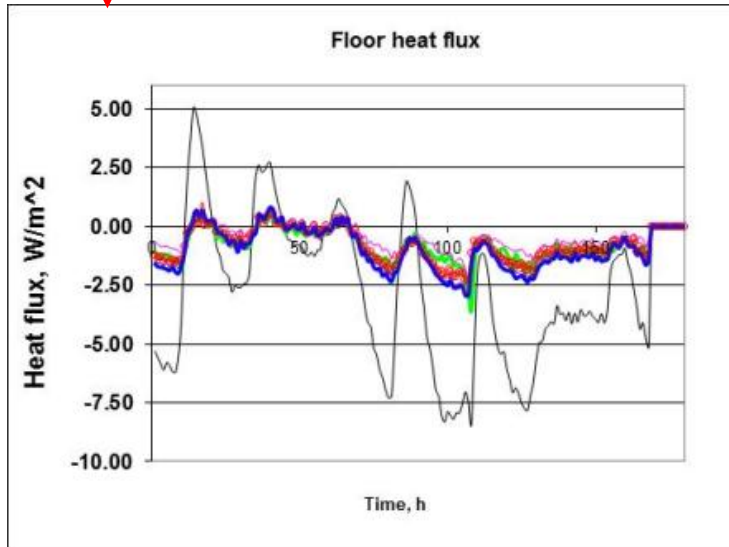
- Heat flux entering North facing roof deck is lower than facing South
- Non-breathable > breathable-1:300 > Cool-color > RB > ASV > sealed attic

Heat Entering Living Space



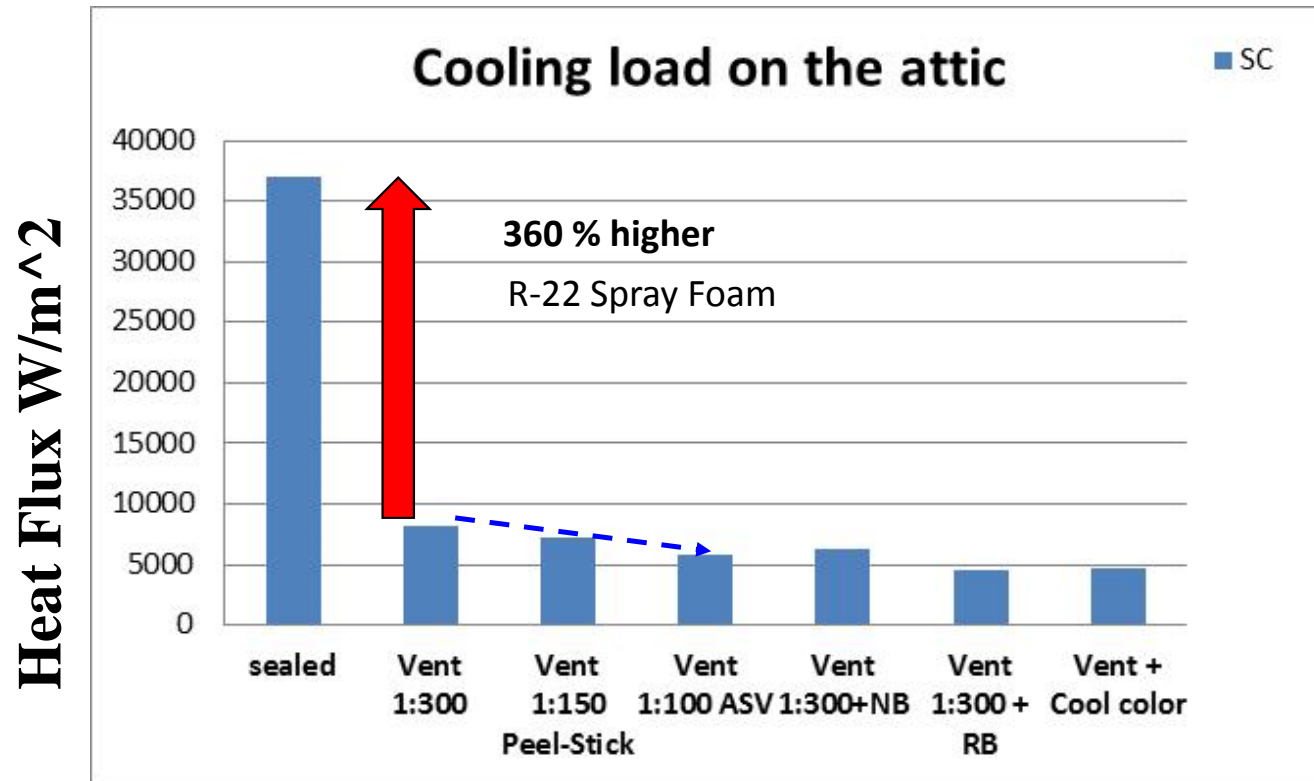
Winter

Summer



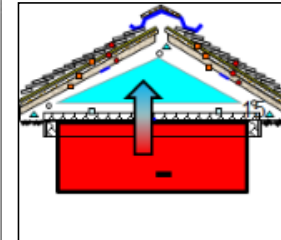
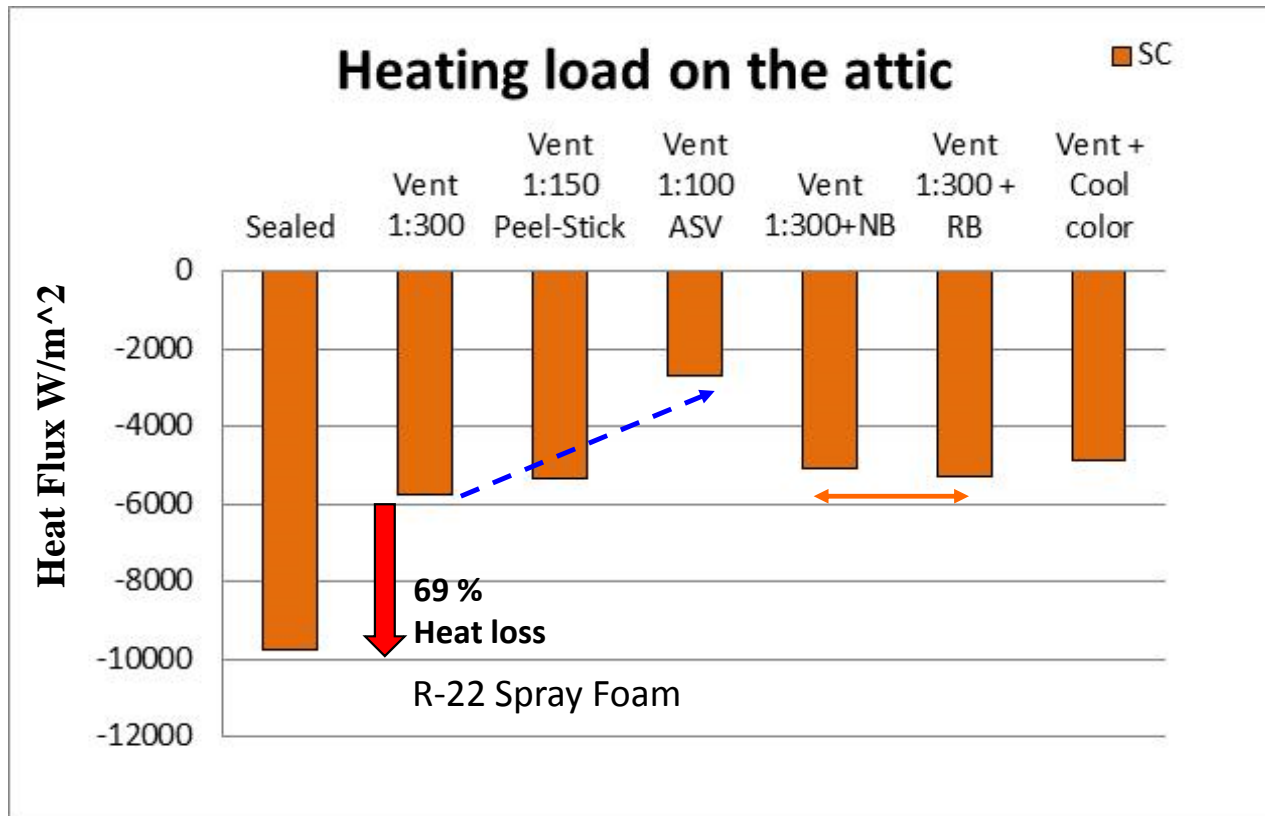
- Sealed attic has by far the highest heat entering living space than any other attic
- During winter nights, sealed attic takes heat out of living space

SUMMER MONTHS – Total Cooling Load



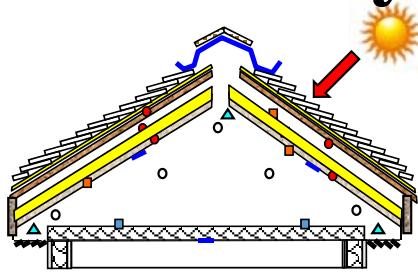
- Sealed attic increases cooling load by 360% compared to ventilated attic
- Increasing ventilation further reduces cooling load on attics

WINTER MONTHS – Total Heating Load

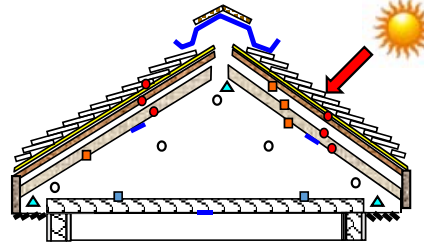


- Sealed attic removes 69% more heat than ventilated attic
- Increasing ventilation reduces heating load on attics

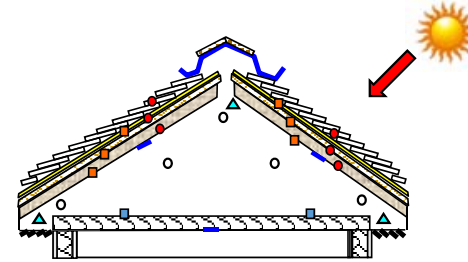
Yearly Heat Transfer to Attic



ThermaCal product (ISO + Air Gap)

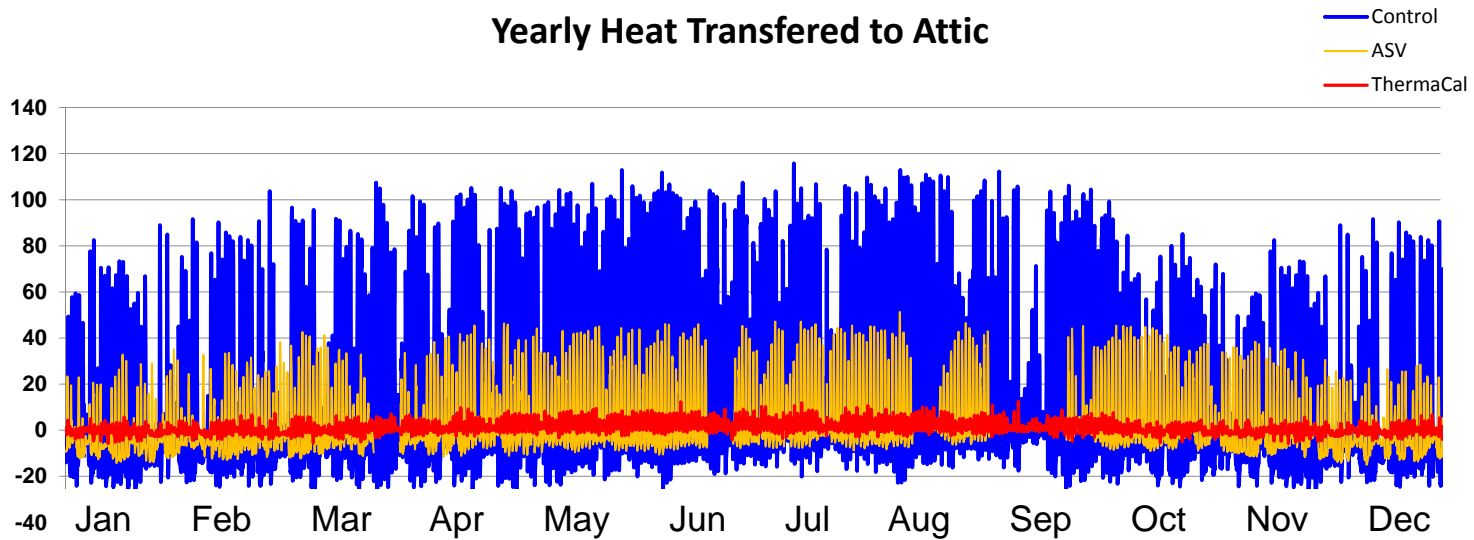


Above Sheathing Ventilation (Air Gap)



Control Standard deck

Yearly Heat Transferred to Attic



Outcomes for Owners

- Energy Costs
- Liability
- Repair Costs –
leaks, etc.
- Replacement
Costs





keep going.

Continued Follow Up & Compliance

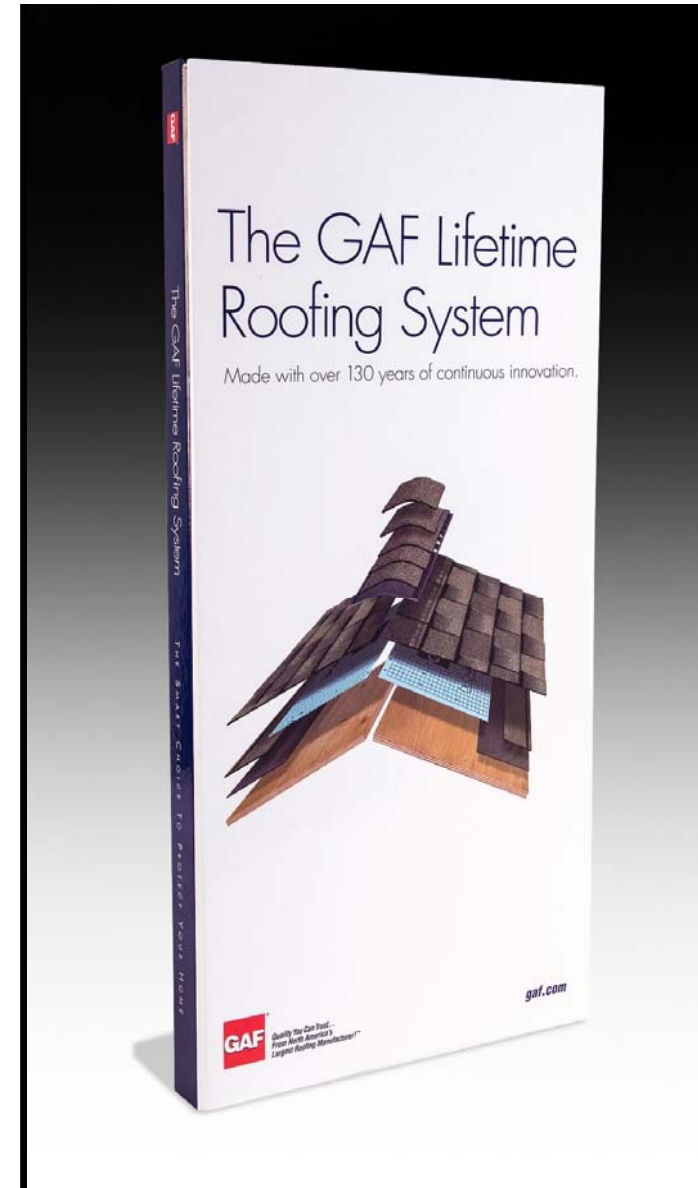
- UL Approvals –
Ensures Continued
Compliance
- Not One and Done!



A wide-angle photograph of a beach at sunset. The sun is low on the horizon, creating a bright glow and long shadows. The sky is a mix of blue and orange. The ocean waves are gently washing onto the shore. In the foreground, two people are sitting on the sand, their silhouettes visible against the bright light. A semi-transparent white box with dark borders is centered over the image, containing the text "WHAT'S REALLY IMPORTANT" in a bold, dark font.

**WHAT'S
REALLY IMPORTANT**

Lifetime Roofing System





Distinctive
Ridge Cap Shingles

Effective
Cobra® Attic Ventilation

Lifetime Roofing Shingles

Strong
Roof Deck Protection

Effective
Starter Strip Shingles

Durable
Leak Barrier

Roof Deck

Great Protection Starts Here...

A new roof is more than just shingles. The components of the GAF Lifetime Roofing System are designed to work together to protect your home — and give you peace of mind. Make sure your new roof includes only genuine GAF roofing components!



- 1 Distinctive Ridge Cap Shingles**
Enhance the beauty of your home with the look of a grand old ridge.
- 2 Effective Cobra® Attic Ventilation**
Helps remove excess heat and moisture from your attic to your home's energy efficiency in the life of your roof.
- 3 Lifetime Roofing Shingles**
Including Timberline® Shingles with Advanced Protection® Shingle Technology. They're the #1 selling shingles in North America!
- 4 Strong Roof Deck Protection**
Provides a durable layer of protection against condensation, rain and moisture infiltration.
- 5 Effective Starter Strip Shingles**
Helps reduce risk of shingle sliding and provides extra security coverage.
- 6 Durable Leak Barrier**
Provides excellent protection against leaks caused by roof settling and extreme weather.

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