Steep Slope Roofing: Current Issues & Industry Updates

CEU Information: AIA CRCA2025-T3 (1LU/HSW), ICC 44428 (0.1 CEU), IIBEC 1 CEH

Joan Crowe

GAF

Code Updates and Shingle Stuff

Joan Crowe, AIA
GAF

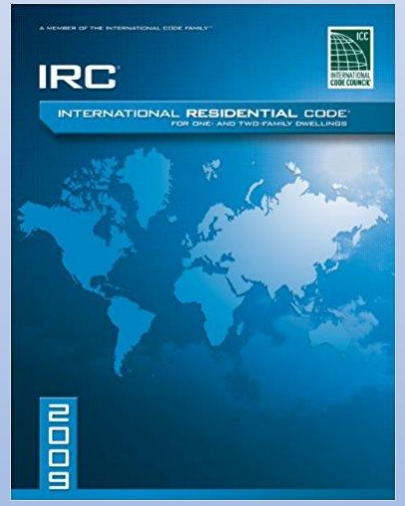
Learning Objectives

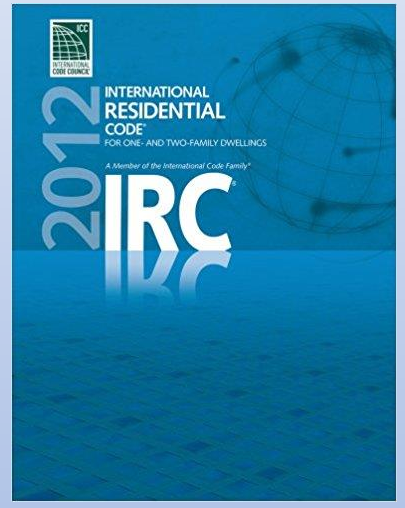
- Update on building code requirements for asphalt shingle roofing.
- Understand the basics of attic ventilation, explore the attic ventilation code requirements and compare different editions of the International Residential Code.
- Identify the variety of attributes of asphalt shingles.
- Understand the most common questions that come up with shingles.
- Identify useful resources.

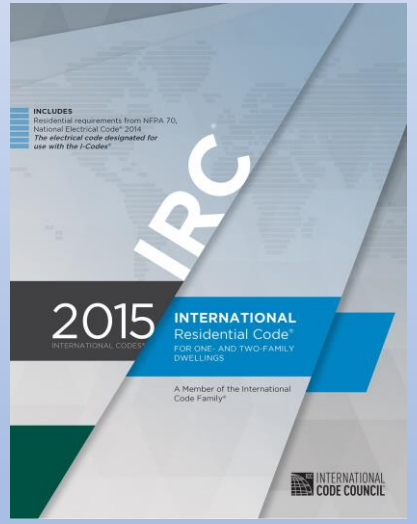
ICC I-Codes

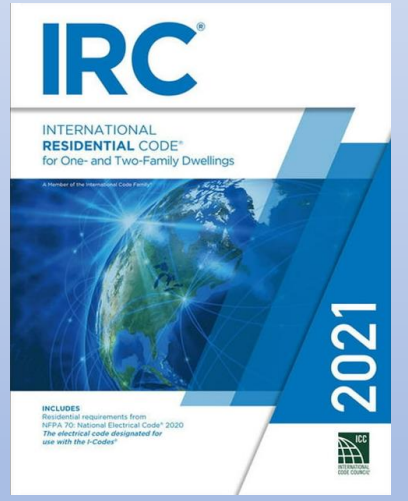
Asphalt shingles are addressed in International Building Code (IBC) and International Residential Code (IRC)

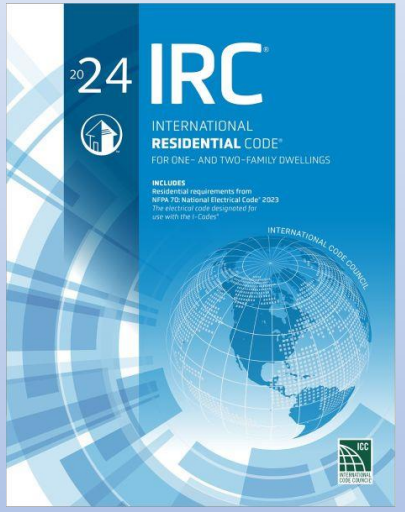
IRC is updated every 3 years





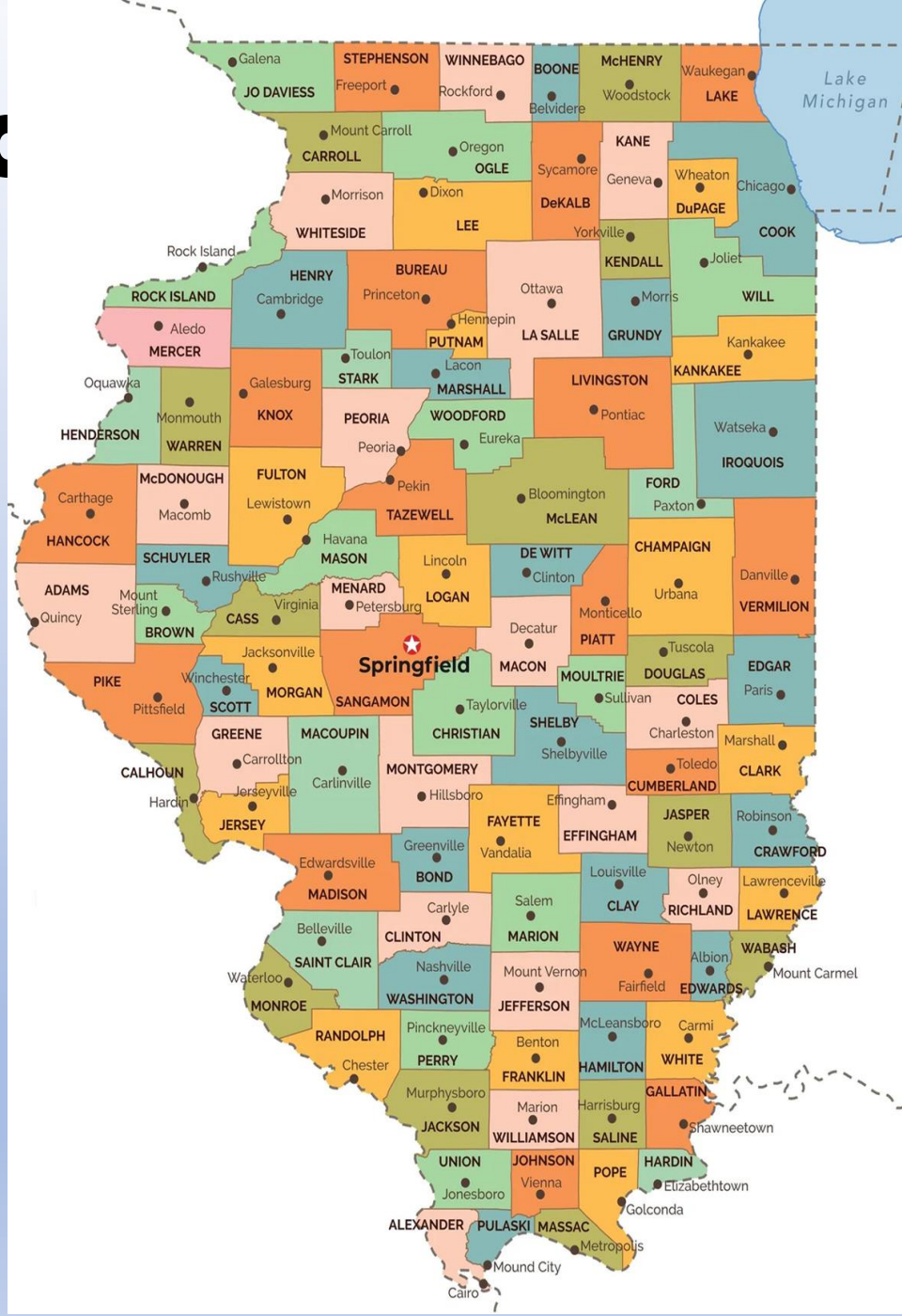






The Great State of Illinc

Building codes are adopted at the local level…except the energy code.



Where to find adopted codes

https://illinois-code-directory.powerappsportals.us/

BUILDING CODE QUESTIONS

To assist you, CDB provides two directories; one of local building codes and the other listing state regulations and statutes for your convenience.

- **Illinois Municipal Code Directory**
- **Illinois Construction-Related Statutes and Rules Directory**

For more information see our **Building Codes & Regulations FAQs** or contact us at:

401 South Spring Street
3rd Floor, Stratton Building
Springfield, IL 62706
CDB.BuildingCodes@illinois.gov
Voice: 217-720-3021
TDD: 217-524-4449

Illinois Municipal Code Directory

To see what local codes have been adopted, please select a municipality from the list below.

If you are a Code Official and need to update the contact information for a municipality, please send an email to cdb.buildingcodes@illinois.gov and someone will contact you with instructions.

Codes are displayed in abbreviated form. Please refer to the **code reference** for full names.

Municipality

Apply

Municipality	Code Official Name	Code Official Phone	Code Official Email
Abingdon	John DeJaynes	3094623182	
Adams County	Georgia Volm	2172772150	
Addieville	Kay Gaebe	6184247803	
Addison	Michael Crandall	6306937541	mcrandall@addison-il.org
Adeline	Karen Dickinson	8159382619	
Albany	Deanne Anglese	3098874064	
Albers	Richard Casson	6182485154	albersmayor@hotmail.com
Albion	Gary Mason	6184453214	


BREAKING NEWS
BREAKING NEWS
FROM THE DESK OF RON BURGUNDY

IL *kinda* started mandating code adoption

Building Codes and Regulations

The State of Illinois recently passed legislation (**Public Act 103-0510**) changing the Capital Development Board Act to require statewide building codes effective 1/1/2025. Until then, units of local government such as cities and counties can adopt codes of their choice. The best and most accurate answers to building code questions must be answered by your city, village, or county code official.

Started several weeks ago!

Public Act 103-0510

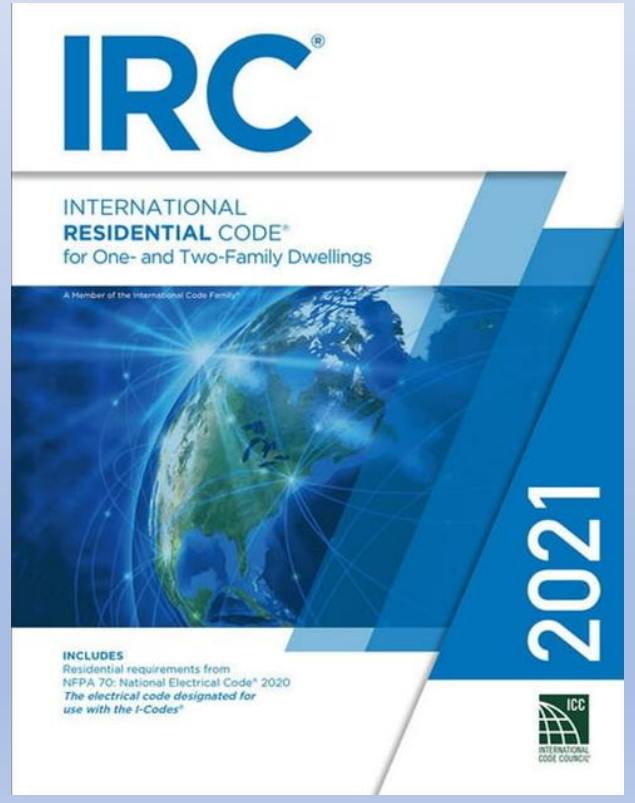
Beginning January 1, 2025, any municipal building code or county building code must:

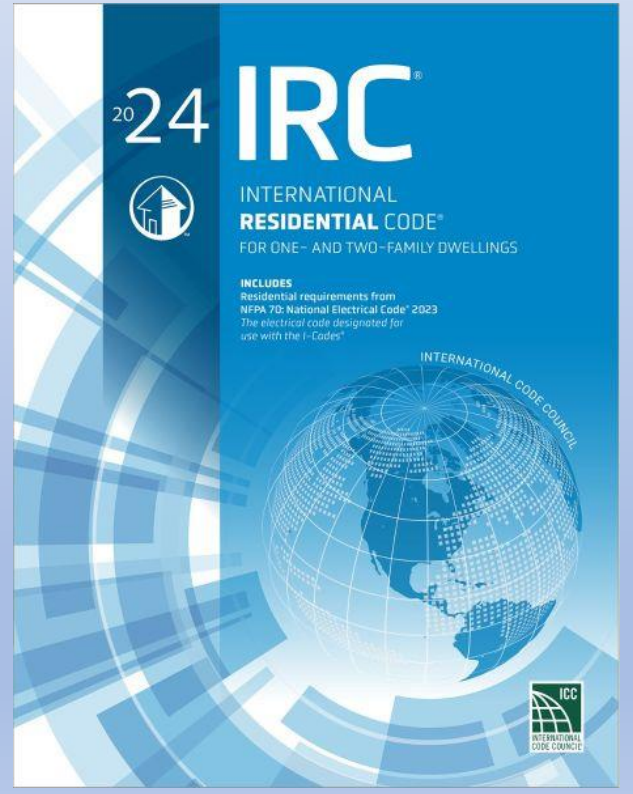
“(3) regulate the structural design of residential buildings in a manner that is at least as stringent as the baseline residential code.”

"Baseline residential code" means the edition of the International Residential Code for One- and Two-Family Dwellings first published by the International Code Council during the current year or preceding 9 calendar years with the least restrictive provisions for structural design.

So, I’m interpreting this to mean municipalities have to adopt the 2018 edition or later.
But notice that it says “structural design”…

IRC editions that will be in play in IL





Illinois Municipal League fact sheet

FACT SHEET

January 2, 2025

STATEWIDE BUILDING CODES

Effective January 1, 2025

Public Act 103-0510 amends the Capital Development Board Act (20 ILCS 3105/1 *et seq.*). It requires that certain building code standards be adopted or followed effective January 1, 2025. The Act does not require municipalities or counties that do not currently have building codes to adopt building codes, but it does require minimum construction standards in those communities. For municipalities and counties that have adopted building codes, the Act requires that those codes meet certain requirements. Having a municipal or county zoning ordinance is separate from having a municipal or county building code.

IF YOUR MUNICIPALITY CURRENTLY HAS A BUILDING CODE

Any municipality or county that has adopted and is currently enforcing a building code must identify the code, by title and edition, and any local amendments and inform the Illinois Capital Development Board (CDB) in writing no later than 180 days after the effective date of the Act.

Any municipality or county choosing to adopt a new building code edition must, at least 30 days before the effective date of the new code, identify the model code being adopted, by title and edition, and any local amendments and inform CDB in writing. To report your local building codes, fill out the "County Municipal Code Reporting Form" on the CDB website.[1] If you have issues submitting the form or questions, please email cdb.buildingcodes@illinois.gov.

Beginning January 1, 2025, any municipal building code or county building code must:

(1) Meet the baseline codes as set forth in the Act. The baseline codes are the International Building Code including Appendix G, International Existing Building Code and International Residential Code, published in the current year or preceding nine calendar years;

(2) Regulate the structural design of new buildings, other than residential buildings, in a manner that is at least as stringent as the baseline statewide building code standard;

(3) Regulate the structural design of rehabilitation work in existing buildings, other than residential buildings, in a manner that is at least as stringent as the baseline statewide existing building code standard; and,

(4) Regulate the structural design of residential buildings in a manner that is at least as stringent as the baseline statewide residential code standard.

[1] https://illinois-code-directory.powerappsportals.us/Code-Update-Submission/

Scan for PDF Version

ILLINOIS MUNICIPAL LEAGUE

500 East Capitol Avenue | P.O. Box 5180 | Springfield, IL 62705-5180 | Ph: 217.525.1220 | Fx: 217.525.7438 | iml.org

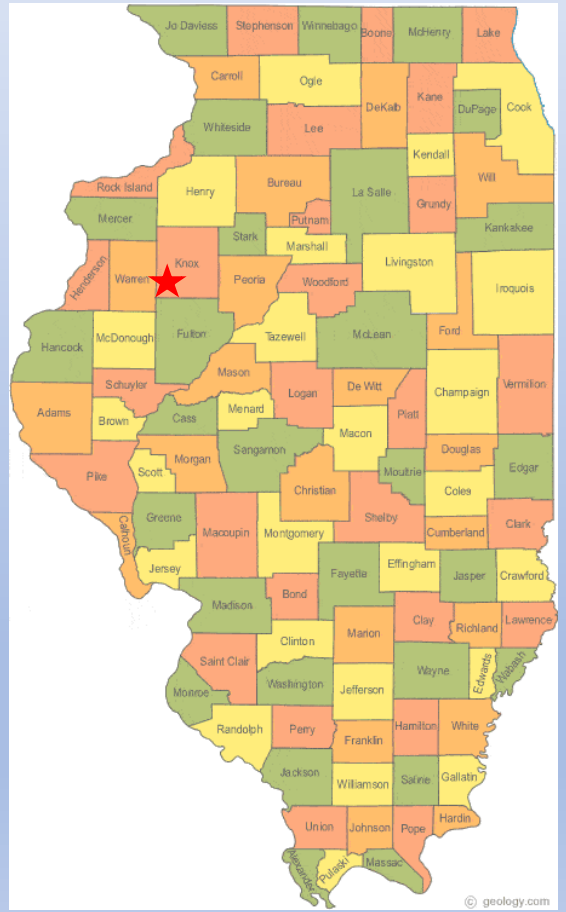
Per the fact sheet

- The Act does not require municipalities that do not currently have building codes to adopt building codes, but it does require minimum construction standards in those communities.

- For municipalities that have adopted building codes, the Act requires that those codes meet certain requirements.

This is very confusing, so check with the AHJ!

Let's look at **Abingdon, IL**



Code Official Contact

John DeJaynes
Mayor
3094623182

Code Official Email

—

Corporate Authority Contact

Ed Swearingen
Mayor
114 E MEEK ST
Abingdon, IL 61410
(309) 462-3182

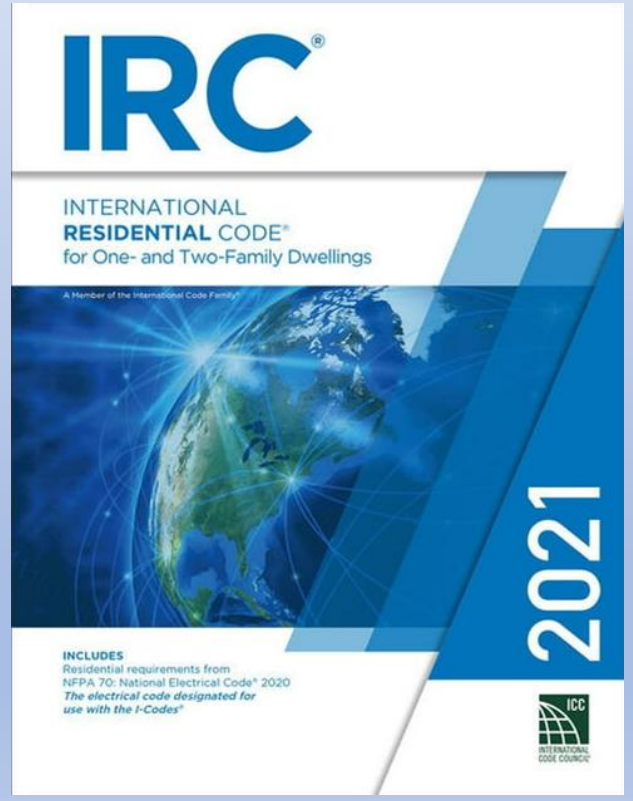
Codes

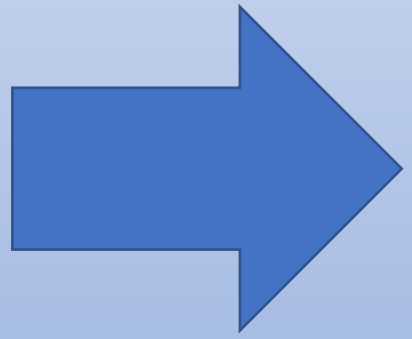
Code Abbreviation	Edition Year	Local Modification Adopted	Effective Date	Last Updated
BOCA	1990	Yes		

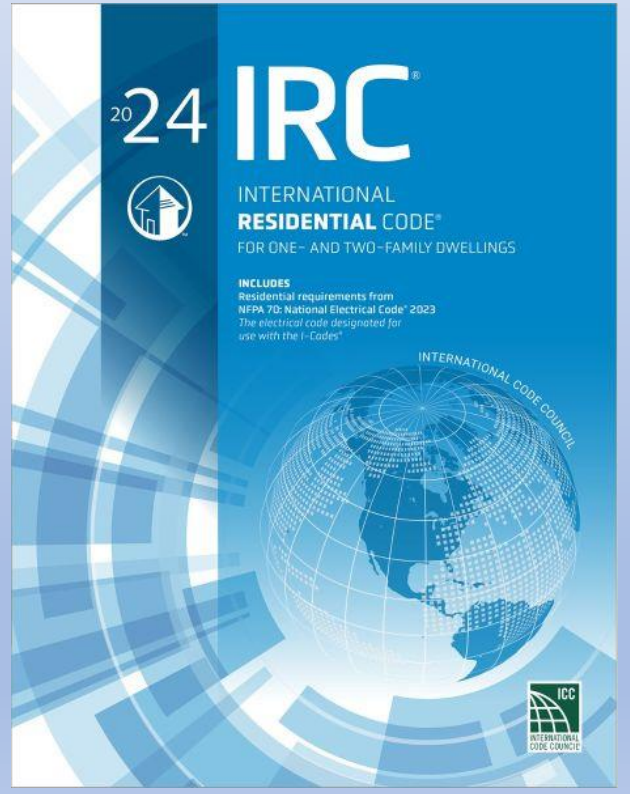
So, I'm interpreting this to mean Abingdon has to adopt the 2018 IRC, but again, check with the AHJ

“Significant” Code Changes

Thankfully, not a lot…





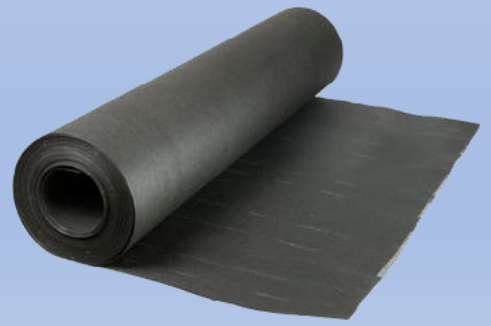


Underlayment Changes

IRC 905.1.1 – Underlayment

R905.1.1 Underlayment. INSIGHTS

Underlayment in accordance with this section is required for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and building-integrated photovoltaic (BIPV) roof coverings shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226; D1970; D2626; D4869; D6380, Class M; D6757; or D8257 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be fastened in accordance with Table R905.1.1(3).



- Added BIPV
- Added two material types:
  - ASTM D6380: asphalt-saturated organic felts
  - ASTM D8257: synthetic underlayments

Underlayment Changes

IRC Tables 905.1(1) – Underlayment Types

TABLE R905.1.1(1)UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257

Note that D1970 (ice-dam protection membrane) and D8257 (synthetics) was added, but not D6380?

Underlayment Changes

IRC Tables 905.1(2) – Underlayment Application

2024 IRC

TABLE R905.1.1(2)UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full-width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.

2021 IRC

TABLE R905.1.1(2)UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches, Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

TABLE R905.1.1(2)UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
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Simply put, 2024 IRC:

- Revised instructions for two layers (2:12 to 4:12) to be more generic, so addresses different product sizes.
- Added ice-dam protection membrane

Tiny Change for Closed Valleys

IRC R905.2.8.2

R905.2.8.2 Valleys. INSIGHTS

Valley linings shall be installed in accordance with the manufacturer's instructions before applying shingles. Valley linings of the following types shall be permitted:

1. For open valleys (valley lining exposed) lined with metal, the valley lining shall be not less than 24 inches (610 mm) wide and of any of the corrosion-resistant metals in Table R905.2.8.2.
2. For open valleys, valley lining of two plies of mineral-surfaced roll roofing, complying with ASTM D3909 or ASTM D6380 Class M, shall be permitted. The bottom layer shall be 18 inches (457 mm) and the top layer not less than 36 inches (914 mm) wide.
3. For closed valleys (valley covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D6380 and not less than 36 inches wide (914 mm) or valley lining as described in Item 1 or 2 shall be permitted. Self-adhering polymer-modified bitumen *underlayment* complying with ASTM D1970 and not less than 36 inches (914 mm) wide shall be permitted in lieu of the lining material.

Added minimum width for ice-dam membrane

Section 908.3 Roof Replacement

More clarification for the sticky stuff

aka, what to do when you have existing *Ice Barrier Membrane*

2012 IRC (introduced)
2015 IRC
2018 IRC
2021 IRC

R908.3 Roof replacement.

Roof replacement shall include the removal of existing layers of roof coverings down to the roof deck.

Exception: Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905.

2024 IRC

R908.3 Roof replacement.

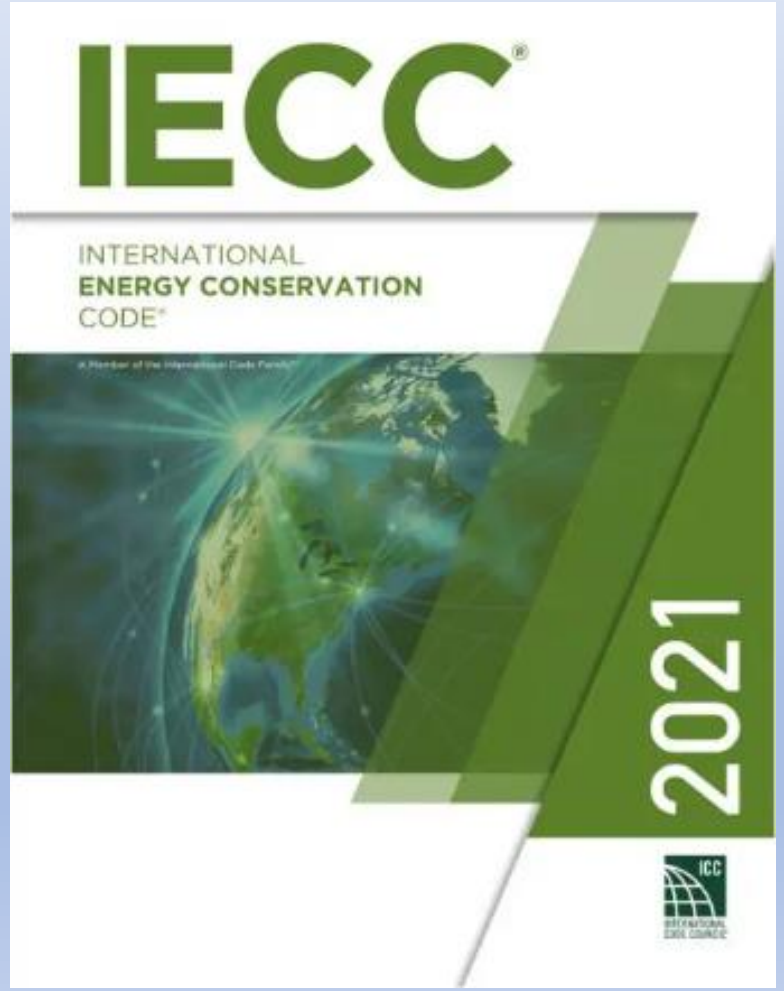
Roof replacement shall include the removal of existing layers of *roof coverings* down to the *roof deck*.

Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section R905 where permitted by the roof covering manufacturer and new ice barrier underlayment manufacturer.
2. Where the existing roof includes a self-adhered *underlayment* and the existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing self-adhered *underlayment* shall be permitted to remain in place and covered with an *underlayment* complying with Table R905.1.1(1), Table R905.1.1(2) and Table R905.1.1(3).
3. Where the existing roof includes one layer of self-adhered *underlayment* and the existing layer cannot be removed without damaging the *roof deck*, a second layer of self-adhered *underlayment* is permitted to be installed over the existing self-adhered *underlayment* provided that the following conditions are met:
   3.1. It is permitted by the roof covering manufacturer and new self-adhered underlayment manufacturer.
   3.2. The existing sheathing is not water soaked or deteriorated to the point that it is not adequate as a base for additional roofing.
   3.3. The second layer of self-adhered *underlayment* is installed such that buildup of material at walls, valleys, roof edges, end laps, and side laps does not exceed two layers.

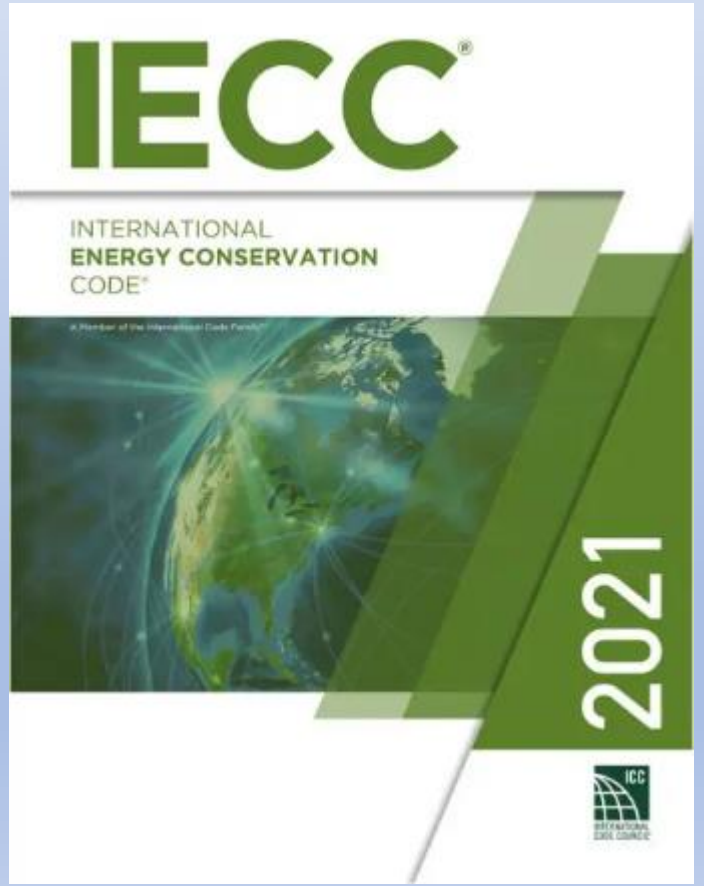
IL currently is on 2021 IECC

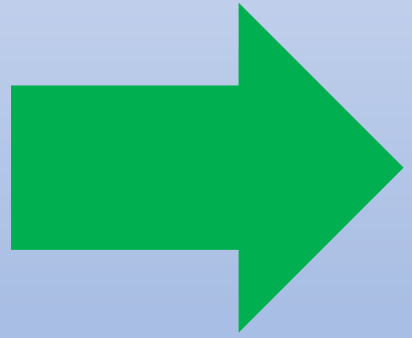
Nothing for residential roofing contractors

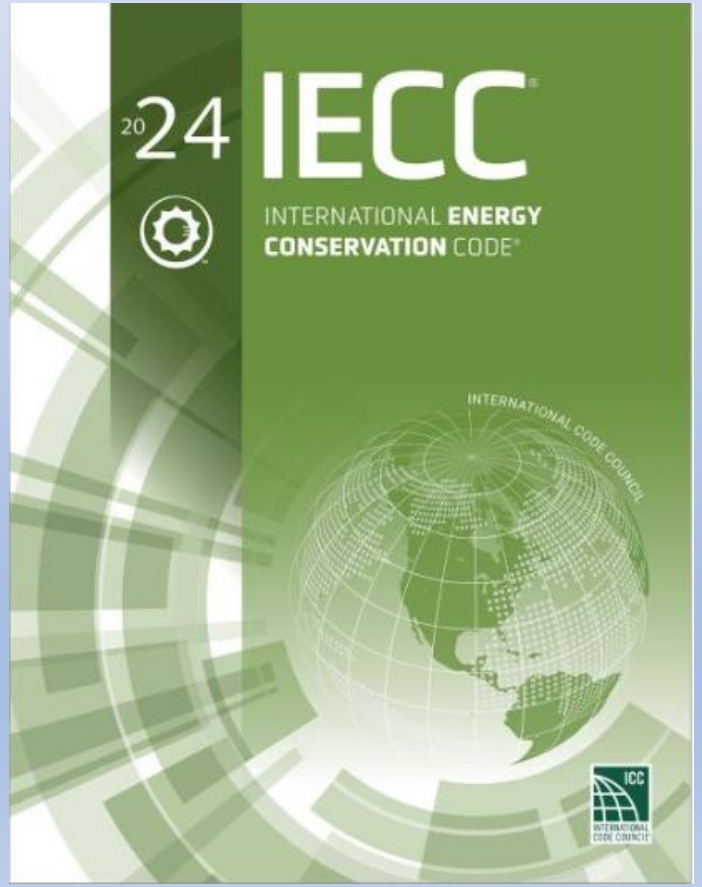


Interesting small change to 2024 IECC

Remember IL is NOT using the 2024 yet,
but it is in the review process….







2024 IECC added a new table

TABLE R402.1.3

INSULATION MINIMUM *R*-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	0	1	2	3	4 EXCEPT MARINE	5 AND MARINE 4	6	7 AND 8
Vertical fenestration *U*-factor	0.50	0.50	0.40	0.30	0.30	0.28[g]	0.28[g]	0.27[g]
Skylight *U*-factor	0.60	0.60	0.60	0.53	0.53	0.50	0.50	0.50
Glazed vertical fenestration SHGC	0.25	0.25	0.25	0.25	0.40	NR	NR	NR
Skylight SHGC	0.28	0.28	0.28	0.28	0.40	NR	NR	NR
Ceiling *R*-value	30	30	38	38	49	49	49	49
Insulation entirely above roof deck	25ci	25ci	25ci	25ci	30ci	30ci	30ci	35ci

Finally addressed low-slope roofs in residential…only took over 2 decades

Not code related, but it's probably coming and it will affect the industry...

Extended Producer Responsibility (EPR)

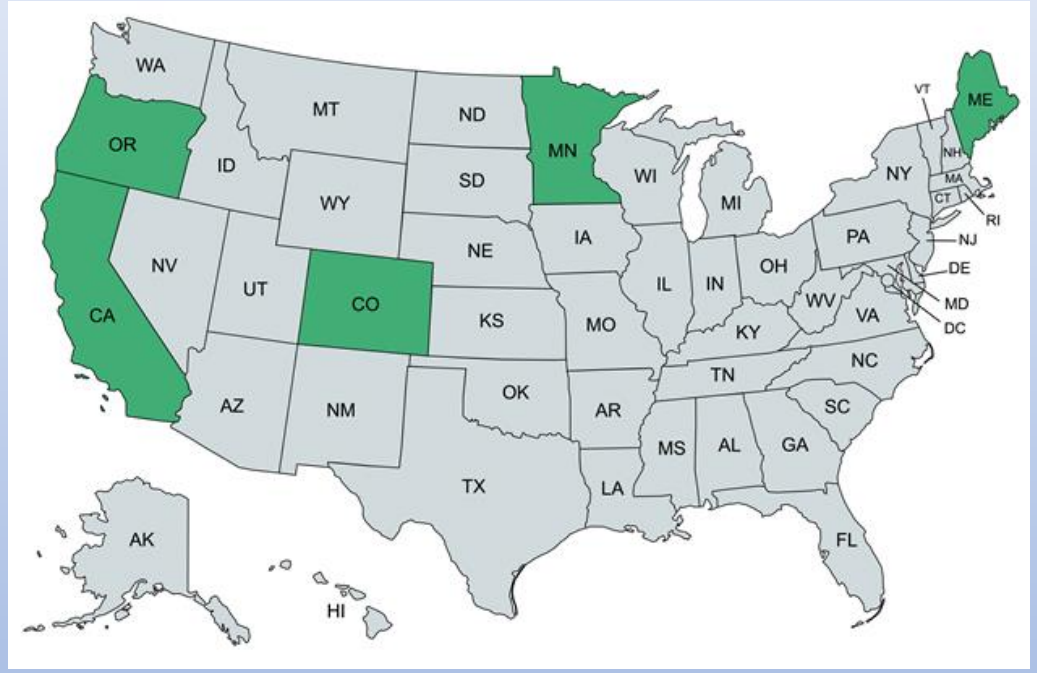
EPR programs have been adopted in 5 states.

Over a dozen states have proposed EPR bills.

EPRs require manufacturers to pay fees (by weight) for single-use packaging used on products sold into the state.

The money is for funding recycling programs.

Packaging includes plastic (flexible and rigid), glass, paper, cardboard and metal.



This affects shingle wrappers, cardboard boxes, fastener buckets, etc.

Not in Illinois yet, but they are doing a needs assessment…but

It kinda already started…

Illinois Becomes 11th State to Adopt PaintCare Program

More than 60 million gallons of paint have been diverted nationally from disposal by program developed by ACA and PSI.

PaintCare®

RECYCLING MADE EASY

Legislation passed in 2023, program is supposed to start in 2025.

The program collects leftover paint from retailers and municipalities, and they send it to recycled paint companies.

Paid for by fees by manufacturers which are added to products' purchasing price.

Retailers then pass on the fees to customers.

Look for it on your Home Depot/Loews' receipts.

Attic Ventilation

Attic Ventilation is Important!

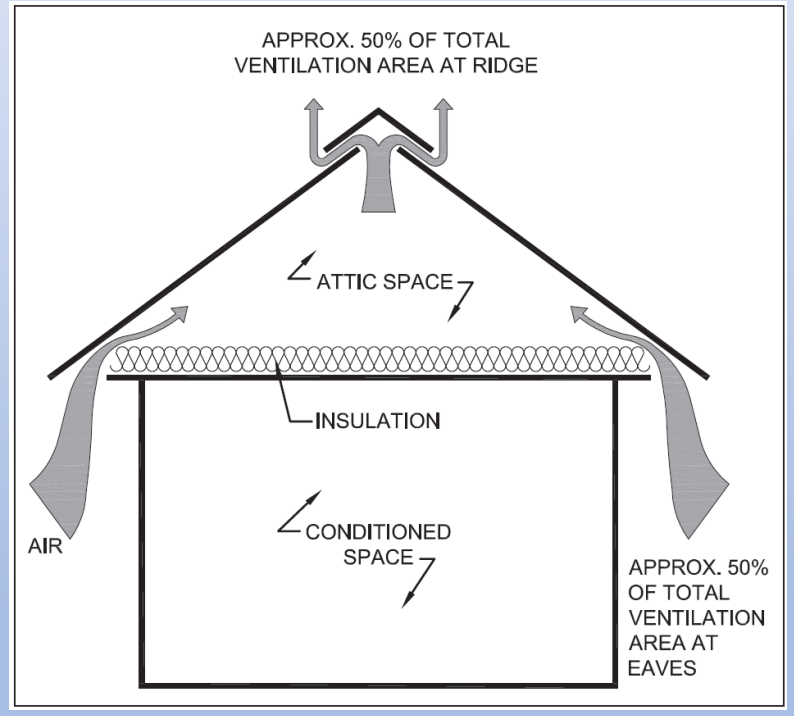
Attic ventilation serves two main functions:

- **Remove excess moisture**
  - reduces mold and mildew growth
  - reduces potential for wood rot

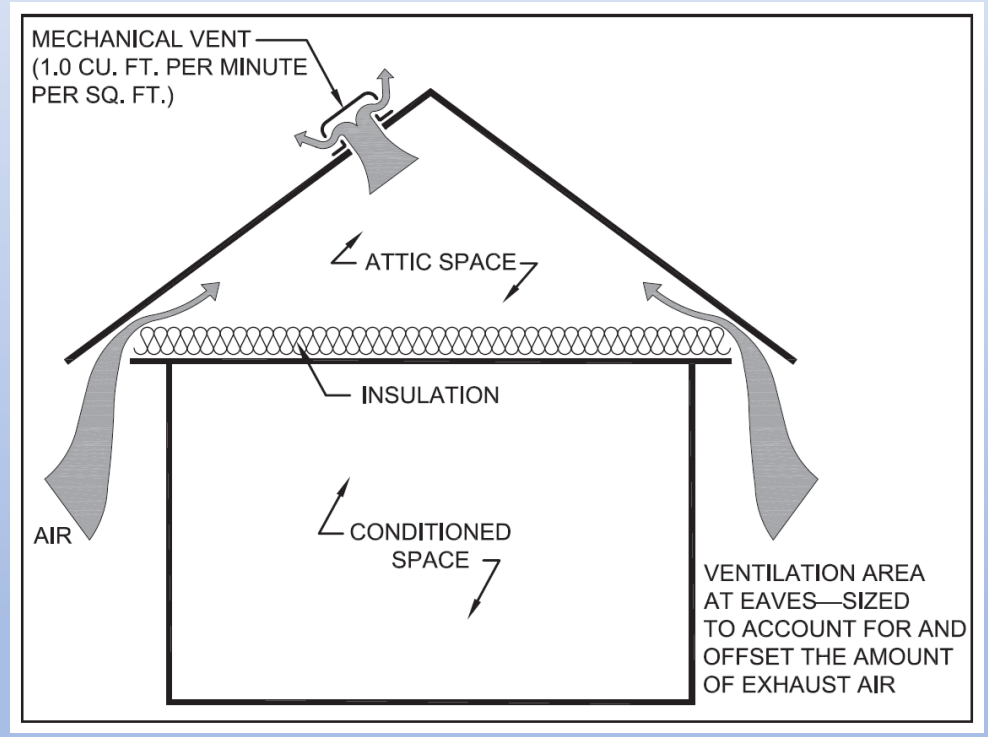
- **Lower attic temperatures**
  - reduces air-conditioning energy costs and roof deck temperature
  - optimizes a roof covering's service life (such as asphalt shingles)
  - *minimizes* ice damming

Two Ventilation Methods

Static Method



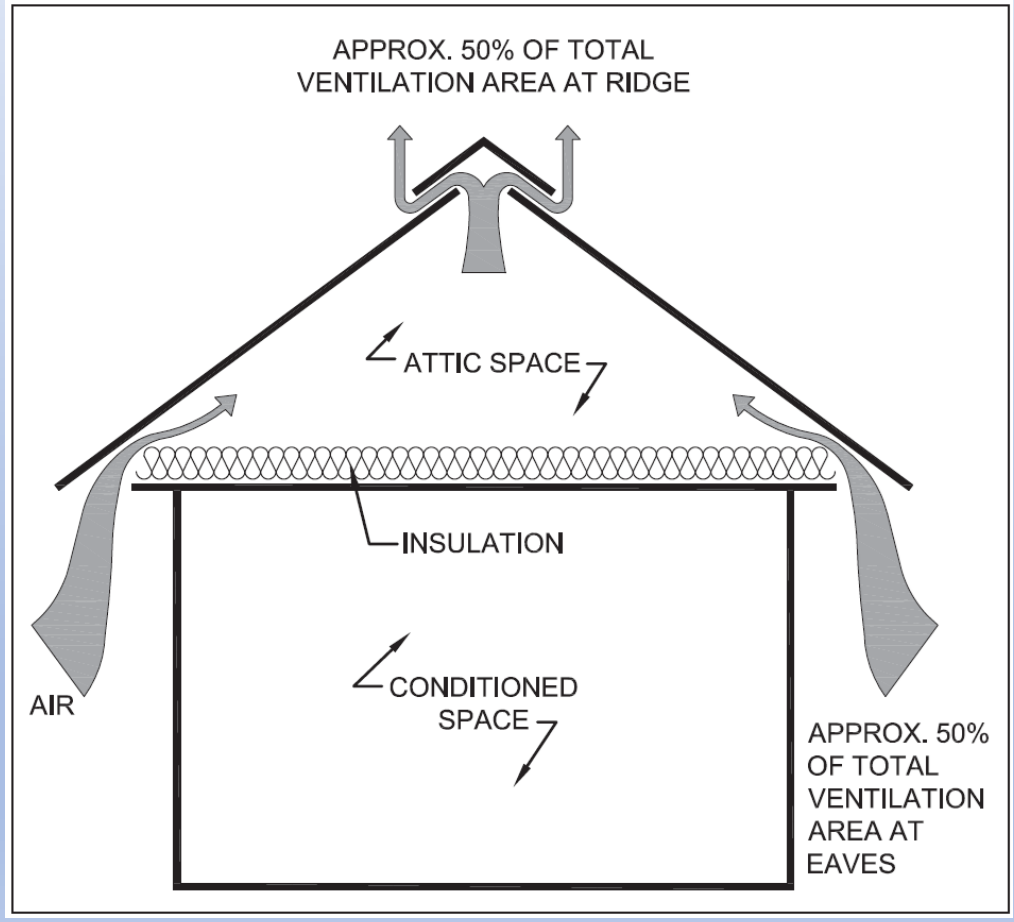
Mechanical Method



Images taken from The NRCA Roofing Manual: Architectural Metal Flashing and Condensation and Air Leakage Control

Static Ventilation

A “Balanced” System



Most common

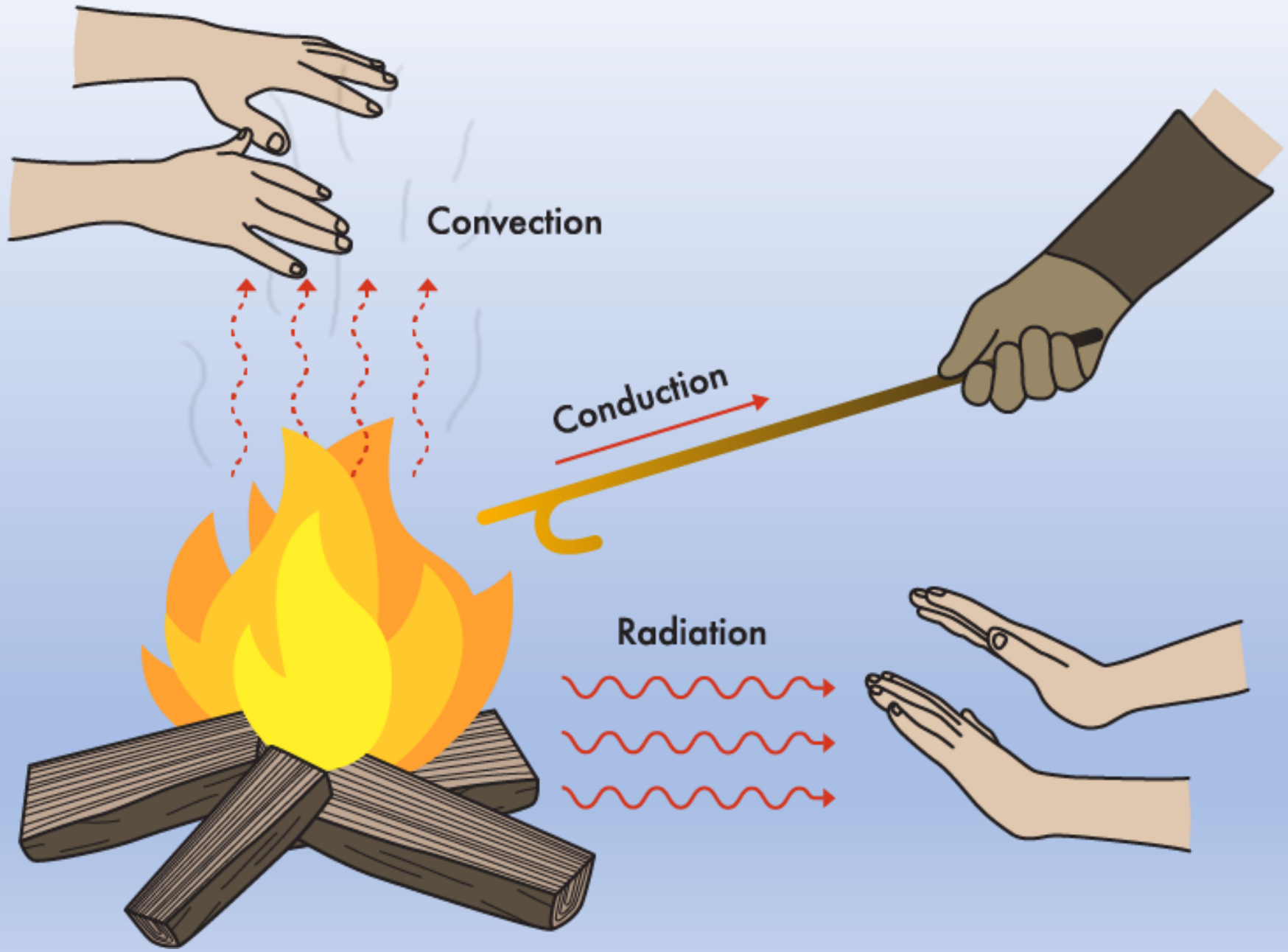
Outside air enters into the attic through soffit or eave vents and exits at vents positioned at or near the top.

This method relies on convection (warm air rises).

In order for it to work, approximately equal amounts of ventilation must be placed at the soffits/eaves and at the top of the attic space. This is referred to as “balanced.”

Images taken from The NRCA Roofing Manual: Architectural Metal Flashing and Condensation and Air Leakage Control

Static ventilation relies on *convection*, a mode of heat transfer that causes warm air and water vapor to rise.



It Takes Two Baby!

Static ventilation requires both <u>intake</u> and <u>exhaust</u> vents to work!

Intake

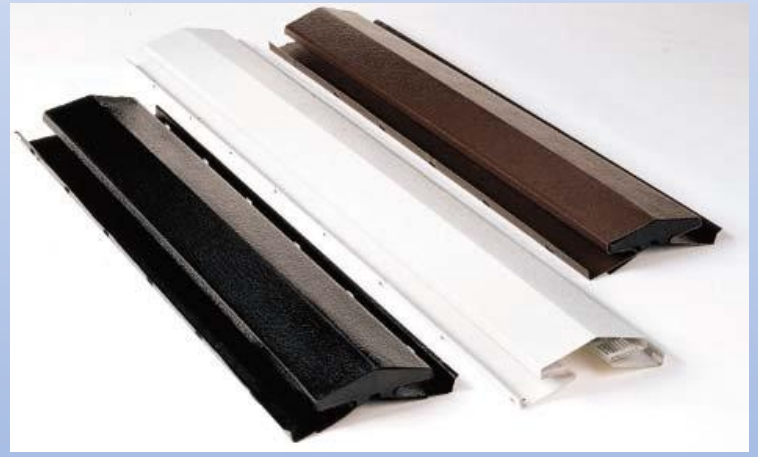
+

Exhaust

One won't work without the other…

Types of Exhaust Vents

Ridge vents

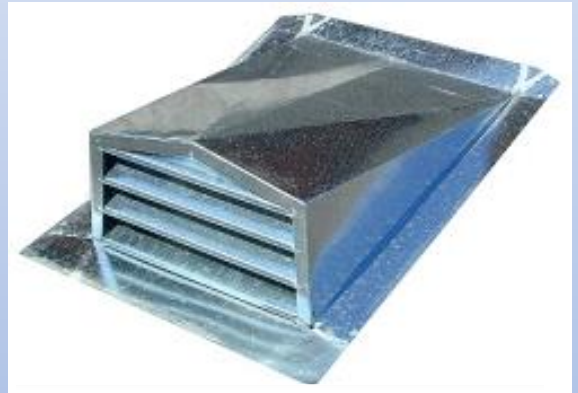


Hip vents

Types of Exhaust Vents

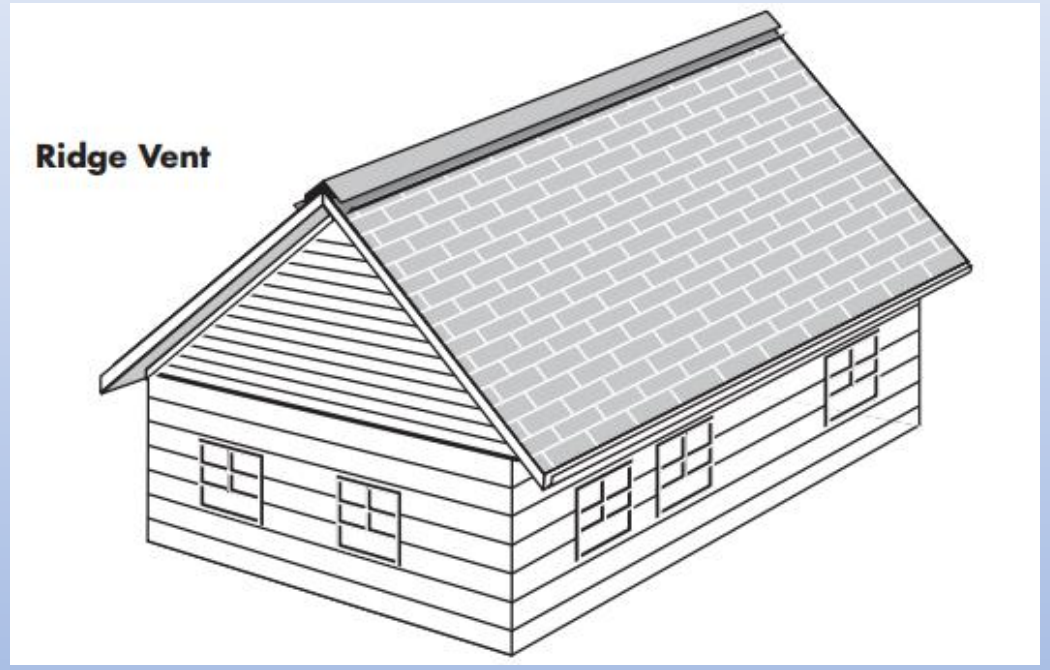
Static roof vents (mushroom vents)

Dormer



Turbine (whirlybird)

Ventilation Fun Fact!



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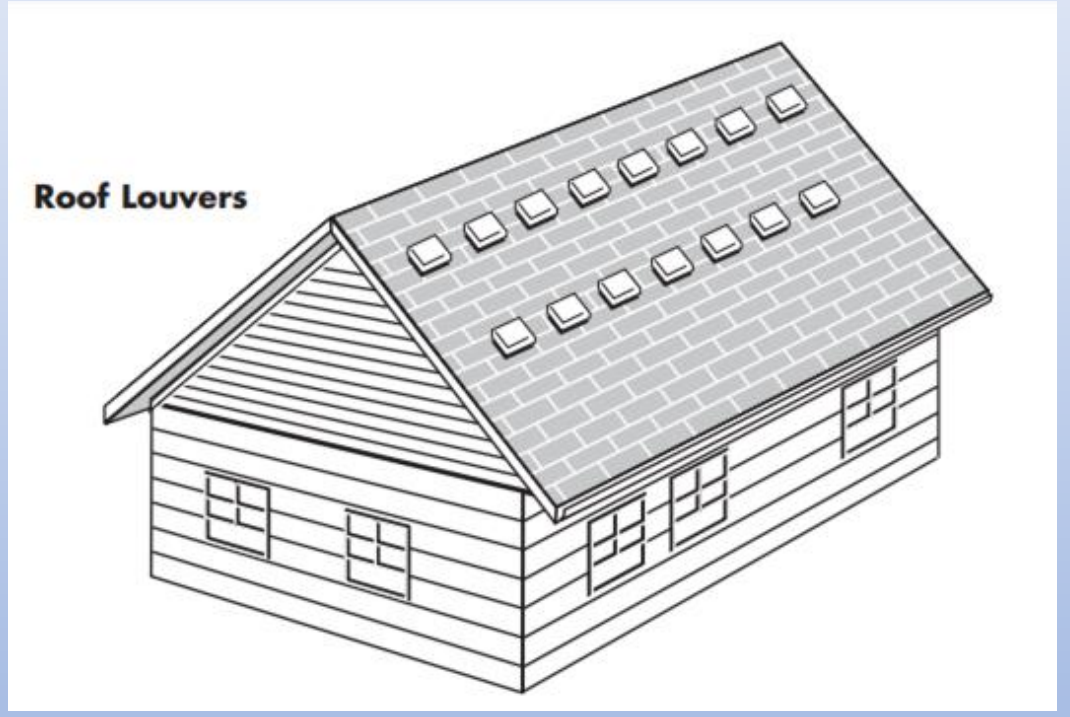


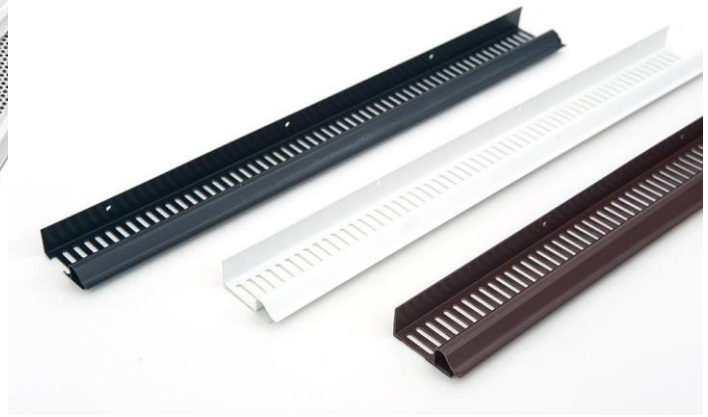
According to Air Vent, Inc., fifteen roof louvers are required to equal the exhaust venting of 42 linear feet of ridge vent!

Types of Intake Vents

Individual Vents

Soffit Panel Vents

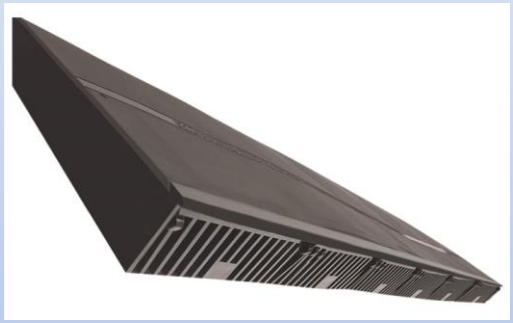
Continuous Strip Vents

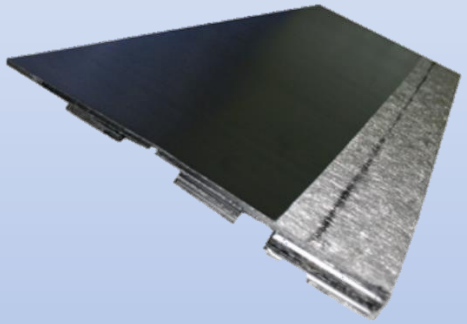


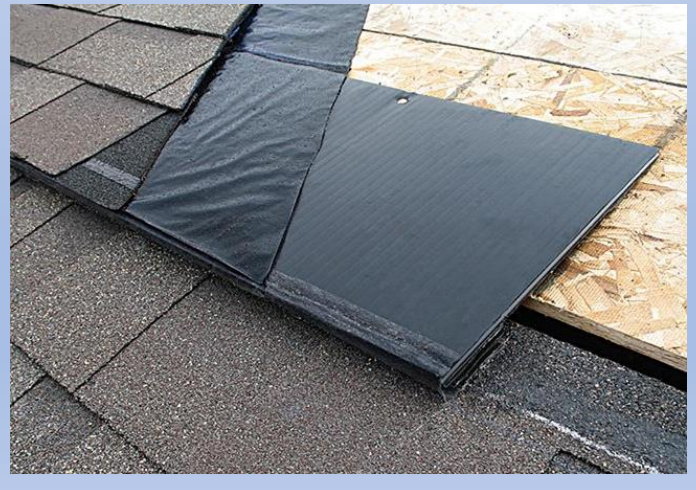
Unique Intake Vents

When you don’t have a soffit

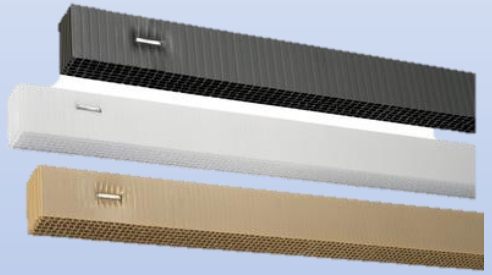
Under-shingle vents

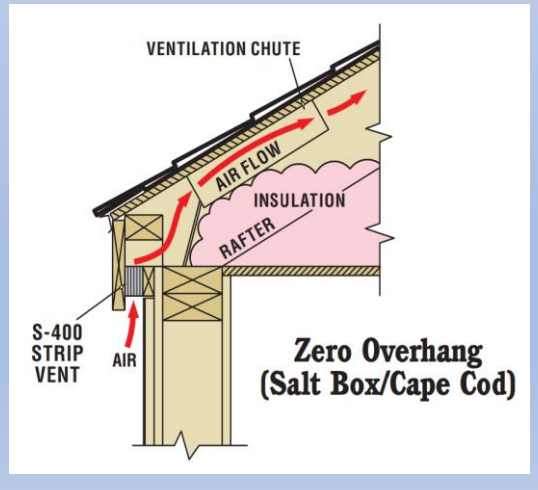




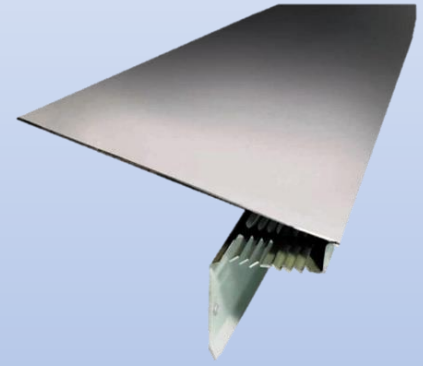


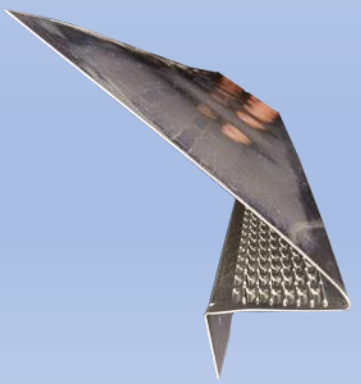
Continuous strip vent





Drip edge vent





Types of Gable Vents

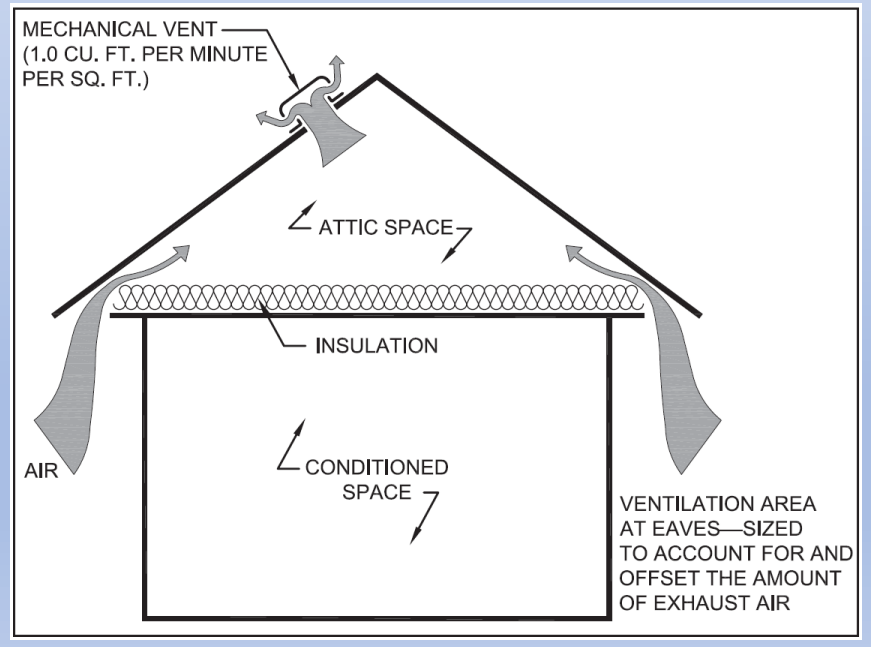
Exhaust and intake vents

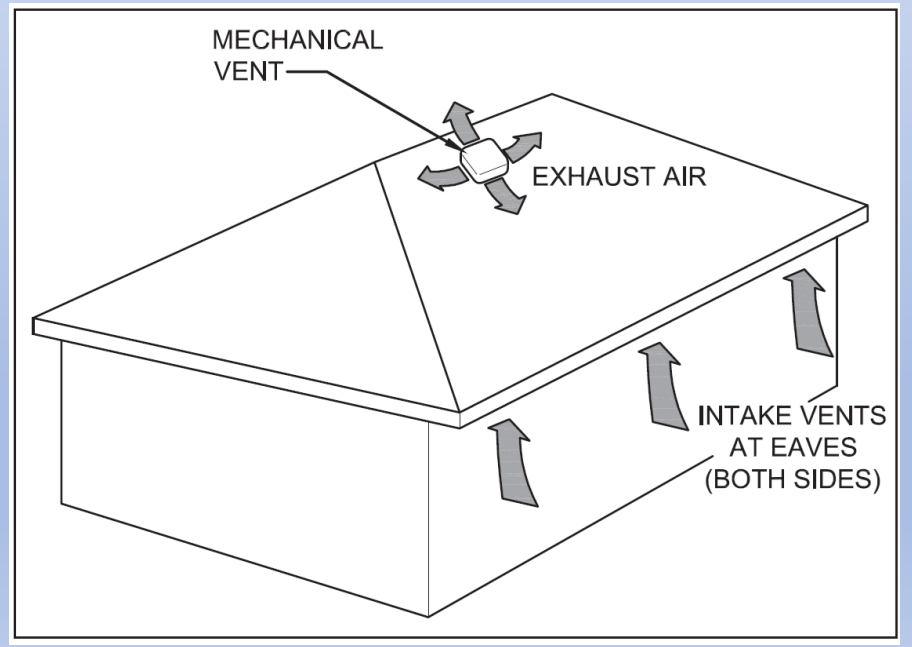
Mechanical Ventilation

This method uses mechanically forced air to ventilate.

Similar to static attic ventilation, it is important to provide for adequate amounts of intake air.

Often used with hip roofs…





Images taken from The NRCA Roofing Manual: Architectural Metal Flashing and Condensation and Air Leakage Control

IRC Requirements for Vent Area

Section R806.2

R806.2 Minimum vent area. The minimum net free ventilating area shall be $^{1}/_{150}$ of the area of the vented space.

IRC requires 1:150, but there are exceptions…and they vary by edition…

Here's when you can use 1:300

IRC 2012
IRC 2015

Exception: The minimum net free ventilation area shall be $^{1}/_{300}$ of the vented space provided one or more of the following conditions are met:

1. In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
2. Not less than 40 percent and not more than 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.

IRC 2018
IRC 2021
IRC 2024

Exception: The net free cross-ventilation area shall be permitted to be reduced to $^{1}/_{300}$ provided both of the following conditions are met:

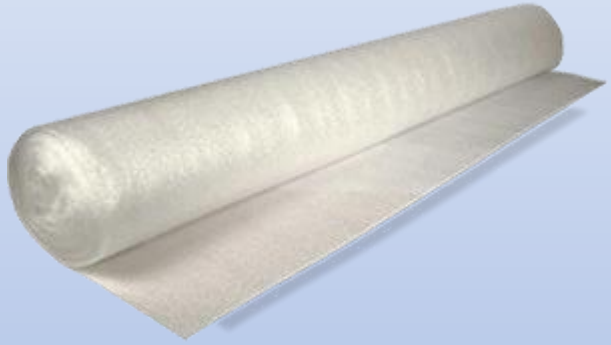
1. In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.
2. At least 40 percent and not more than 50 percent of the required venting area is provided by ventilators located in the upper portion of the *attic* or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the *ventilation* provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.

Section R806.2 – Exception 1

Vapor Retarders in Climate Zones 6, 7 & 8

On the warm-in-winter side of the ceiling

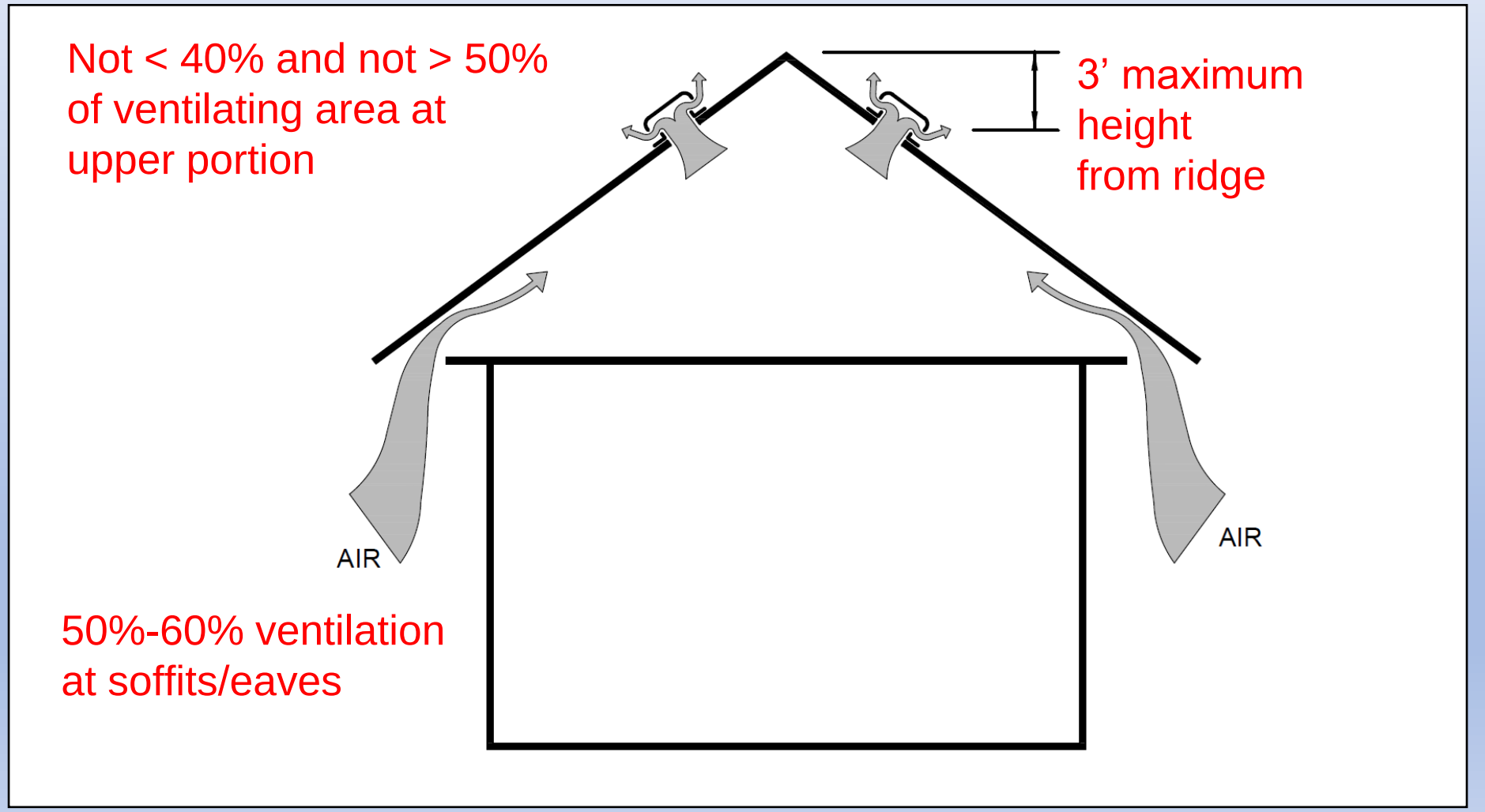
Class I:
< 0.1 perm
Polyethylene sheet (aka visqueen)



Class II:
> 0.1 perm and < 1.0 perm
Kraft-faced fiberglass batt insulation

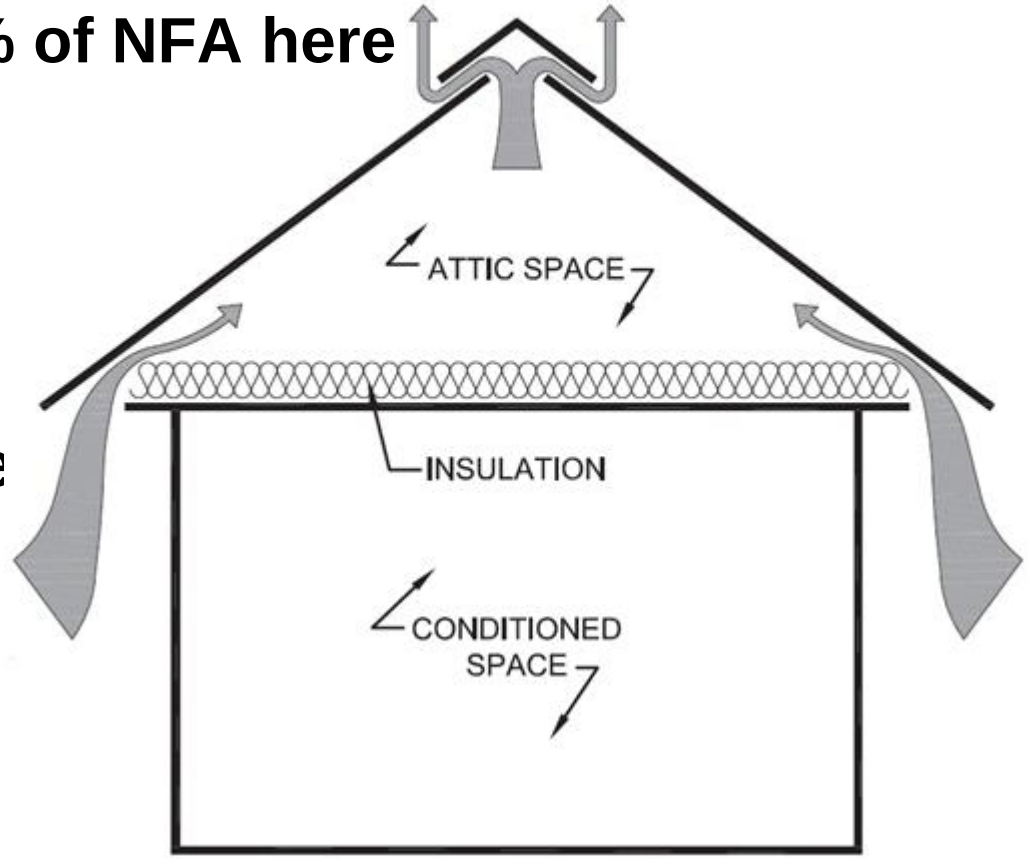
Section R806.2 – Exception 2

Vent Requirements



Another way to put it…

50% of NFA here



25% of NFA here

25% of NFA here

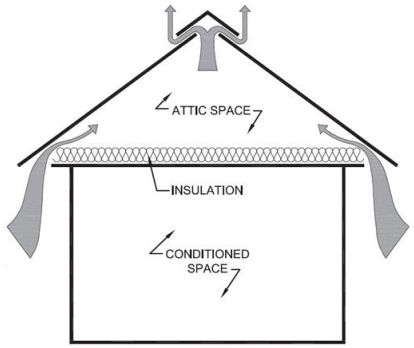
So, here's when you can use 1:300 in the "Chicagoland" area…

Assuming we are just following 2018 IRC and later…

IRC 2018
IRC 2021
IRC 2024

Climate Zones 4 & 5

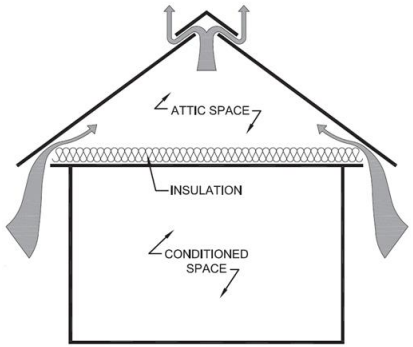
Balanced system



← Only need

Climate Zone 6

Balanced system



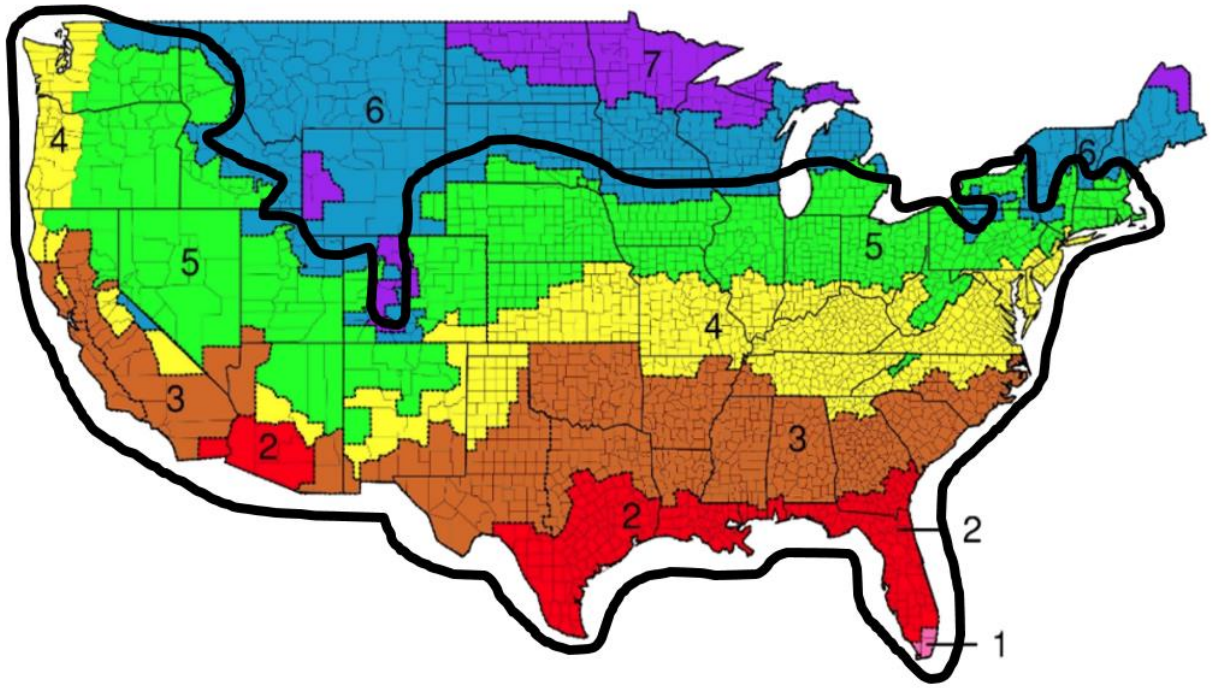
← Need both →

Vapor Retarders

IN OTHER WORDS, if you are in Climate Zones 4 & 5…

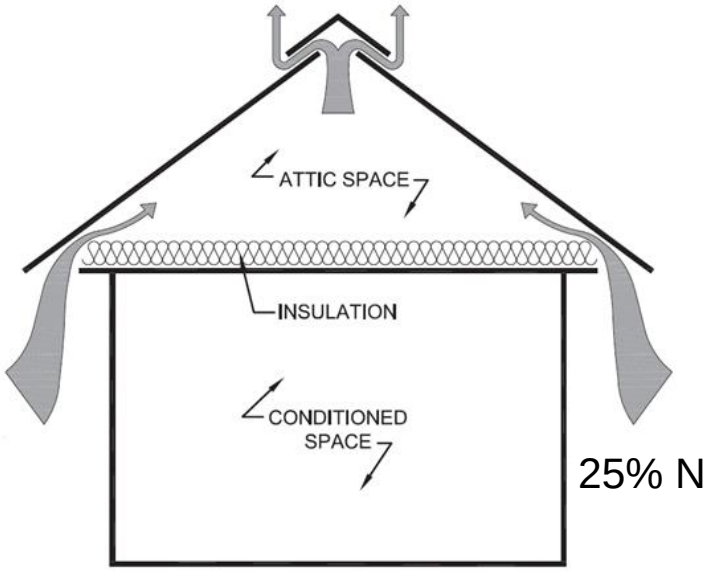
You can use 1:300, as long as you install a balanced system.

No vapor retarder is needed.



Balanced system

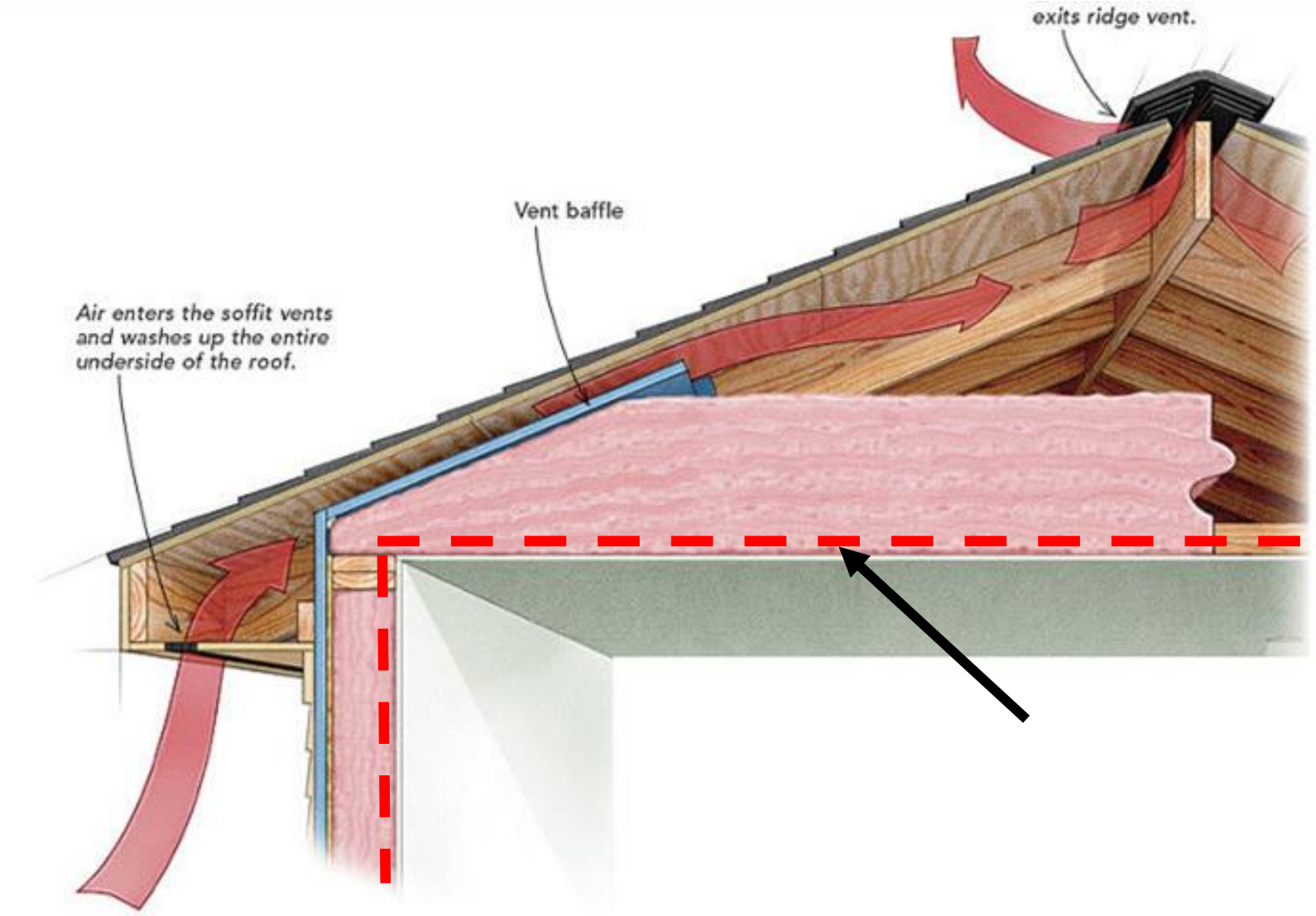
50% NFA



25%

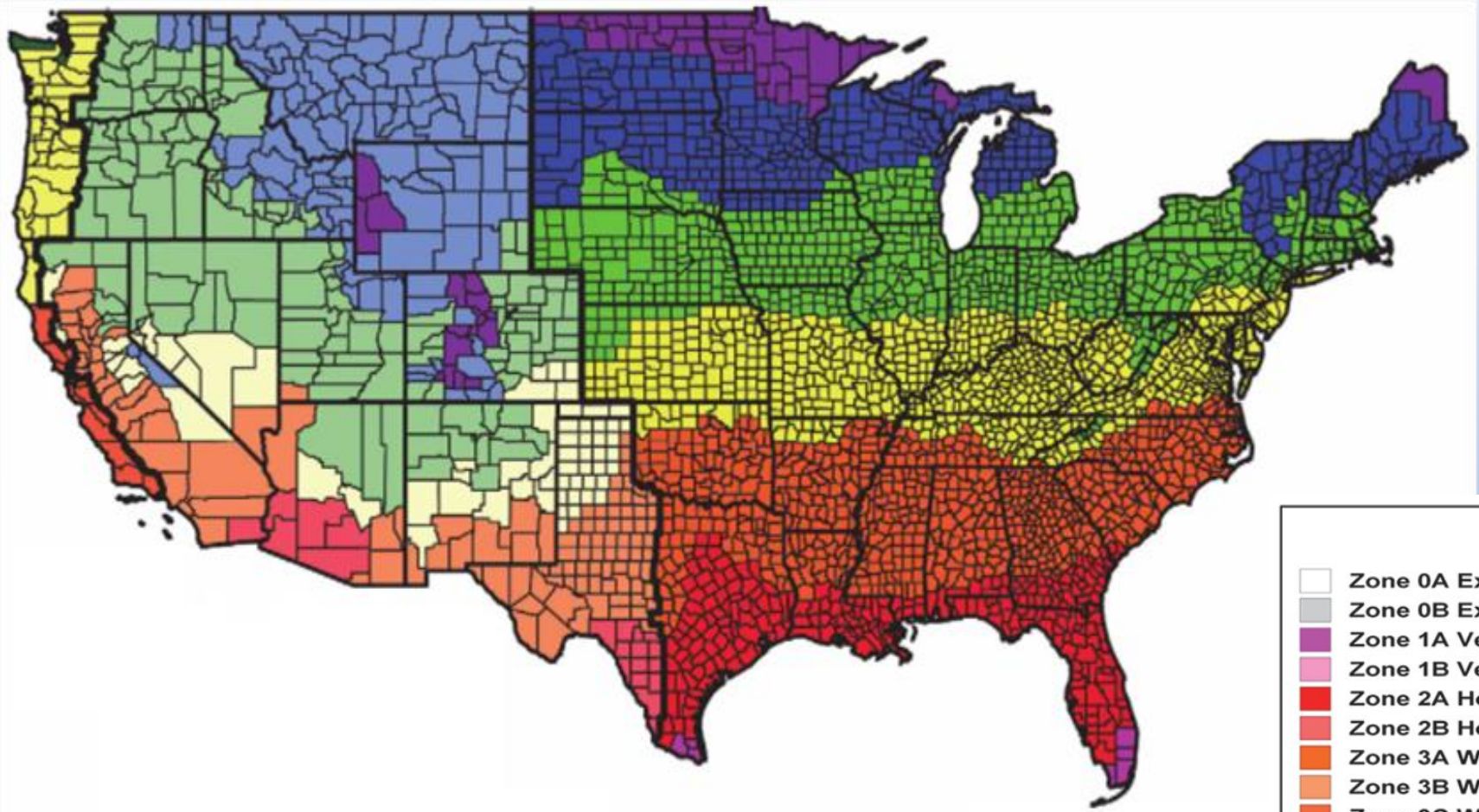
25% NFA

In Climate Zone 6



ed a vapor retarder under
021 IRC and 2024 IRC

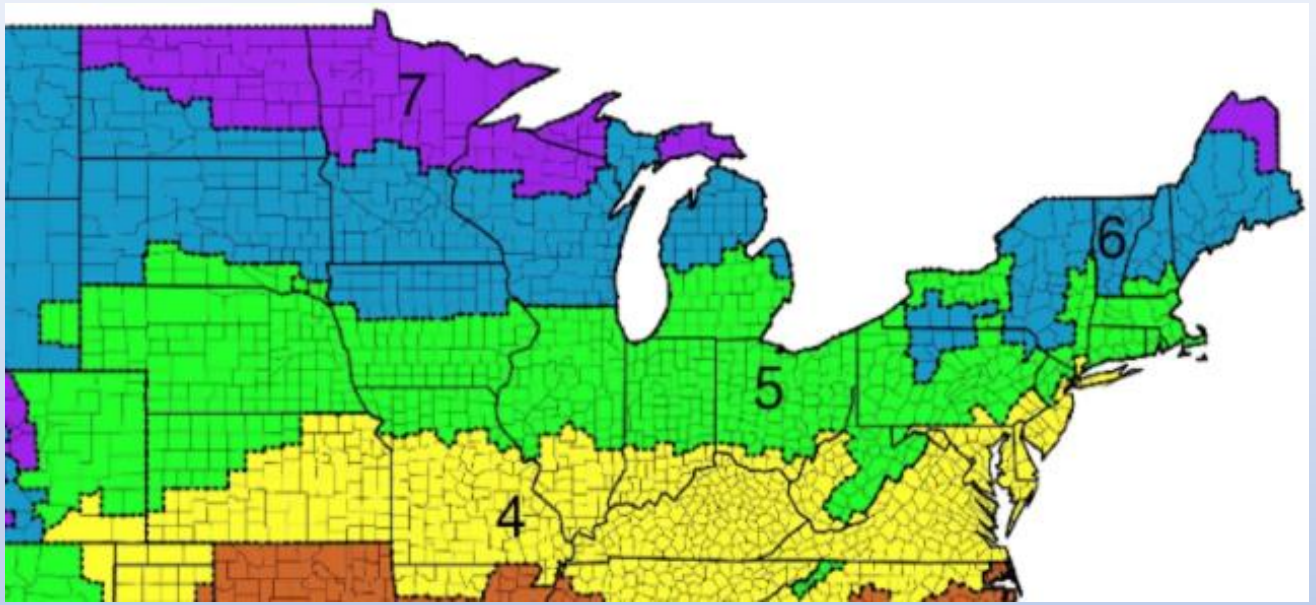
FYI, the map changes in the 2021 Edition!



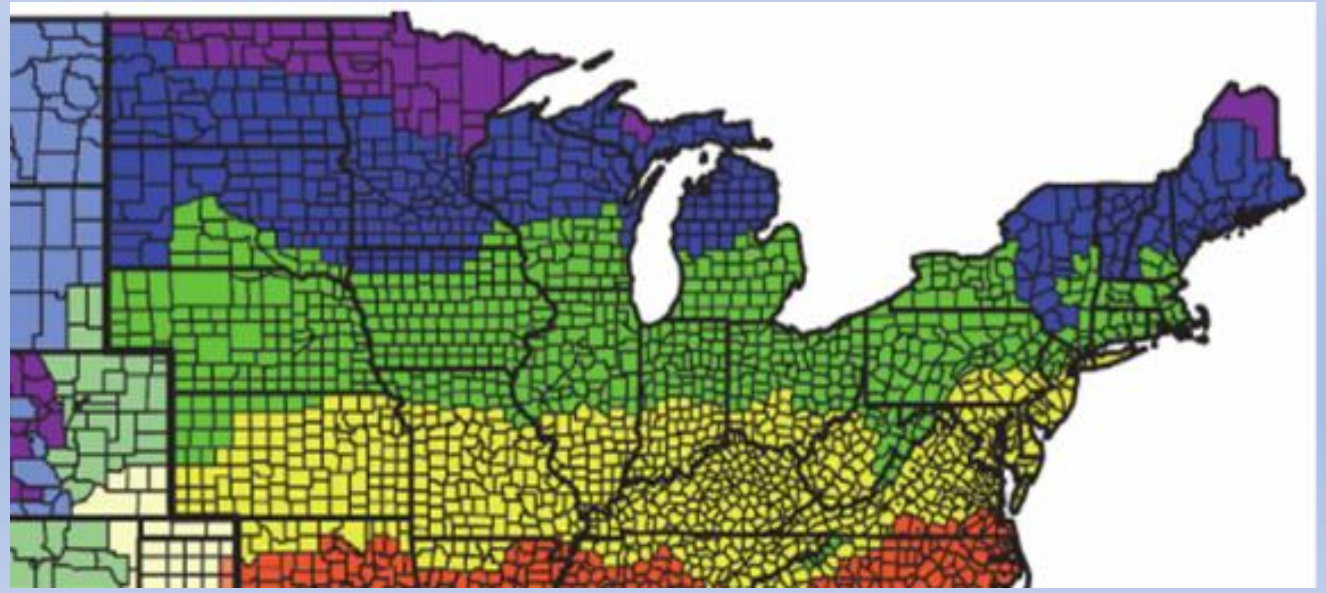
- Zone 0A Extremely Hot Humid
- Zone 0B Extremely Hot Dry
- Zone 1A Very Hot Humid
- Zone 1B Very Hot Dry
- Zone 2A Hot Humid
- Zone 2B Hot Dry
- Zone 3A Warm Humid
- Zone 3B Warm Dry
- Zone 3C Warm Marine
- Zone 4A Mixed Humid
- Zone 4B MIxed Dry
- Zone 4C Mixed Marine
- Zone 5A Cool Humid
- Zone 5B Cool Dry
- Zone 5C Cool Marine
- Zone 6A Cold Humid
- Zone 6B Cold Dry
- Zone 7 Very Cold
- Zone 8 Subarctic/Arctic

Look at Climate Zones 5, 6 & 7

2018 IECC
And earlier editions



2021 IECC
2024 IECC



Net Free Area Calculations

aka, “NFA” or “NFVA”

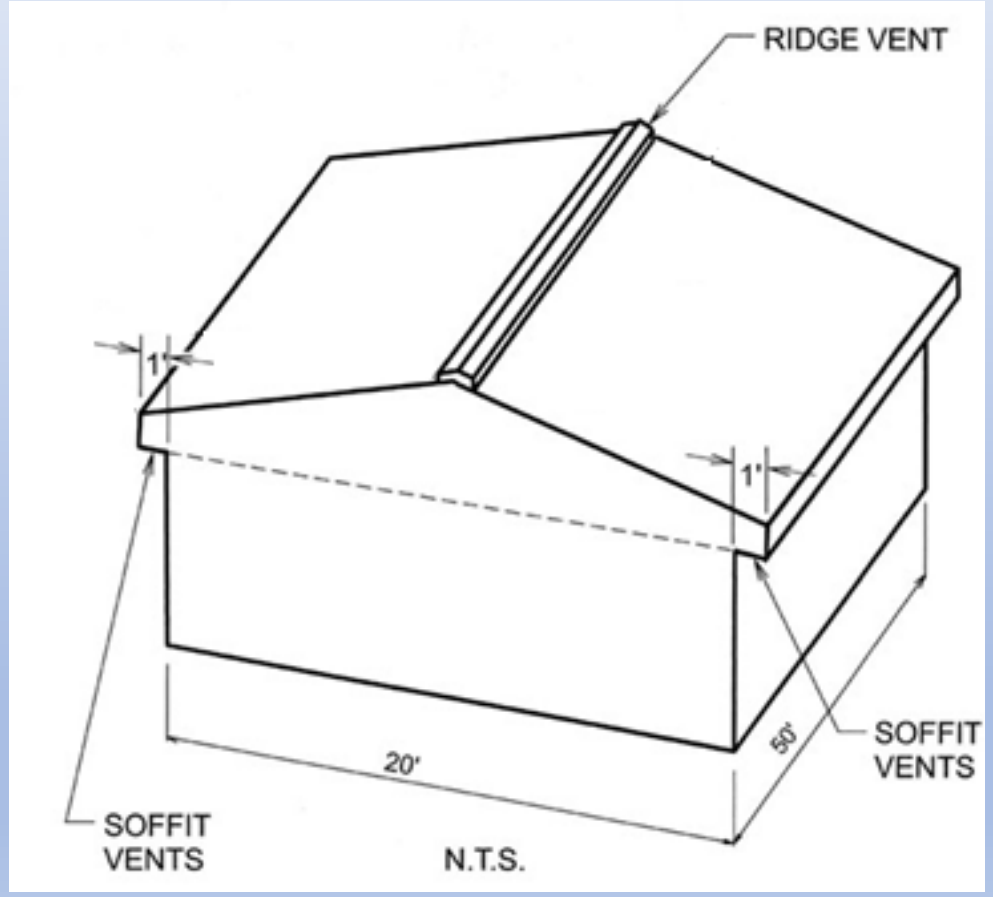
Attic floor area = 20 ft x 50 ft = 1,000 ft^2

Required NVA = attic floor area x 1/300
= 1,000 ft^2/300
= 3.33 ft^2

Convert feet into inches: 3.33 ft^2 x 144 in^2/ft^2 = 480 in^2

Ridge NFA (50%) = 480 in^2 x 0.5 = <u>240 in^2</u>

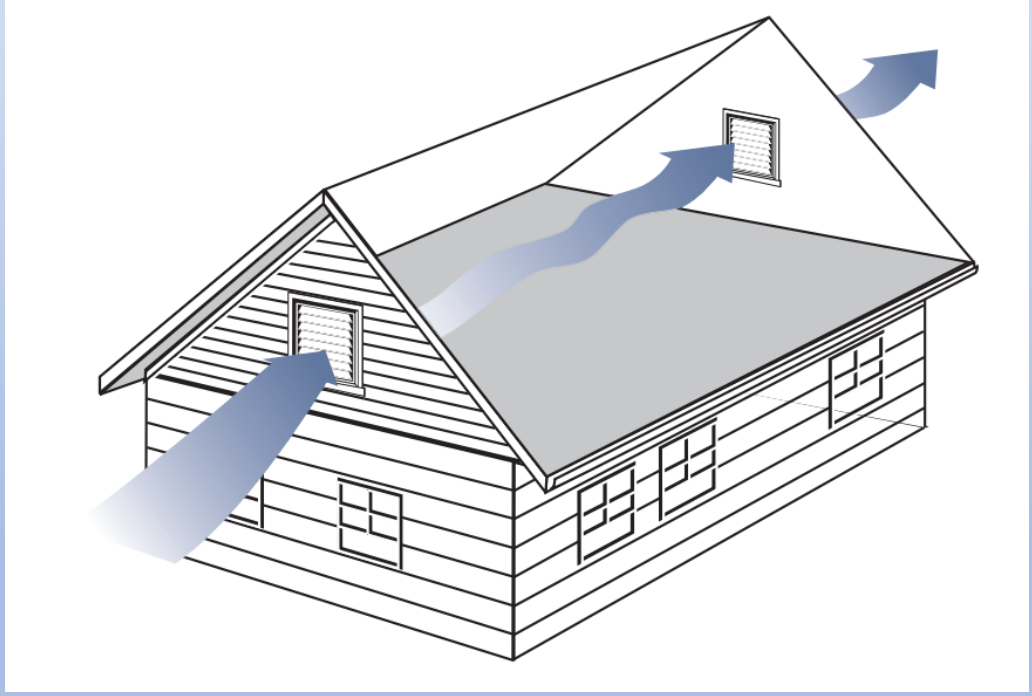
Each soffit NFA (25%) = 480 in^2 x 0.25 = <u>120 in^2</u>

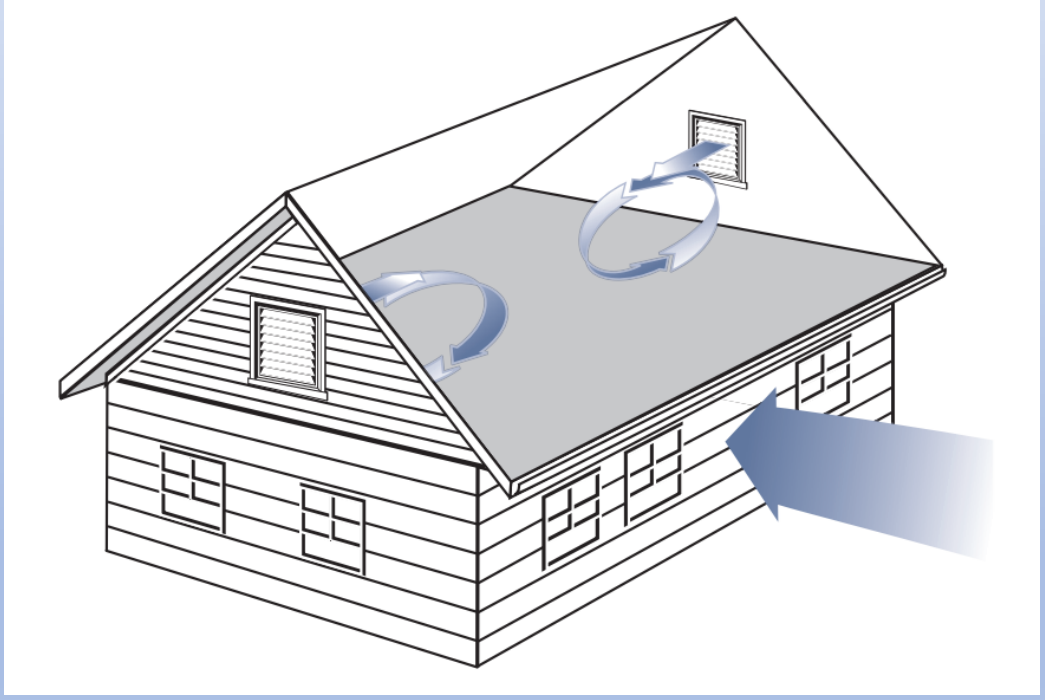


Wait, what about 1:150?

Gables Vents

Gable vents, when used alone, are not a “balanced system”
so that’s a situation when you use 1:150





Images taken from Air Vent, Inc.

However

Check the NFA for products, the right sizes often aren’t used!

Same house as before

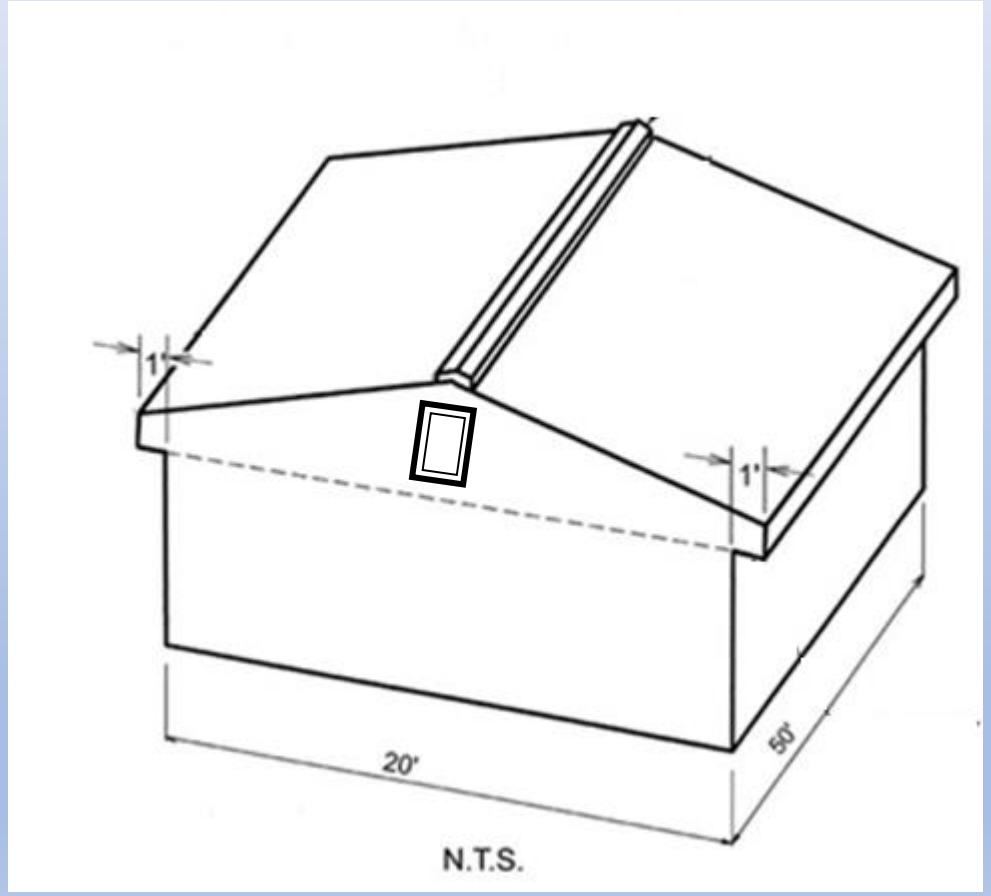
Attic floor area = 20 ft x 50 ft = 1,000 ft^2

Required NVA = attic floor area x 1/150
= 1,000 ft^2/150
= 6.67 ft^2

Convert feet into inches: 6.67 ft^2 x 144 in^2/ft^2 = 960 in^2

For two gables:

Each Gable NFA (50%) = 960 in^2 x 0.5 = <u>480 in^2</u>



Options from one manufacturer

Remember, this wasn't a big house…

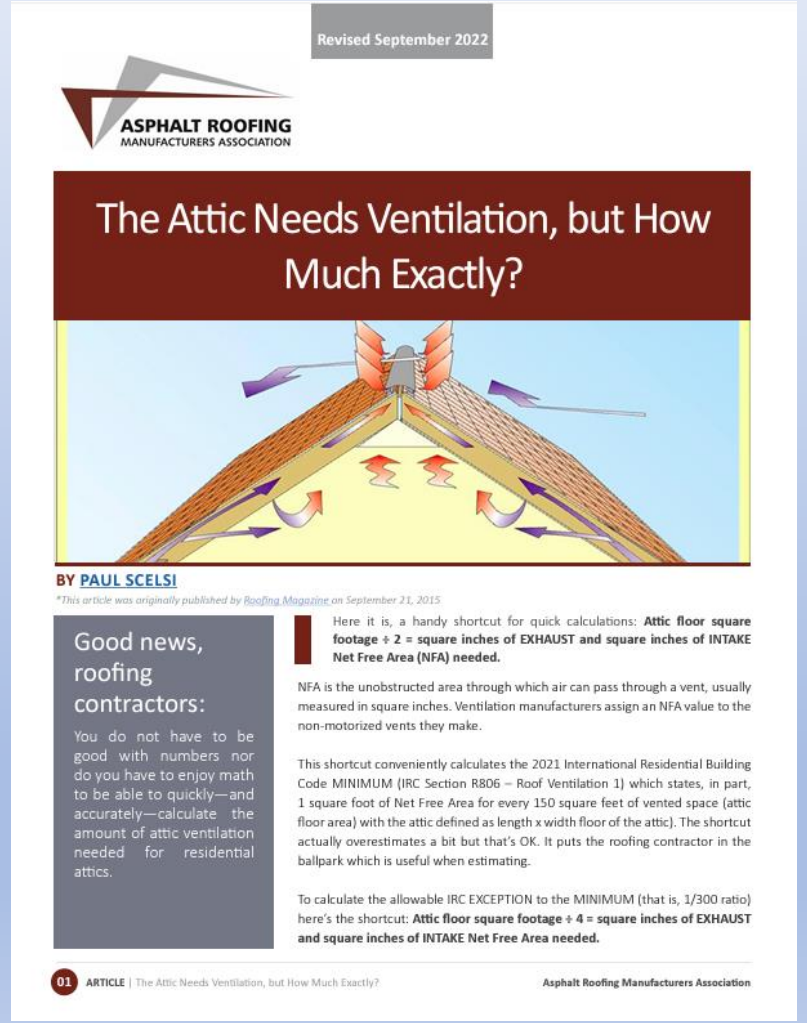
Shape	Overall Size	Net Free Area (in^2)
Square	36" x 36"	585
Triangular	18" x 17"	512
Octagonal	36" x 36"	482
Round	48"	775


HELPFUL
TIPS

Say you aren’t a math nerd…

www.asphaltroofing.org/the-attic-needs-ventilation-but-how-much-exactly/

ARMA is here to help!



Revised September 2022

ASPHALT ROOFING MANUFACTURERS ASSOCIATION

The Attic Needs Ventilation, but How Much Exactly?

BY PAUL SCELSI

*This article was originally published by Roofing Magazine on September 21, 2015

Good news, roofing contractors:

You do not have to be good with numbers nor do you have to enjoy math to be able to quickly—and accurately—calculate the amount of attic ventilation needed for residential attics.

Here it is, a handy shortcut for quick calculations: **Attic floor square footage ÷ 2 = square inches of EXHAUST and square inches of INTAKE Net Free Area (NFA) needed.**

NFA is the unobstructed area through which air can pass through a vent, usually measured in square inches. Ventilation manufacturers assign an NFA value to the non-motorized vents they make.

This shortcut conveniently calculates the 2021 International Residential Building Code MINIMUM (IRC Section R806 – Roof Ventilation 1) which states, in part, 1 square foot of Net Free Area for every 150 square feet of vented space (attic floor area) with the attic defined as length x width floor of the attic). The shortcut actually overestimates a bit but that’s OK. It puts the roofing contractor in the ballpark which is useful when estimating.

To calculate the allowable IRC EXCEPTION to the MINIMUM (that is, 1/300 ratio) here’s the shortcut: **Attic floor square footage ÷ 4 = square inches of EXHAUST and square inches of INTAKE Net Free Area needed.**

Here’s a shortcut for the 1/150

Attic square footage ÷ 2 =

square inches of NFA needed for EXHAUST and INTAKE

Say a house has an attic with 2,200 sq. ft.

2,200 ÷ 2 = 1,100 square inches of EXHAUST net free area needed

2,200 ÷ 2 = 1,100 square inches of INTAKE net free area needed

Here’s a shortcut for the 1/300

Attic square footage ÷ 4 =

square inches of NFA needed for EXHAUST and INTAKE

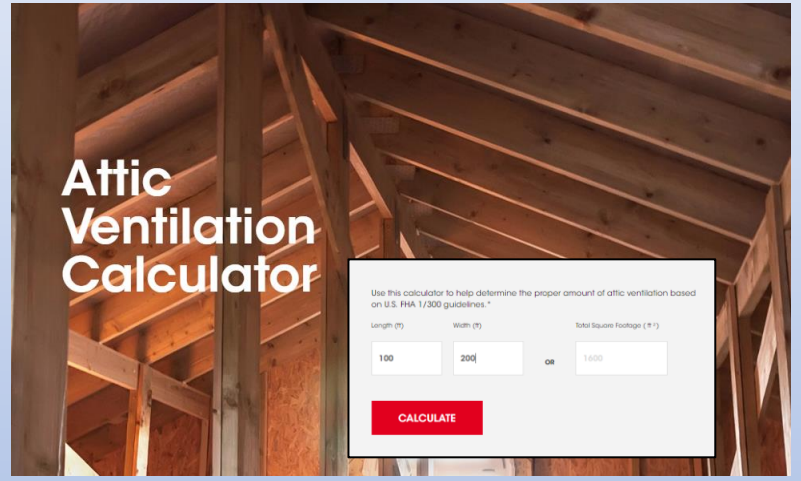
Say a house has an attic with 2,200 sq. ft.

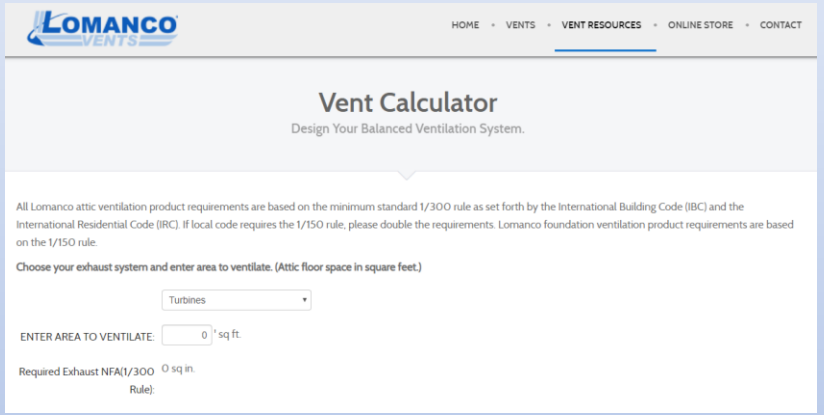
2,200 ÷ 4 = 550 square inches of EXHAUST net free area needed

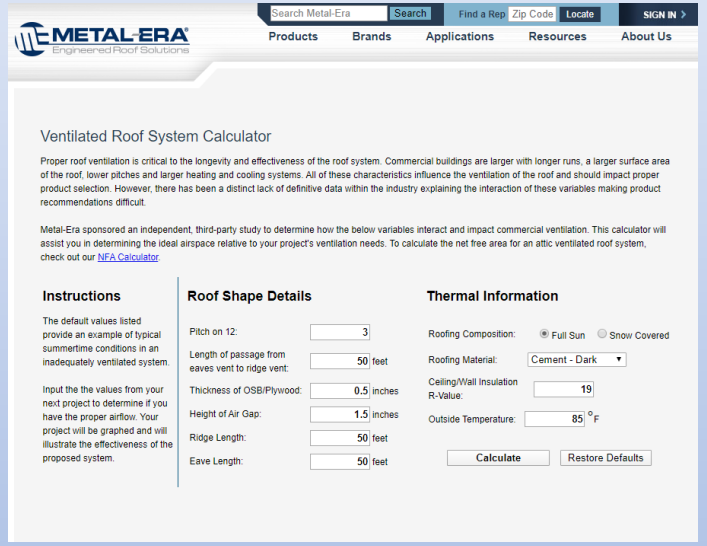
2,200 ÷ 4 = 550 square inches of INTAKE net free area needed

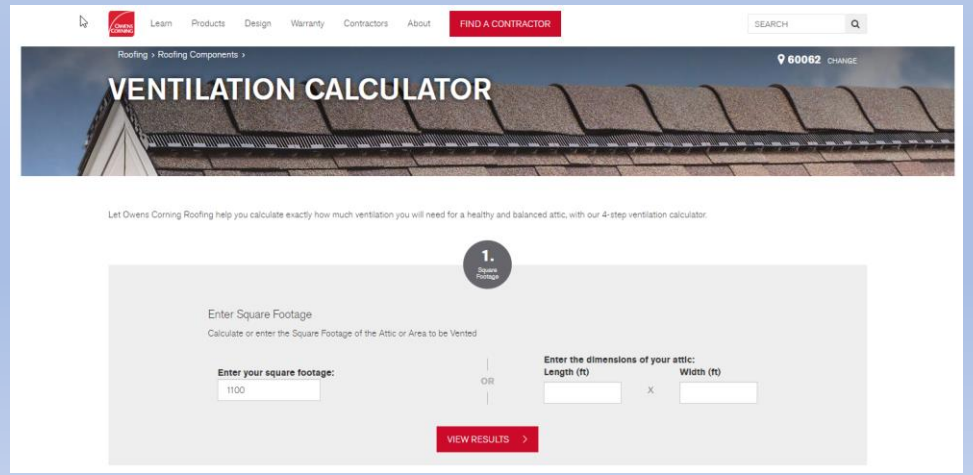
Still Don’t Want To Do Any Math?

Manufacturers offer online attic ventilation calculators









Bedtime reading...

CRCA TODAY Article

The ABCs of Attic Ventilation

By Joan Crowe, AIA

Joan Crowe, AIA

Many people do not realize that attic ventilation has been a code requirement since 1948. It was included in the very first edition of the Building Officials Conference of America's (BOCA's) model building code. Of course, attic ventilation is still addressed in model building codes today. But when you consider that attic ventilation has been required for over seven decades, it continues to be one of the most misunderstood concepts in the roofing industry.

The intent of this article is to provide a better understanding of attic ventilation by starting with the basic. It will cover why you need ventilation, the most common types of ventilation, the building code requirements, and common ventilation-related issues.

A Is for Attic Ventilation

Attic ventilation serves two main functions, lower attic temperature and remove excess moisture from the attic space.

Lowering the temperature in the attic can help reduce:

- air-conditioning energy costs during summer months.
- roof deck temperature, which assists in optimizing a roof covering's service life (such as asphalt shingles), and minimize ice damming.

Removing excess moisture will help reduce the possibility for mold and mildew growth and lessen the potential for wood rot.

B Is for Balance

There are two basic methods used to ventilate attics: static and mechanical. The most common method is the static method. This method relies on the fact that warm air rises. In physics' terminology, this is called "convection." Simply put, air flows through the attic space naturally, without the use of mechanical means.

Outside air enters the attic space through soffit or eave vents, rises through the attic space, and exits through vents that are positioned at or near the top. For this method to be most effective, approximately equal amounts of ventilation should be placed at the soffits or eave level, and at or near the top of the attic space. This is referred to as a "balanced system." See Figure 1.

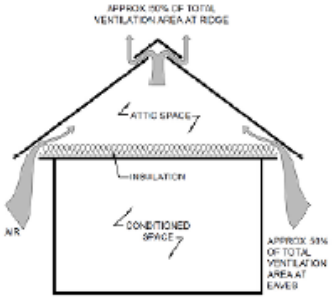


Figure 1: A balanced system (Figure courtesy of National Roofing Contractors Association)

The mechanical method uses power vents to generate air movement. Similar to the static method, adequate amounts of intake air into the attic space should be provided. See Figure 2.

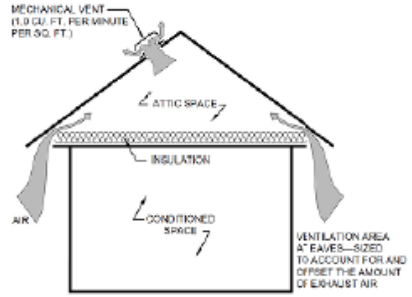


Figure 2: A mechanical ventilation system (Figure courtesy of National Roofing Contractors Association)

Shingle Stuff

ARMA Shipment Reports

Shipments (squares)	Q3 2024	Q3 2023	% Change	YTD 2024	YTD 2023	% Change
Shingles – U.S. (including individual shingles)	44,895,076	45,717,847	-1.8%	134,681,353	131,259,101	2.6%

Shipments (squares)	Q3 2023	Q3 2022	% Change	YTD 2023	YTD 2022	% Change
Shingles – U.S. (including individual shingles)	45,717,847	39,434,939	15.9%	131,259,101	127,883,943	2.6%

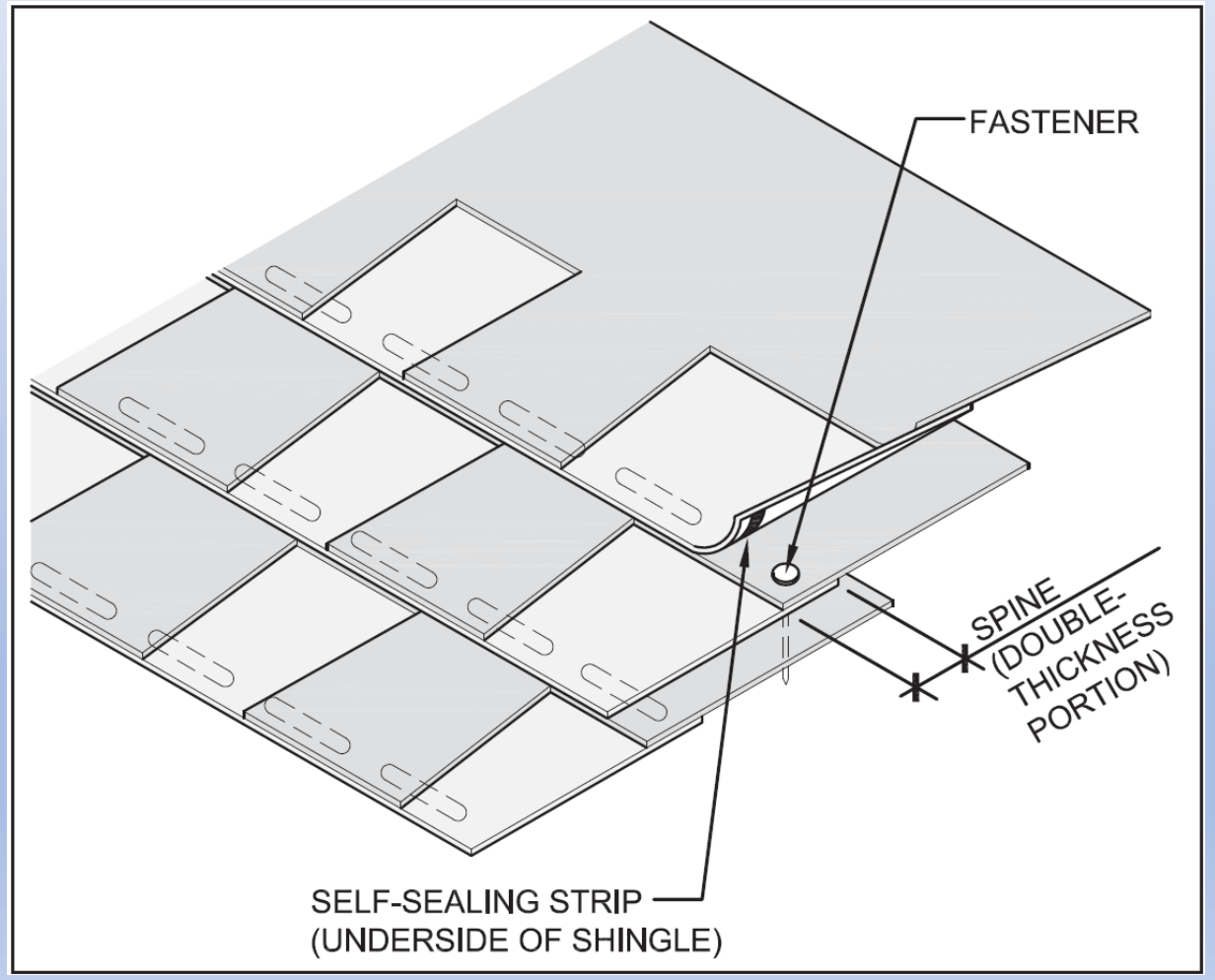
Shipments (squares)	Q3 2022	Q3 2021	% Change	YTD 2022	YTD 2021	% Change
Shingles – U.S. (including individual shingles)	39,434,939	42,061,550	-6.2%	127,883,943	132,173,509	-3.2%

Shipments (squares)	Q3 2021	Q3 2020	% Change	YTD 2021	YTD 2020	% Change
Shingles – U.S. (including individual shingles)	42,061,550	46,874,478	-10.3%	132,173,509	120,207,122	10.0%

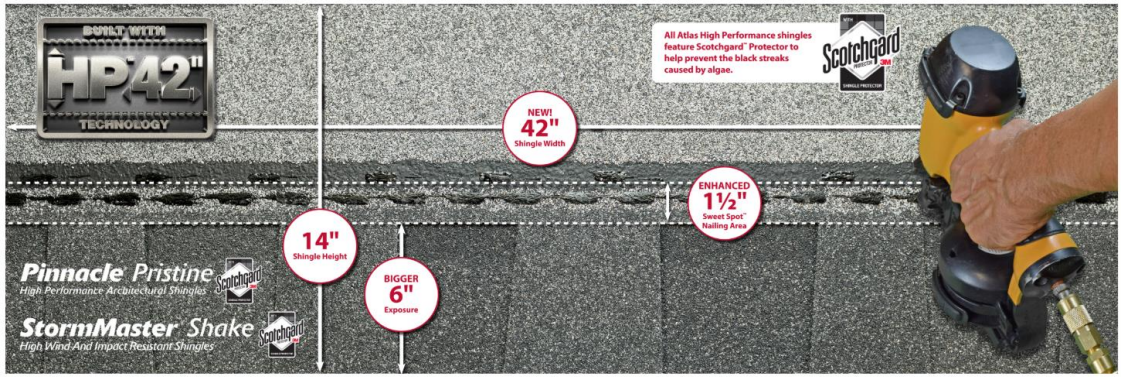
Fastener Placement

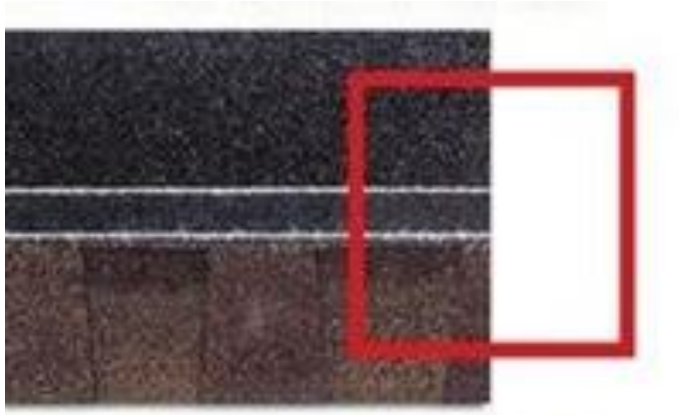
Laminate/Architectural Shingles

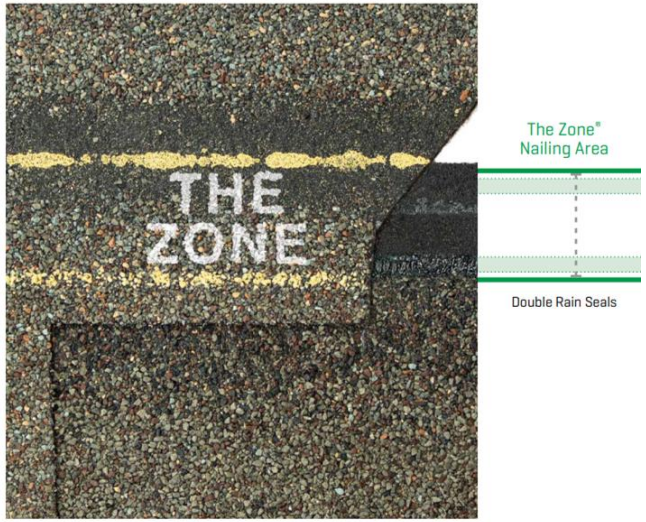
For years, NRCA has been of the opinion that too much emphasis is sometimes placed on manufacturers' exact fastener placement locations.

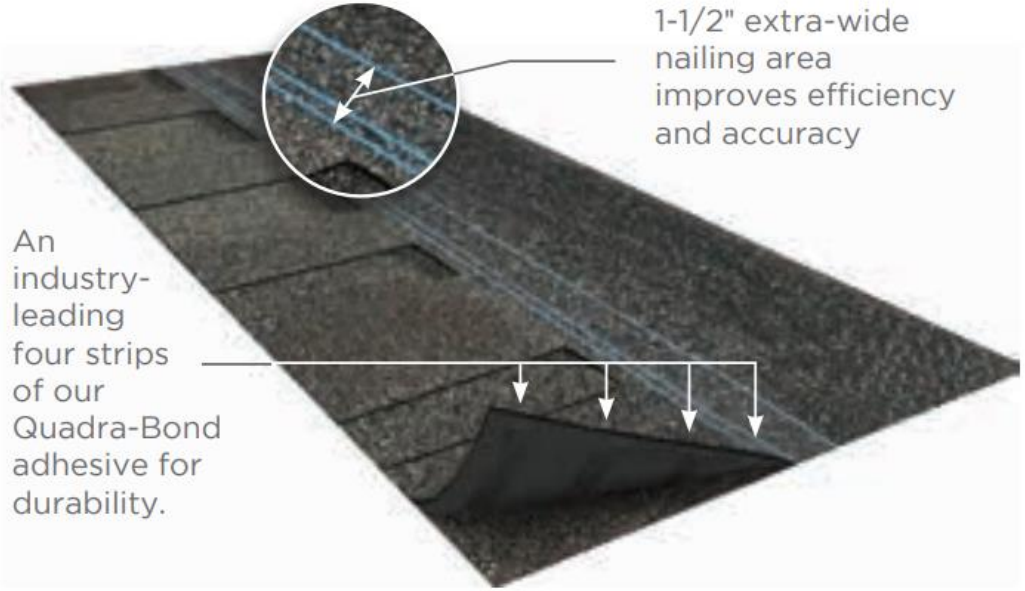


So nail zones came along...





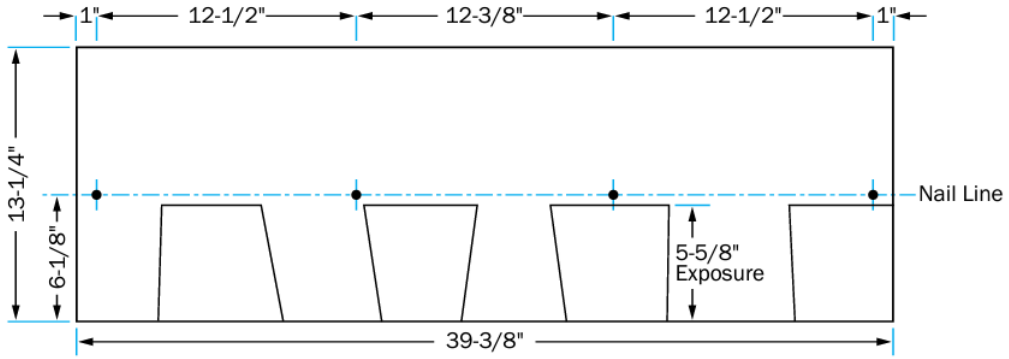


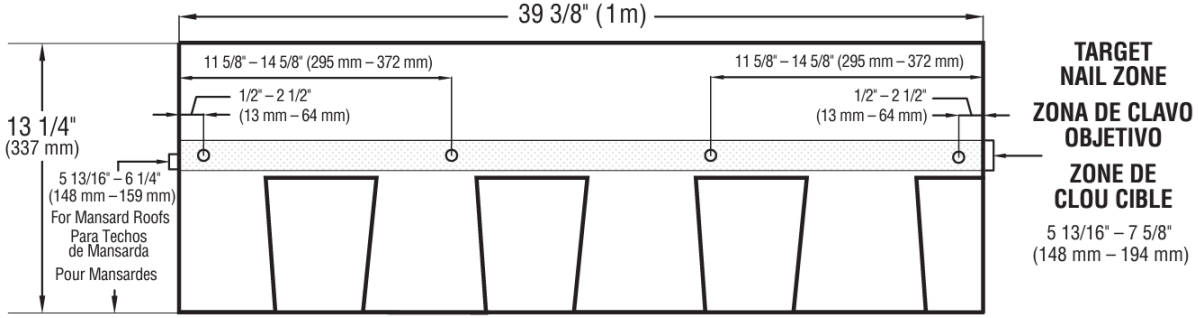


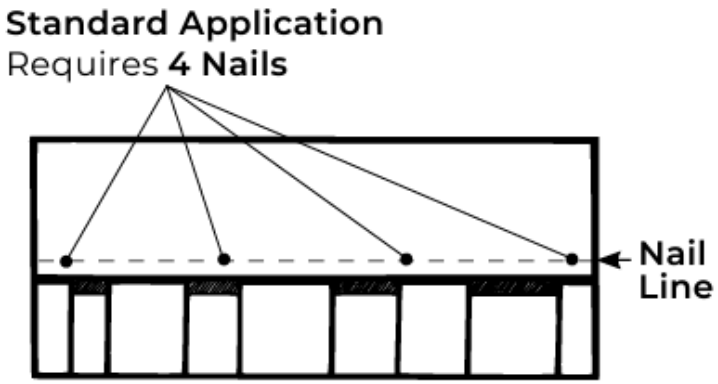
Nailing Zones

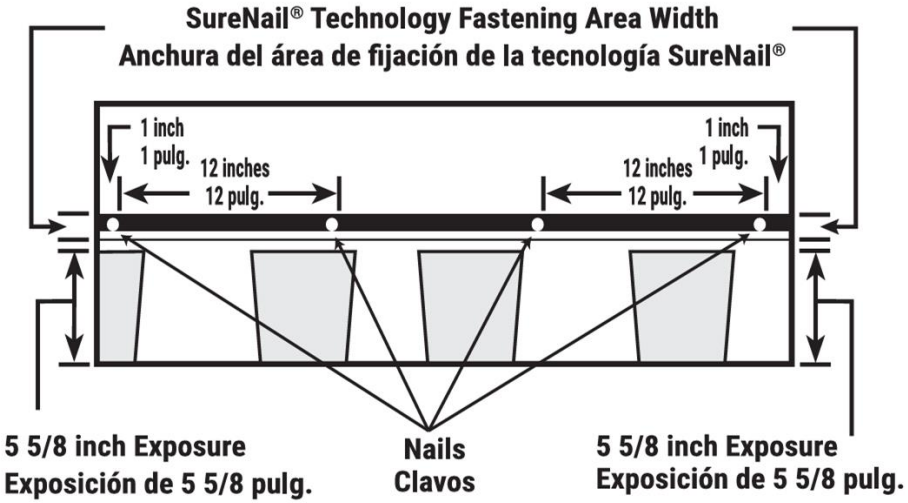
For the “Most Popular” Architectural/Laminates

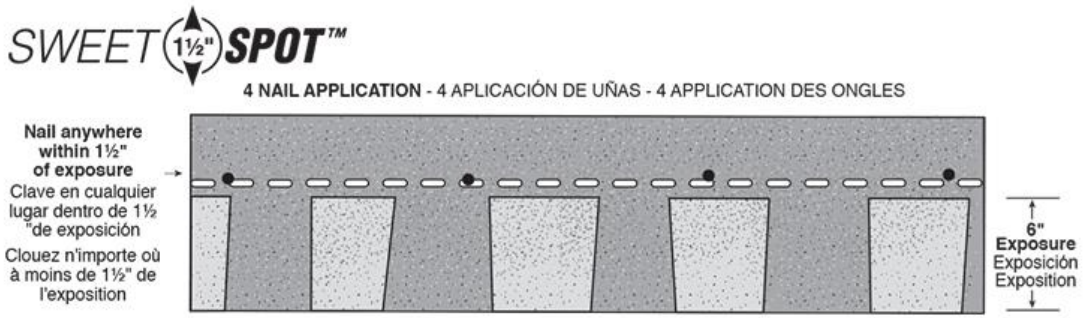
Manufacturer	Nail Zone Width	Comments
Atlas	1½”	“Sweet Spot” (but zone is not really shown)
CertainTeed	1½”	“NailTrak”
GAF	$1^{13}/_{16}$”	“StrikeZone”
Malarkey	$1^{5}/_{16}$”	“The Zone”
Owens Corning	Think it’s ¾”?	Uses a “SureNail” fabric strip
IKO	-	Uses a nail line
Tamko	-	Uses a nail line

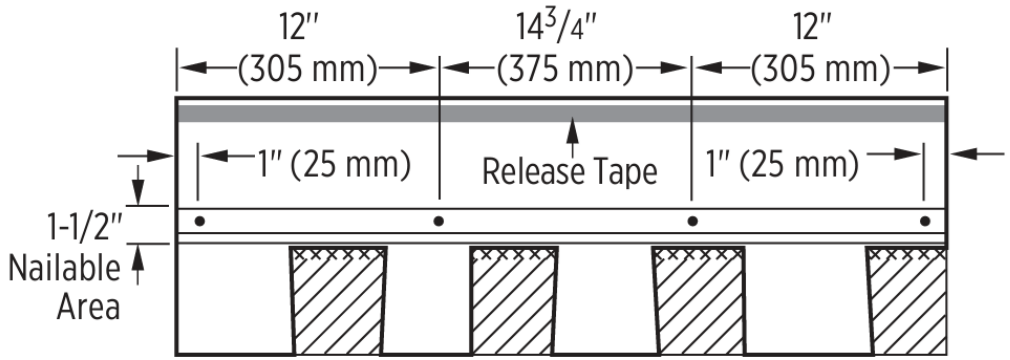

1"
12-1/2"
12-3/8"
12-1/2"
1"
13-1/4"
6-1/8"
Nail Line
5-5/8"
Exposure
39-3/8"


39 3/8" (1m)
11 5/8" – 14 5/8" (295 mm – 372 mm)
11 5/8" – 14 5/8" (295 mm – 372 mm)
1/2" – 2 1/2"
(13 mm – 64 mm)
1/2" – 2 1/2"
(13 mm – 64 mm)
13 1/4"
(337 mm)
5 13/16" – 6 1/4"
(148 mm – 159 mm)
For Mansard Roofs
Para Techos de Mansarda
Pour Mansardes
TARGET NAIL ZONE
ZONA DE CLAVO OBJETIVO
ZONE DE CLOU CIBLE
5 13/16" – 7 5/8"
(148 mm – 194 mm)


Standard Application
Requires 4 Nails
Nail Line

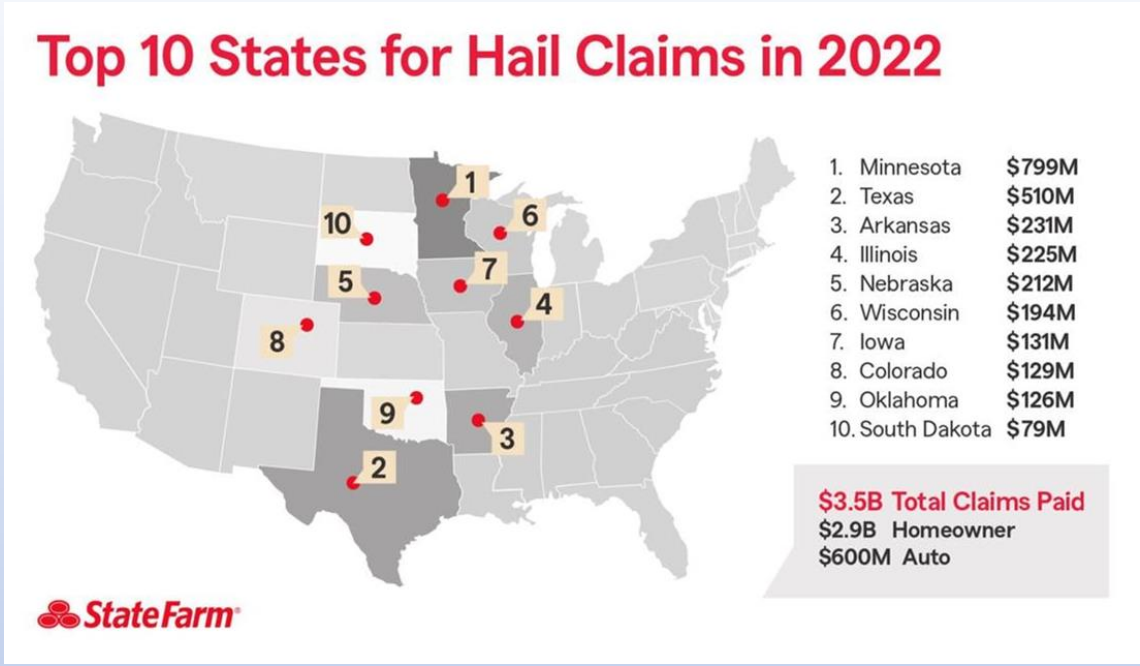

SureNail® Technology Fastening Area Width
Anchura del área de fijación de la tecnología SureNail®
1 inch
1 pulg.
12 inches
12 pulg.
12 inches
12 pulg.
1 inch
1 pulg.
5 5/8 inch Exposure
Exposición de 5 5/8 pulg.
Nails
Clavos
5 5/8 inch Exposure
Exposición de 5 5/8 pulg.

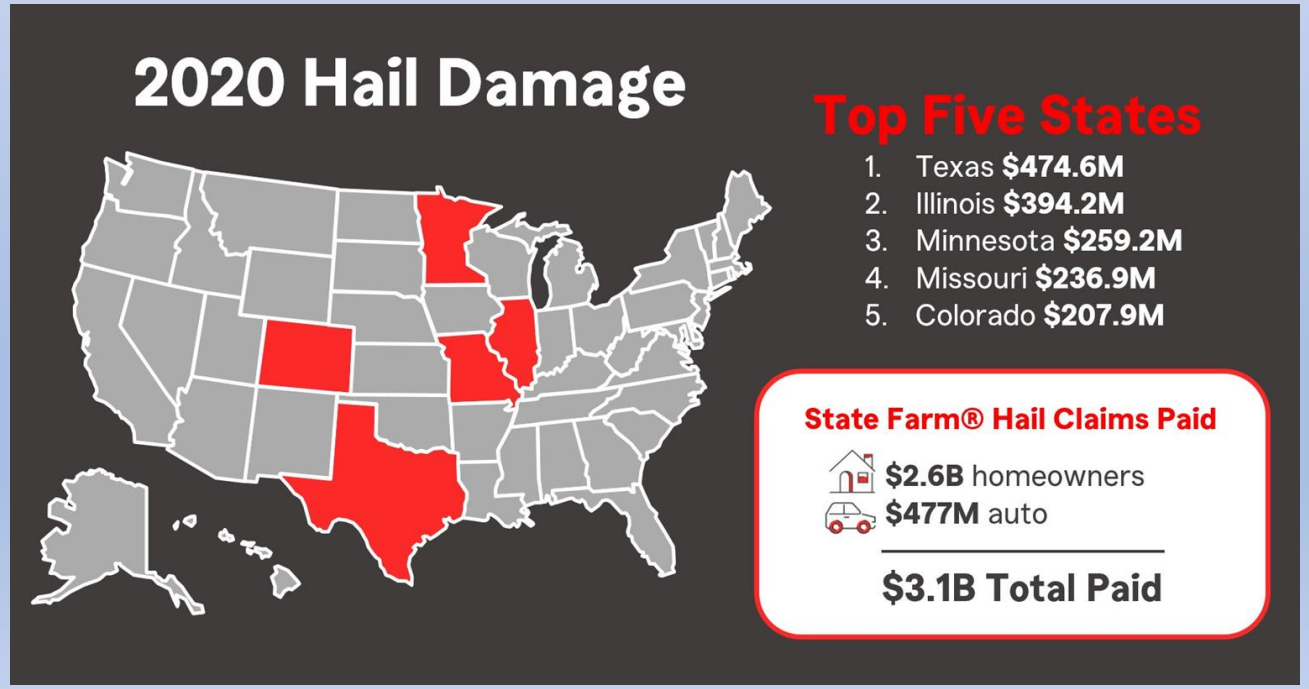

SWEET 1½" SPOT™
4 NAIL APPLICATION - 4 APLICACIÓN DE UÑAS - 4 APPLICATION DES ONGLES
Nail anywhere within 1½" of exposure
Clave en cualquier lugar dentro de 1½ "de exposición
Clouez n'importe où à moins de 1½" de l'exposition
6" Exposure
Exposición
Exposition

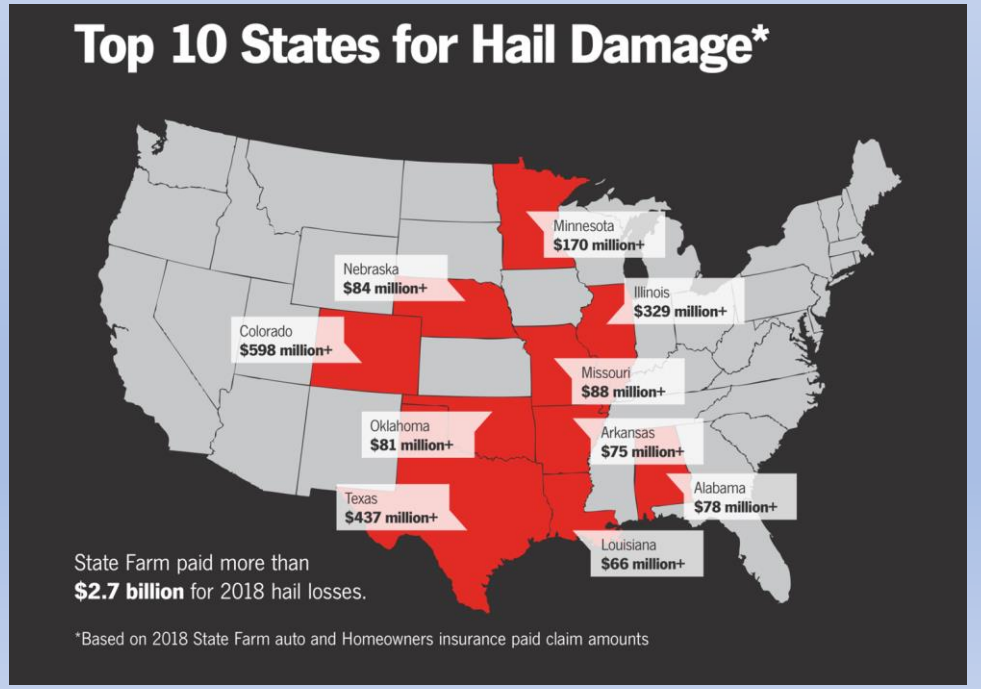

12"
(305 mm)
14 3/4"
(375 mm)
12"
(305 mm)
1" (25 mm)
Release Tape
1" (25 mm)
1-1/2"
Nailable
Area

What the Hail Illinois?

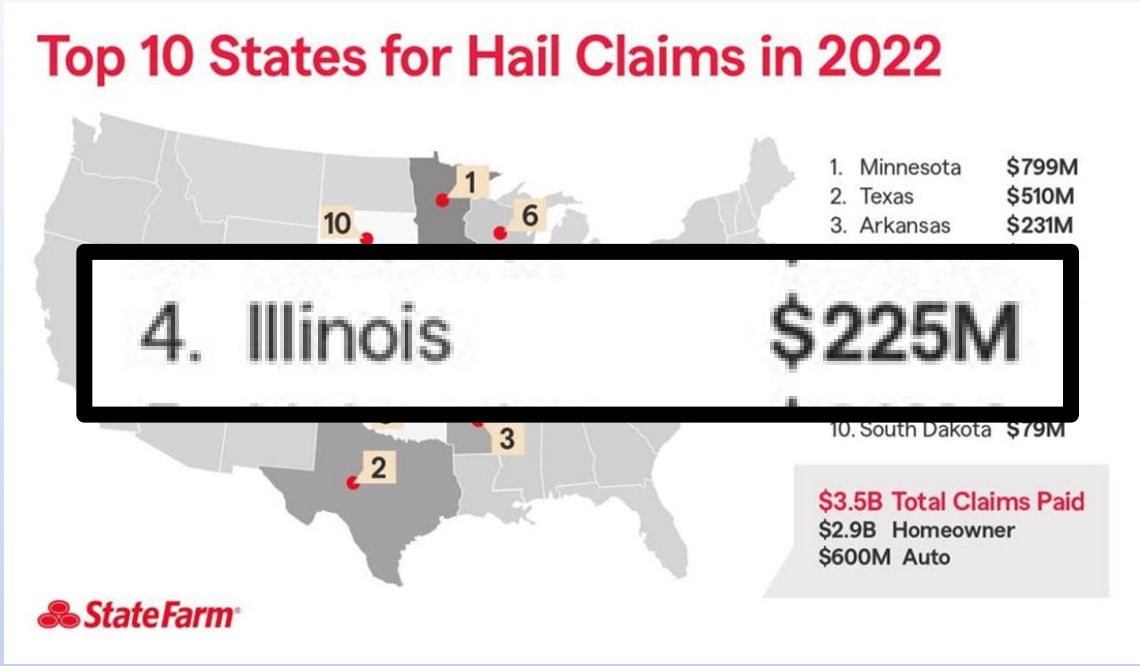
According to State Farm...

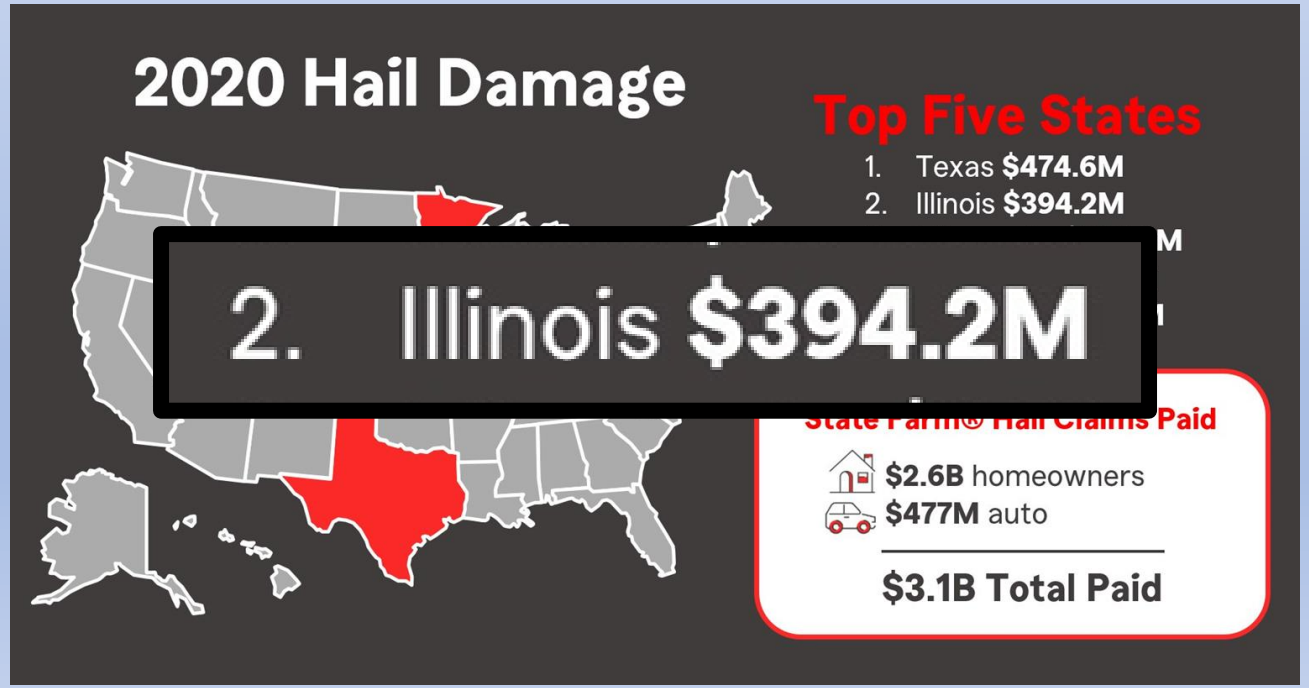


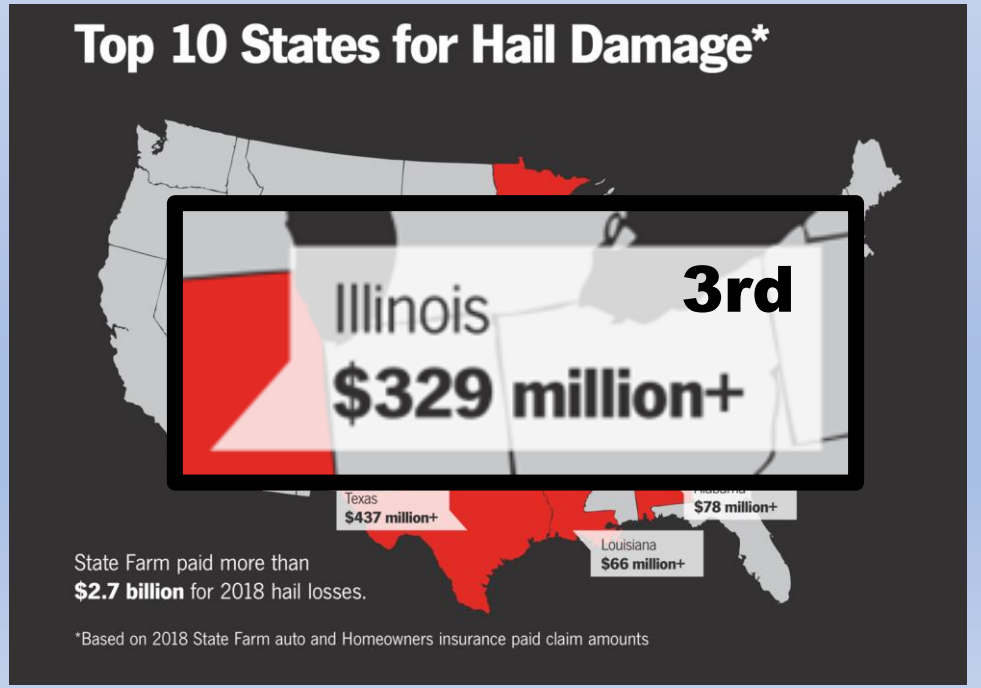




According to State Farm...







Hail resistant
(aka impact resistant)

UL 2218 - Standard for Impact Resistance of Prepared Roof Covering Materials

Height of drop	12 ft.	14 ft.	17 ft.	20 ft.	Reference
Size of item dropped	 1.25 inch diameter	 1.5 inch diameter	 1.75 inch diameter	 2 inch diameter	 Standard golf ball: 1.680 inch diameter
Class	1	2	3	4	

- **IBC/IRC does not have code requirements for hail.**
- Some insurance companies offer discounts on Class 3 or 4.
- UL 2218, “Impact Resistance of Prepared Roof Coverings”
  - Class 1, Class 2, Class 3 or Class 4
- 5 years ago, Class 4 was primarily what was available

Hail-resistant - Class 4 Products

Manufacturer	Products with UL 2218 Class 4
Tamko	StormFighter FLEX™ 4
Owens Corning	Duration FLEX, Duration Storm
Malarkey	Vista, Legacy, Windsor
IKO	Nordic
GAF	Timberline AS II, Grand Sequoia AS, Timberline UHDZ
CertainTeed	Grand Manor, Carriage House, Landmark TL, Mountain Ridge
Atlas	StormMaster Shake, Pinnacle Impact

Abundance of Class 3 Products

Manufacturer	Products with UL 2218 Class 3
Tamko	StormFighter FLEX™ 3, Titan XT
Owens Corning	Duration, Duration Designer, Duration MAX, Duration Premium, Duration Cool, Duration Cool Plus
Malarkey	Highlander
IKO	Dynasty
GAF	Timberline HDZ
CertainTeed	Landmark, Landmark Pro, Landmark Solaris, Landmark Solaris Pro, Cedar Crest
Atlas	Pinnacle Sun, Pinnacle Pristine

Class 3 shingles started to become a thang only a couple of years ago

Algae Angst

- Caused by Gloeocapsa magma, a.k.a., blue-green algae
- Spreads via airborne spores.
- While mostly an aesthetic issue, manufacturers have developed solutions.
- No consensus standard is available to evaluate or rate product performance, so contractors end up relying on product warranties.

Where is it an issue?

Figure provided by 3M Industrial Mineral Products Division, St. Paul, Minn.

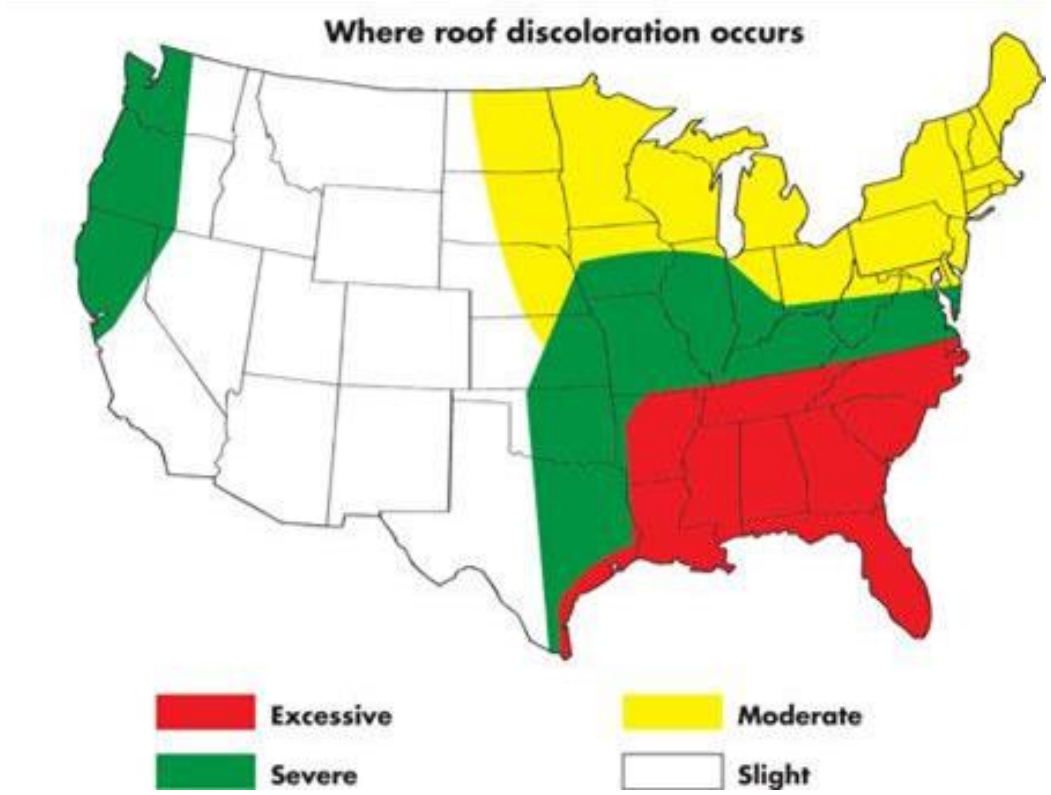


Figure provided by ISP Minerals Inc., Hagerstown, Md.

Oh, Chicagoland area

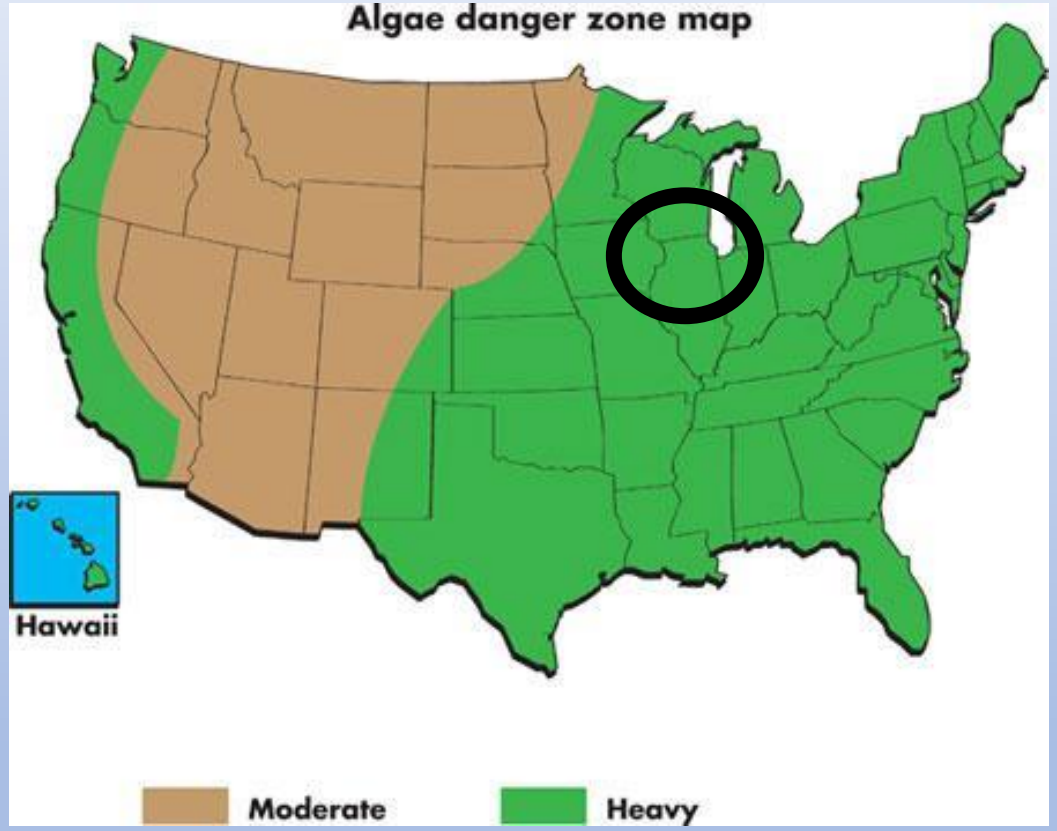


Figure provided by 3M Industrial Mineral Products Division, St. Paul, Minn.

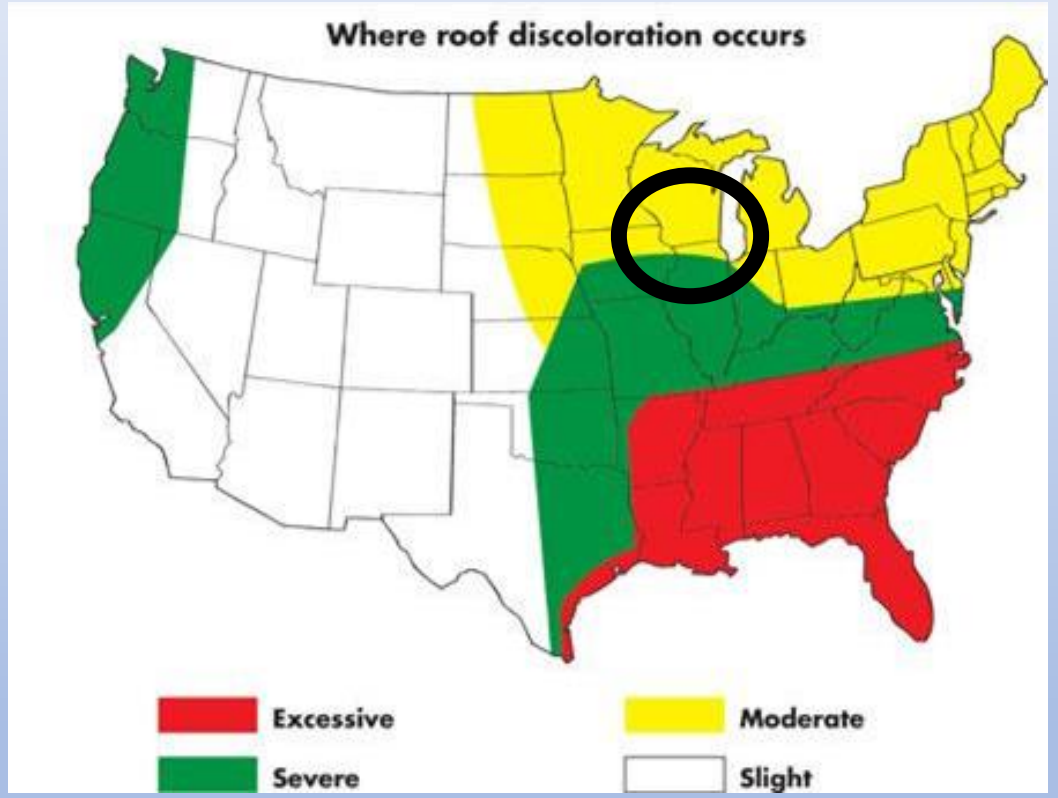


Figure provided by ISP Minerals Inc., Hagerstown, Md.

Algae Resistant

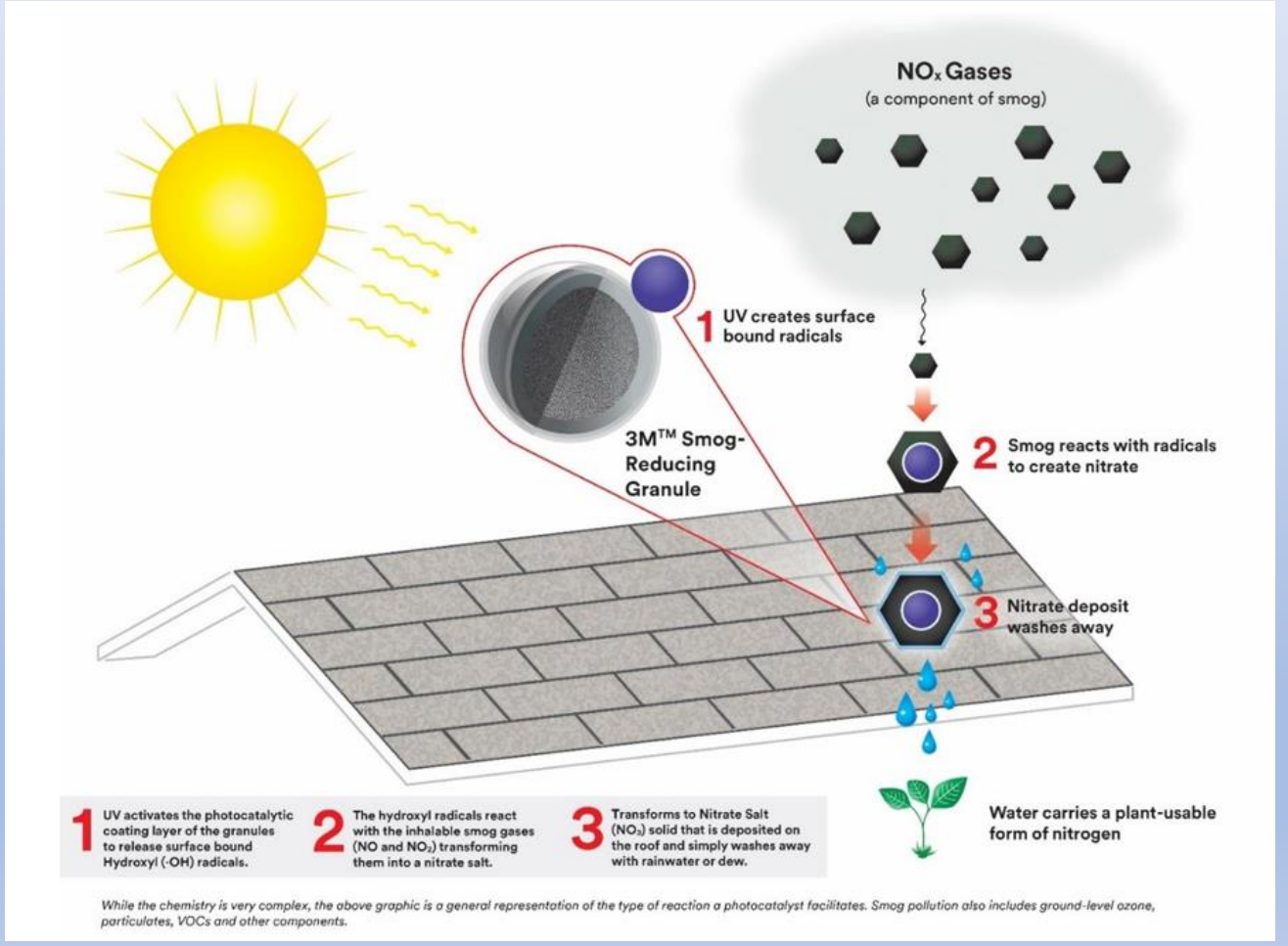
Manufacturer	Marketing Moniker	Limited Warranty Length (Years)	What was offered in 2020
Tamko	Algae Cleaning Limited Warranty	If shingles become *significantly* stained within 12 months after install, TAMKO pays to clean	“Algae Relief” 10 year coverage
CertainTeed	StreakFighter	10 or 15	Same
IKO	AR	5 or 10	Same
Pabco	Algae Defender	20 years	10, 20 or Lifetime
Atlas	Scotchgard	10 or Lifetime	10, 40 or Lifetime
OC	StreakGuard	10 and 25	10
GAF	StainGuard, StainGuard Plus, StainGuard Plus Pro	10 25 30	10 or 25
Malarkey	3M Copper Granules	5, 10 or 15	5, 10 or 12

“Climate Friendly”

3M™ Smog-reducing Granules

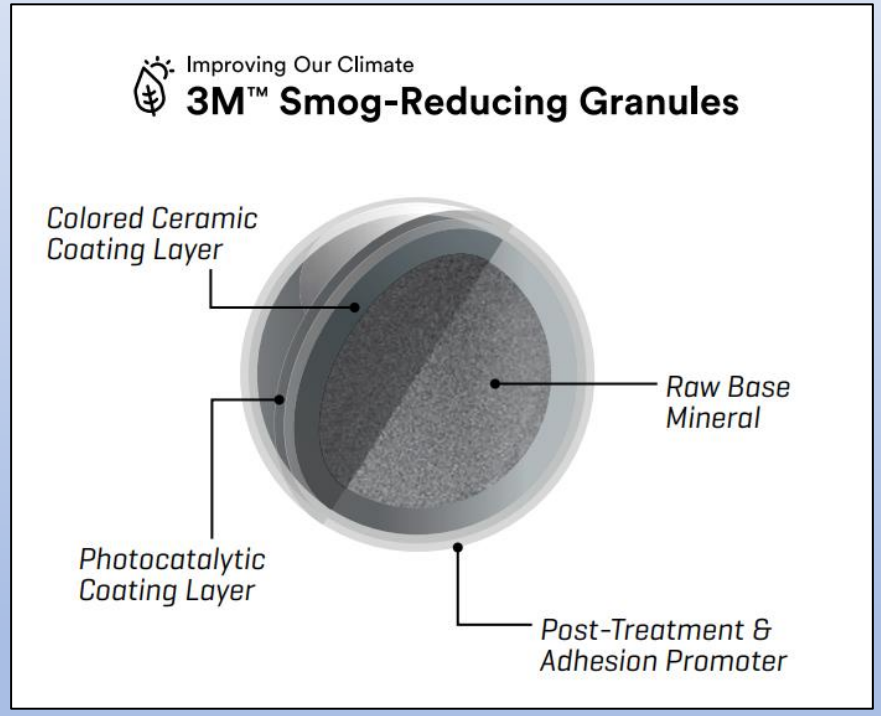
When the sun hits the granules, the photocatalytic coating transforms the smog pollution (nitrogen oxides) into water-soluble ions that safely wash away with rain.

Lawrence Berkeley National Laboratory testing validated the photocatalytic materials used in the granules and found they can reduce smog and contribute to cleaner air.



Who Offers Pollution Eating Shingles

Manufacturer
Atlas
Malarkey



Issues with Reroofing

Gaps in the Deck

How big is too big?

ATLAS

The deck surface must be clean, bare, gap free (less than 1/4") and flat.

GAF

There should be no gaps or spaces between the deck boards or wood planks greater than 1/4" (6 mm). If there are gaps or spaces between the deck boards greater than 1/4" (6 mm), an appropriate deck must be installed over the deck boards.

Decks constructed with spaced deck boards:

- Minimum 6 inch nominal width
- Minimum 3/4-inch thick
- Installed with maximum 1/4-inch spacing between boards
- Holes or gaps greater than 1/4-inch must be repaired or boards replaced.

Partial Replacement

Just replacing a “roof plane”

When replacing a single roof plane, follow the instructions below:

- Remove field shingles and underlayment from the roof plane.
- Carefully remove hip/ridge cap shingles along with any hip/ridge ventilation products, if applicable.
- Slice/cut underlayment along the hip/ridge to provide a clean edge.
- **At hip locations:**
  - For the shingles on the adjacent roof plane that will remain in place, remove nails at the ends of the shingles so that the new underlayment may be inserted between the shingles and existing underlayment.
  - *Option 1:* Use a strip of underlayment to run down the hip. The strip should overlap the new underlayment on the replacement plane and be inserted between the shingles and existing underlayment on the adjacent roof plane. The overlap should extend at least 4" (102 mm) to 6" (152 mm) on both planes.
  - *Option 2:* The new underlayment should extend at least 4" (102 mm) to 6" (152 mm) over the hips and inserted between the shingles and existing underlayment on the adjacent roof plane.
  - Any nails that were removed from existing shingles must be replaced (nails should be relocated). Existing nail holes and any shingles where the sealant bond has been broken must be resealed by hand to ensure a weather-tight roofing system. For more information on hand sealing, refer to TAB-R-114 Hand Sealing Shingles.
- **At ridge locations:**
  - For the shingles on the adjacent roof plane that will remain in place, nails may need to be removed for the new underlayment to be inserted between the shingles and existing underlayment.
  - The new underlayment should extend at least 4" (102 mm) to 6" (152 mm) to fold over the ridge and be inserted between the shingles and existing underlayment.
  - If the nails in the top course of shingles interfere with inserting the new underlayment at least 4" (102 mm) to 6" (152 mm), those shingles may need to be removed. Once a shingle has been fully removed, it should not be reinstalled.

No. The GAF Shingle & Accessory Limited Warranty will remain in effect per its terms and conditions, however, any damage due to reusing existing shingles, ridge cap, underlayments or leak barriers are not covered under the terms of the limited warranty. The GAF Shingle & Accessory Limited Warranty covers manufacturing defects only; it does not cover the workmanship of the roofer who installs the shingles, the design of the roof, or the installation/performance of the roof deck. GAF makes no representation or warranty that the installation conforms to local code requirements and assumes no responsibility for code compliance.

Hips

1. After removal of shingles that are to be replaced, remove the nails closest to the hip from the existing shingles in each course along the hip on the adjacent slope.
2. Install new underlayment on the area being replaced and trim along the hip.
3. Install a minimum 12" strip of underlayment along the hip, tucked 4"-6" under the existing shingles and over the new and existing underlayment.
4. Fasten the end of each existing shingle along the hip and hand seal with asphalt roof cement conforming to ASTM D4586.
5. Continue with installation of new field and Hip & Ridge shingles.

Ridges

1. After removal of shingles that are to be replaced, remove any nails within 6" from the ridge in the existing shingles on the adjacent slope.
2. Install new underlayment on the area being replaced and extend over the ridge, tucked 4"-6" under the existing shingles and over the existing underlayment.
3. Fasten the shingles and if necessary, hand seal with asphalt roof cement conforming to ASTM D4586.
4. Continue with installation of new field and Hip & Ridge shingles.

Recommendations:

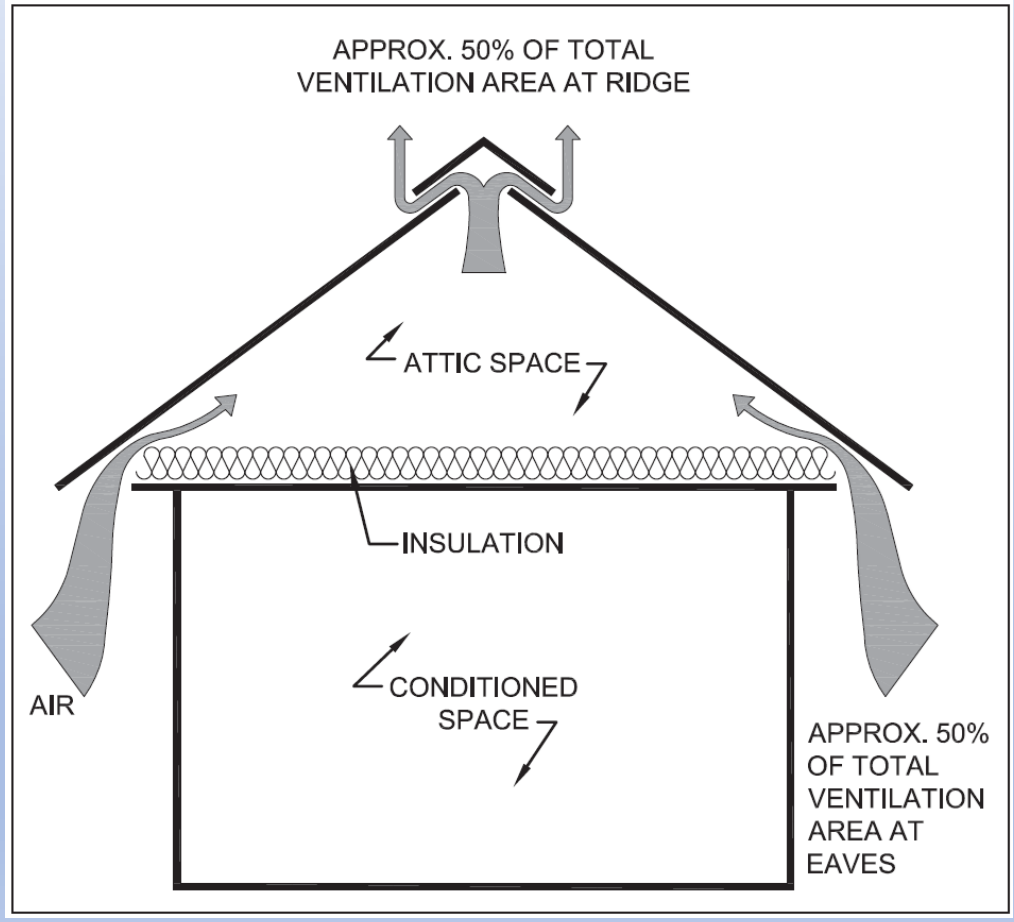
Owens Corning Extended Warranties require that your new roofing system cover the entire structure. Incomplete roofs installed on a portion of a building do not qualify for Owens Corning Platinum, Preferred, or System Protection Extended Warranties.

Adding a Ridge Vent

Does not make sense to add a continuous ridge vent when the house doesn’t have any soffit/eave vents

Remember this slide?

A “Balanced” System



Most common

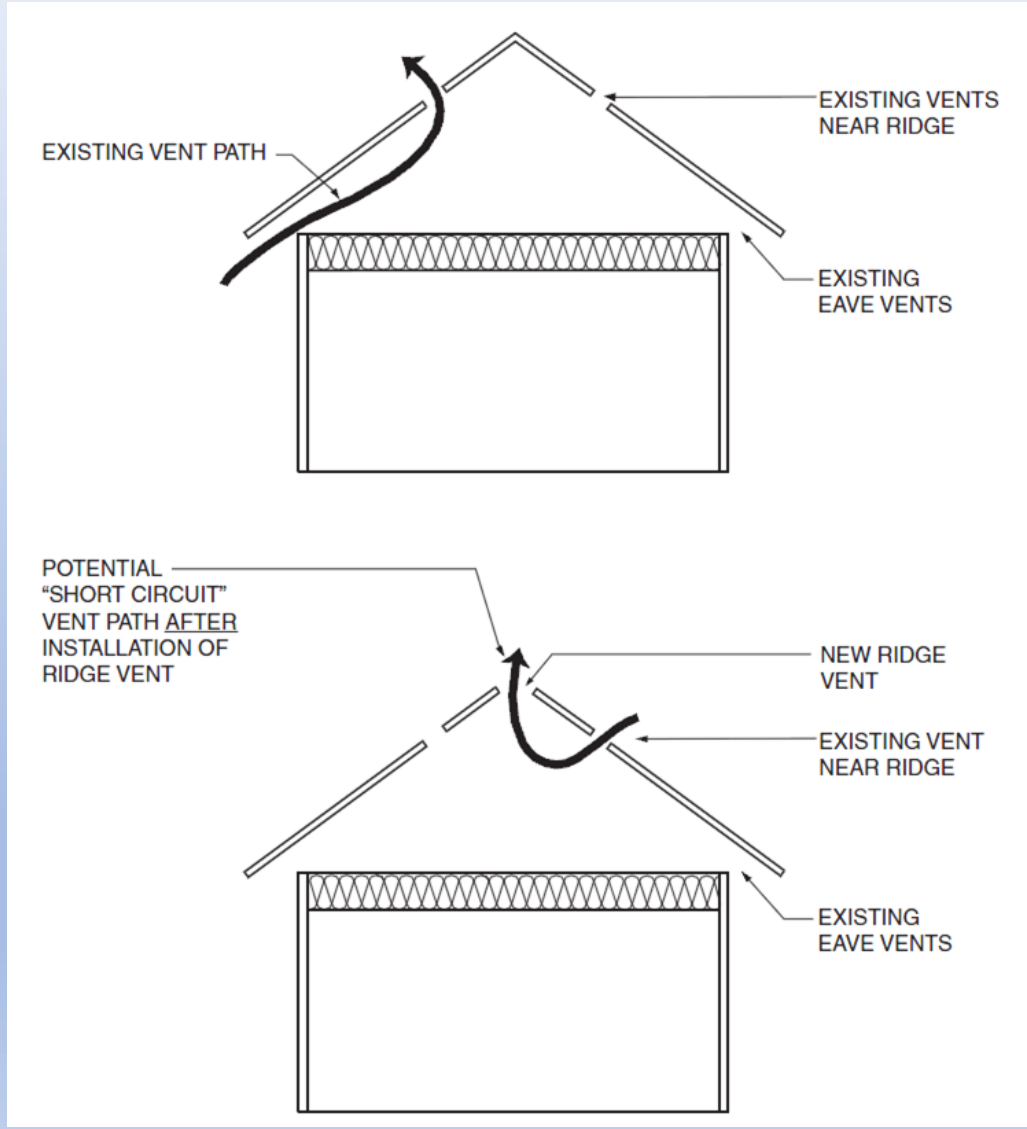
Outside air enters into the attic through soffit or eave vents and exits at vents positioned at or near the top.

This method relies on <u>convection</u> (warm air rises).

In order for it to work, approximately equal amounts of ventilation must be placed at the soffits/eaves and at the top of the attic space. This is referred to as “balanced.”

Images taken from The NRCA Roofing Manual: Architectural Metal Flashing and Condensation and Air Leakage Control

More is better, right?



So you want to create an unvented attic…

aka, a “sealed” roof

- Existing vents should be closed off and/or removed.
- An unvented attic does not have any ventilation openings. This is also known as a compact roof system.
- Unvented attics may be either “conditioned” or “unconditioned” spaces.
- If not properly designed and constructed, they may lead to condensation problems, mold growth, deck deterioration, damage of asphalt shingles, and structural damage.
- Make sure you use the right SPF product
- The roof-to-wall detailing is critical
  - Thermal layer needs to be continuous
  - Air barrier/vapor retarder needs to be sealed to prevent air leakage

Did you know that these code requirements exist?

R806.5 Unvented attic and unvented enclosed rafter assemblies.

Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings that are applied directly to the underside of the roof framing members and structural roof sheathing applied directly to the top of the roof framing members/rafters, shall be permitted where all the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. Interior Class I vapor retarders are not installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, a minimum $^1/_4$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder, or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with Item 5.3 and either Item 5.1 or 5.2:
   - 5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.
     - 5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.
     - 5.1.2. Where *air-permeable insulation* is installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the *R*-values in Table R806.5 for condensation control.
     - 5.1.3. Where both *air-impermeable* and *air-permeable insulation* are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the *R*-values in Table R806.5 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.
     - 5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.
   - 5.2. In Climate Zones 1, 2 and 3, air-permeable insulation installed in unvented *attics* shall meet the following requirements:
     - 5.2.1. An approved *vapor diffusion port* shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.
     - 5.2.2. The port area shall be greater than or equal to 1:600 of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.
     - 5.2.3. The vapor-permeable membrane in the *vapor diffusion port* shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.
     - 5.2.4. The *vapor diffusion port* shall serve as an air barrier between the *attic* and the exterior of the building.
     - 5.2.5. The *vapor diffusion port* shall protect the *attic* against the entrance of rain and snow.
     - 5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (51 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.
     - 5.2.7. The roof slope shall be greater than or equal to 3:12 (vertical/horizontal).
     - 5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing.
     - 5.2.9. *Air-impermeable insulation*, if any, shall be directly above or below the structural roof sheathing and is not required to meet the *R*-value in Table 806.5. Where directly below the structural roof sheathing, there shall be no space between the *air-impermeable insulation* and air-permeable insulation.
     - 5.2.10. The air shall be supplied at a flow rate greater than or equal to 50 CFM (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating.
   - 5.3. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.


Calls that commonly come in

Shingles over Unvented Attics or Decks with SPF

Does it affect the warranty?

Will using Under Deck Insulation Void My Warranty?

No, Atlas warrants that its shingle products are free from manufacturing defects that materially affect the performance of your shingle during the Premium Protection Period or that cause leaks for the balance of the applicable warranty period. Any damage to the shingles attributable to inadequate ventilation is excluded from Atlas's responsibility under the terms of our Limited Warranty.

- Any damage to the shingles attributed to inadequate ventilation is excluded from Atlas' responsibility under the terms of our limited warranty.

None of GAF's limited warranties are voided, even if the shingles are installed over an unvented deck. However, any damage caused by installation over an unvented attic, or lack of ventilation more broadly, is excluded from coverage under the terms and conditions of GAF's limited warranties.

We warrant that your Owens Corning® roofing shingles and component products are free from any manufacturing defects. The Owens Corning Standard Limited Warranty and Total Protection Roofing System Warranty do not cover damage caused by improper or inadequate roof ventilation or roof drainage, unvented attics, or enclosed rafter assemblies. However, full warranty coverage would apply per the terms of the warranty if Owens Corning determines that the shingle damage was caused exclusively by a manufacturing defect that is unrelated to the inadequate roof system ventilation. Please see actual warranty for complete details, limitations and requirements.

EXCLUSIONS AND LIMITATIONS (Cont.)

8. *Any damage that arises from any cause other than a manufacturing defect that significantly affects the water shedding performance of the Shingles, including, but not limited to, such damage arising from:*

A. *The effects of debris, resins or drippings from trees.*

B. *The effects of any chemical reactions with, or chemicals on the Shingles (whether in contact with the face or underside of the Shingles on the roof) or airborne and which come in contact with the Shingles (such as aliphatic or aromatic solvents, chlorinated hydrocarbons, turpentine, oils and organic or inorganic polar materials).*

C. *The excessive use of roofing cement or the use of incompatible roofing cements.*

D. *Water infiltration arising from ice damming.*

E. *Applications where spray insulation has been applied in the attic space of the building.*

"Exclusions from Coverage: There are many reasons why roofs fail, including but not limited to the following matters, all of which are beyond TAMKO's control. TAMKO shall not be liable under any circumstances and shall have no obligation under this Limited Warranty or otherwise for:

1. Shingles that have been: (a) improperly applied, stored or handled; (b) installed without adequate ventilation; (c) not installed in strict accordance with application instructions printed on the wrapper and standard good roofing practices; or (d) installed over roof decks with polyurethane foam applied to the underside of the roof deck. "

Roofing in the Winter

How cold is too cold?

No one is really going to tell you, but you'll get some guidelines…

40s Look Good

ATLAS

It is acceptable to install asphalt shingles in colder weather as long as a few precautions and recommendations are followed during installation. Asphalt shingles may become less flexible at temperatures of approximately 40F. Asphalt shingles that are being handled and/or installed in colder weather should be handled with care as outlined below.

GAF

There is no practical lower or upper temperature limit governing when asphalt fiberglass shingles may be applied, as long as appropriate precautions are taken.

- In cold weather, for easiest handling, temperatures should be above 40° F.

This bulletin provides recommendations for installation of Owens Corning® asphalt shingles in cold weather when the air and surface temperatures are at or below 40°F (5°C).

Extra care should be taken when handling and/or installing asphalt shingles when the air and surface temperatures are at or below 40°F (5°C). Owens Corning® Roofing recommends the following procedures for additional fastening strength and wind blow-off resistance when shingles are installed during cold weather:

Some say 50s

IKO

As with most materials, asphalt shingles can become more brittle in cold weather (10°C (50°F, and below). Thus, extra precaution should be taken when unloading shingles and applying them. Never bend, drop or throw bundles of shingles in cold weather. To circumvent this problem, some contractors bring the shingles into a heated or semi-heated area for a few hours before application. This gives the shingles time to "warm-up", increasing flexibility. In very cold weather, it is possible for the shingle within the bundle to be frozen together, especially if the product has been stored outside.

Malarkey Roofing Products

What temperature does it need to be for shingles to seal down?

There are many variables that affect when shingles seal down, not just temperature. First is the *color* of the shingles; darker shingles will seal faster than a lighter color shingle. Second is *position*; shingles installed on the south and west-facing roofs will seal faster than the north and east sides. Third, the *slope* of the roof can also play a factor. A lower sloped roof will typically seal faster than a steeper sloped roof. In addition, a sunny day at 50 degrees will cause the shingles to seal faster than a cloudy day at 50 degrees. A calm day will cause the shingles to seal faster than a windy day.
With all these variables, it is very difficult to state what the temperature needs to be for them to seal down, but simply, the warmer the better. In related fashion, Malarkey's *wind warranties* go into effect once the shingles seal down. We advise roofing contractors and building owners discuss whether the roofing contractor will stand behind the installation until the shingles do seal down.

Aaaand…

TAMKO ROOFING PRODUCTS

Installation of fiberglass/asphalt shingles during cooler months requires extra care to ensure acceptable appearance and function of the finished roof. Cooler weather installation may affect the appearance and the wind resistance of the finished roof.

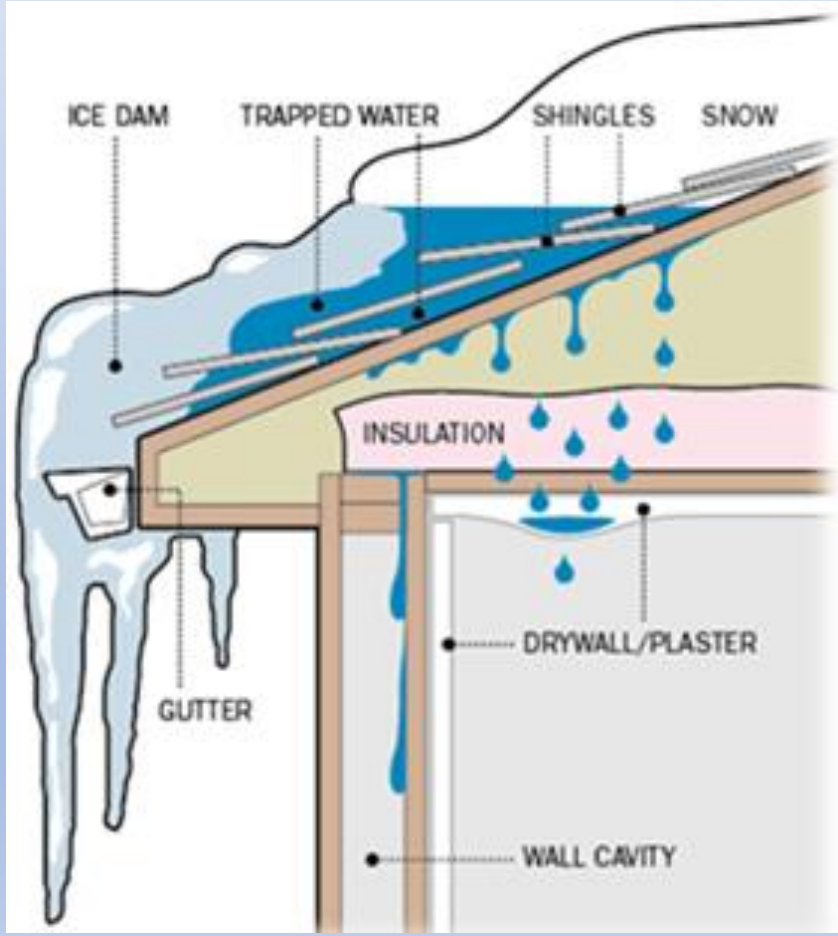
Damn ice dams!

How to Minimize Ice Dams

Houses With Attics

These are ways to <u>minimize</u> ice dam effects:

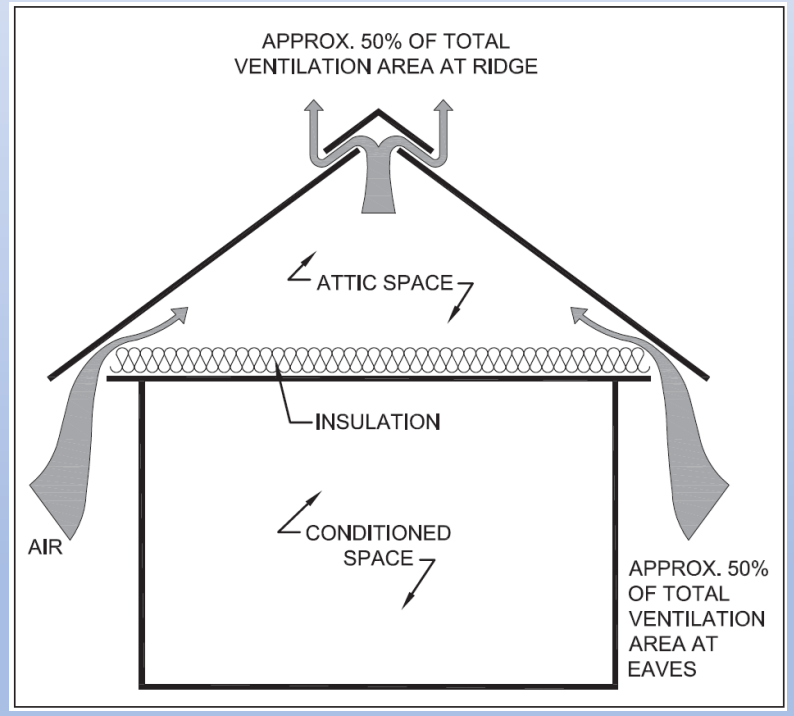
- Adequate attic floor insulation (R-49)
- Proper ventilation
- Ice dam protection membrane
- Vapor retarder on warm side of attic/ceiling insulation
- Prevent warm air from entering attic



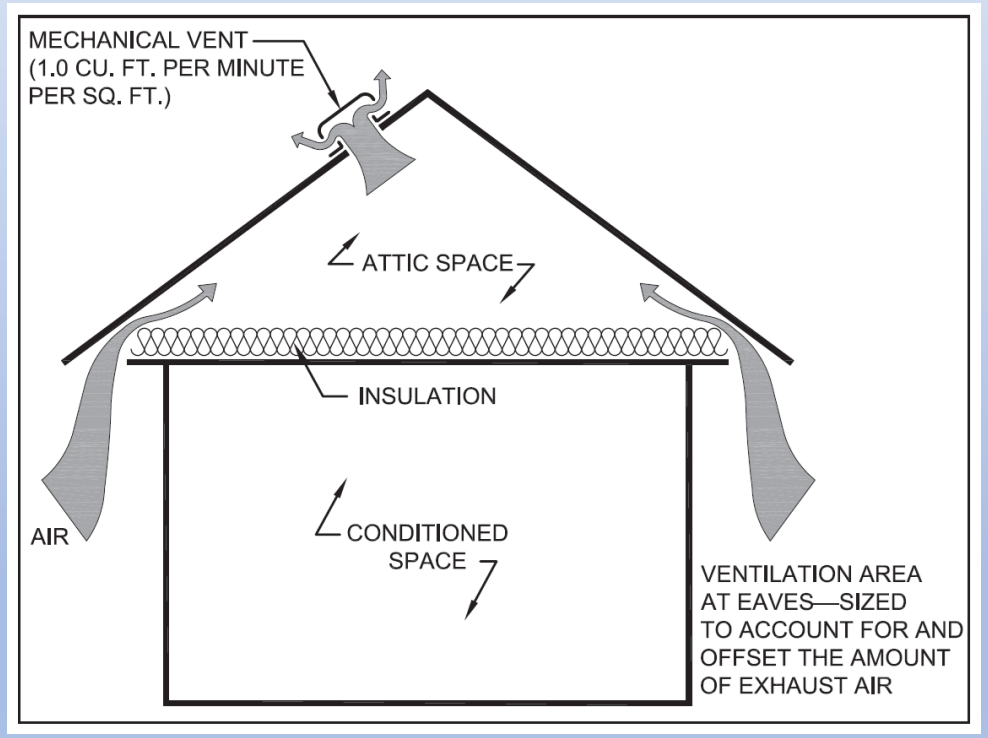
Proper Ventilation

Already went over this…

Static Method



Mechanical Method



Images taken from The NRCA Roofing Manual: Architectural Metal Flashing and Condensation and Air Leakage Control

Ice Dam Protection

Building Code

IRC Section 905.1.2-Ice Barriers

R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of *underlayment* cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building. On roofs with slope equal to or greater than eight units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.

Exception: Detached accessory structures not containing conditioned floor area.

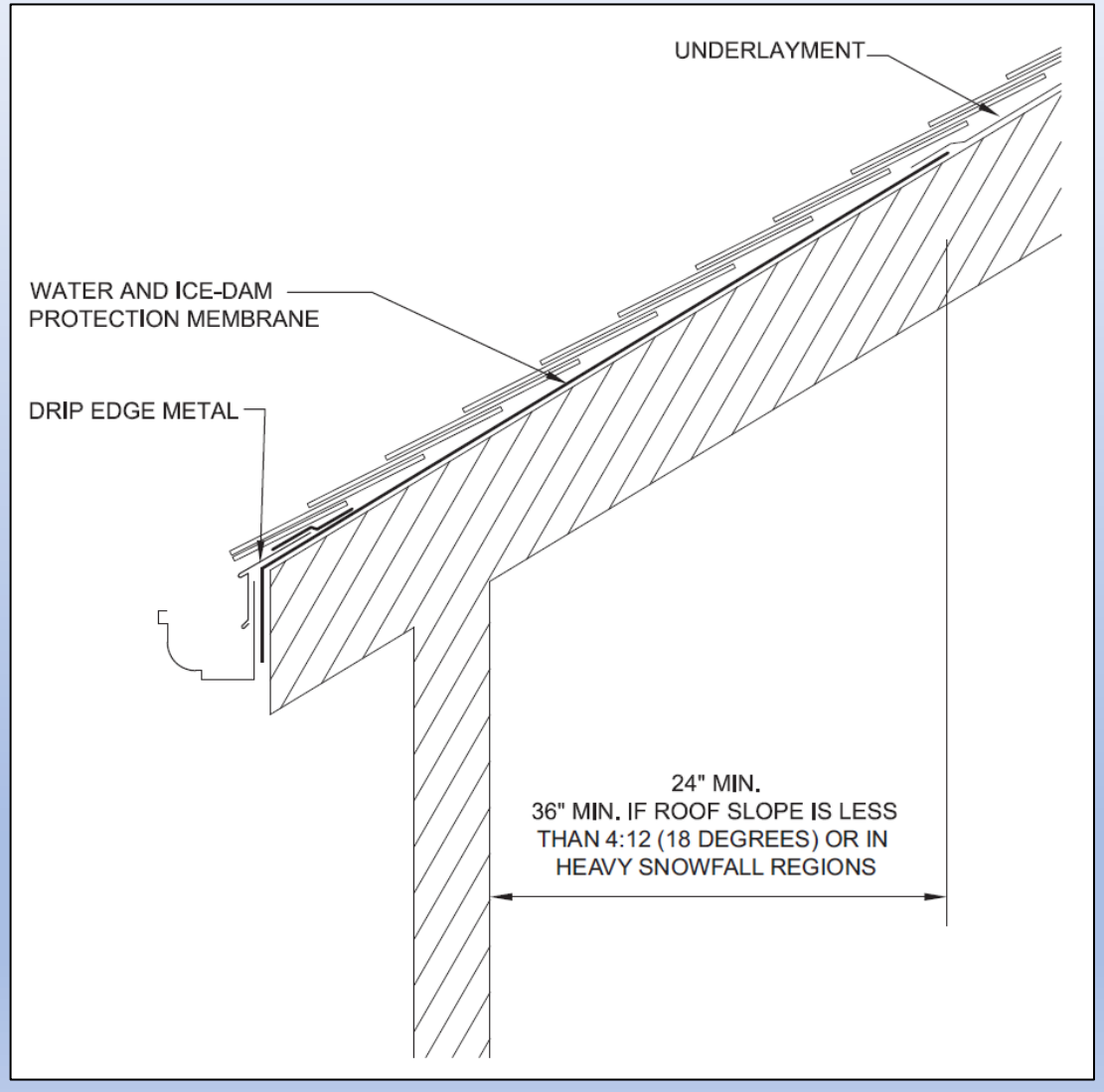
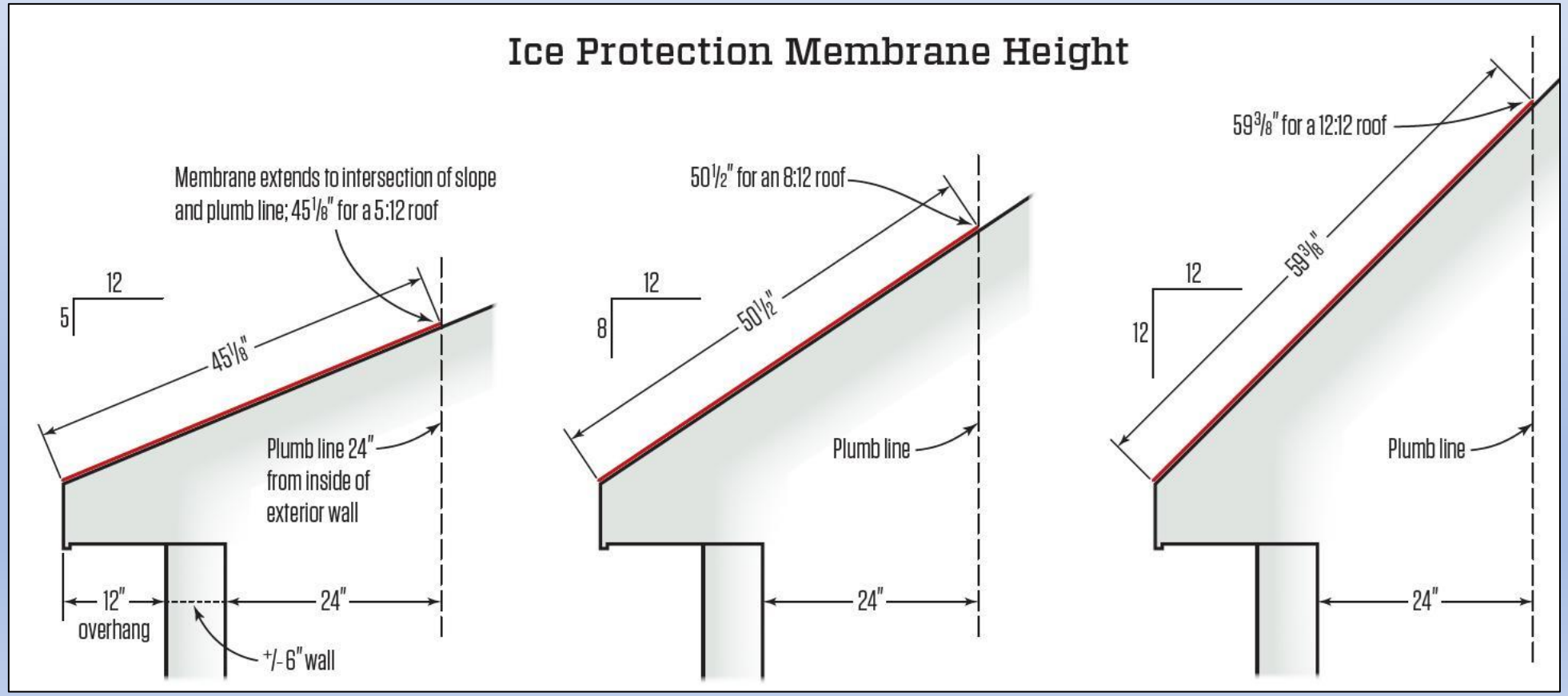


Image taken from The NRCA Roofing Manual: Steep-slope Roof Systems

Ice Dam Protection

**For steeper slopes and larger overhangs,
it'll mean more rows.**



Good Detailing

NRCA recommends wrapping the fascia.

Note the stripping ply is required by code…

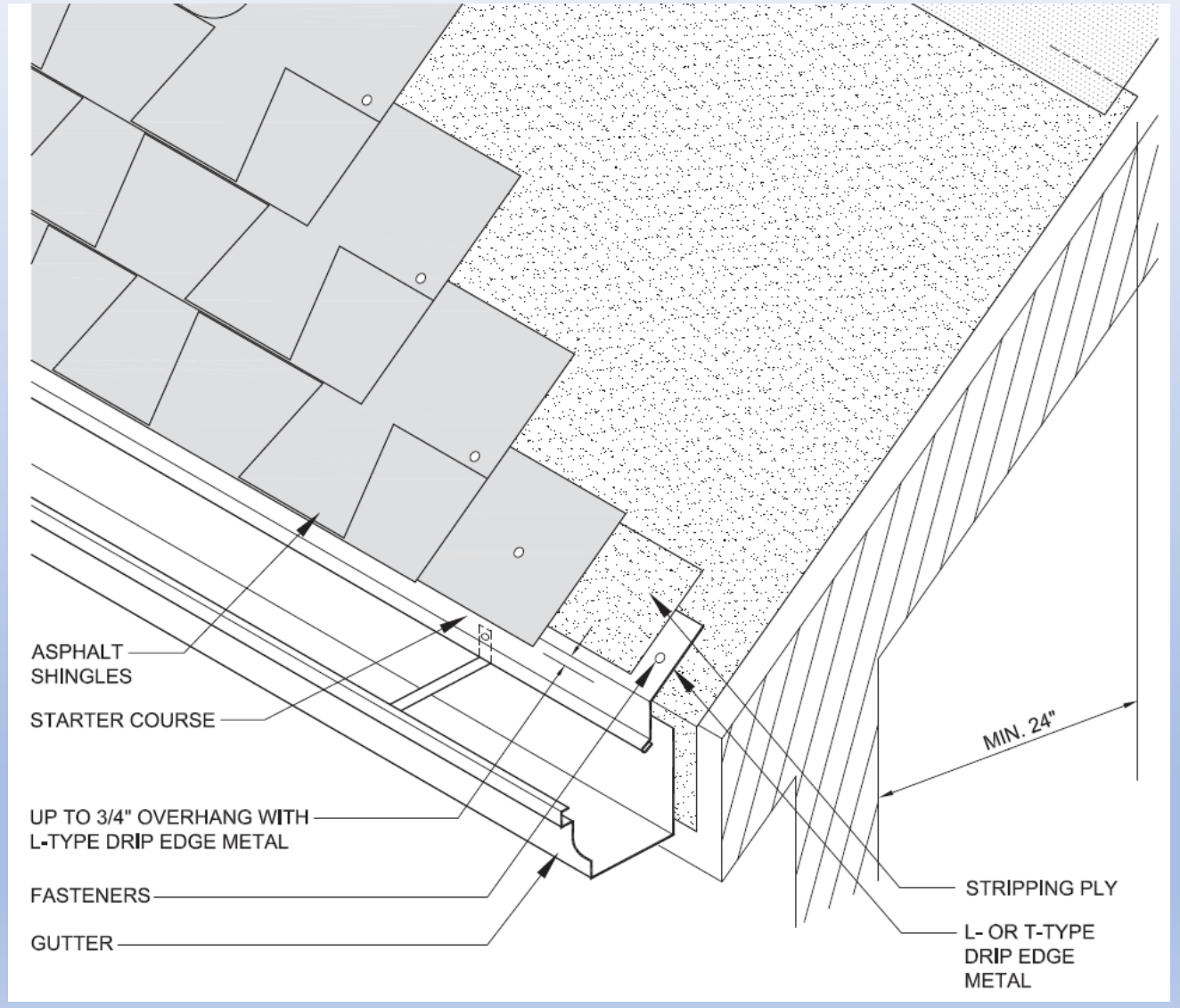


Image taken from The NRCA Roofing Manual: Steep-slope Roof Systems

More good detailing…

But think twice about going overboard

Ice-dam protection membranes can act like a vapor retarder. So in cold climates, you might have added the potential for condensation…

Vapor Retarder Placement

Polyethylene sheet

- Proper placement is on the warm side of the insulation, so above ceiling drywall or under attic floor insulation.
- Laps and penetrations should be sealed.
- Do not place sheet above attic floor insulation or between layers of insulation.

Vapor Retarder Placement

Kraft-faced fiberglass batt insulation

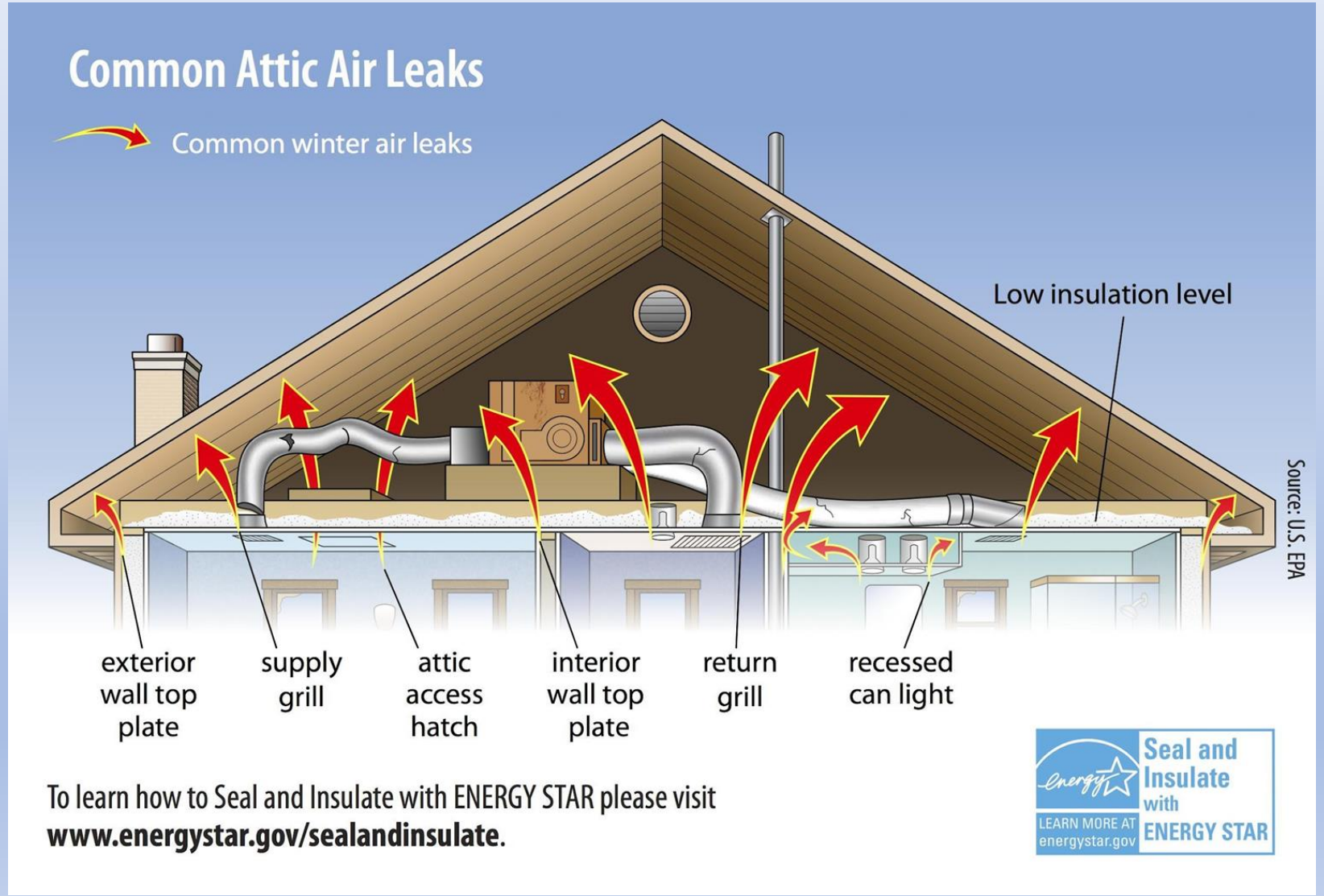
- Kraft paper side should be facing down.
- Keep in mind that this isn't the most effective vapor retarder because it's really not continuous.
- Do not use multiple layers of kraft-faced fiberglass batt insulation

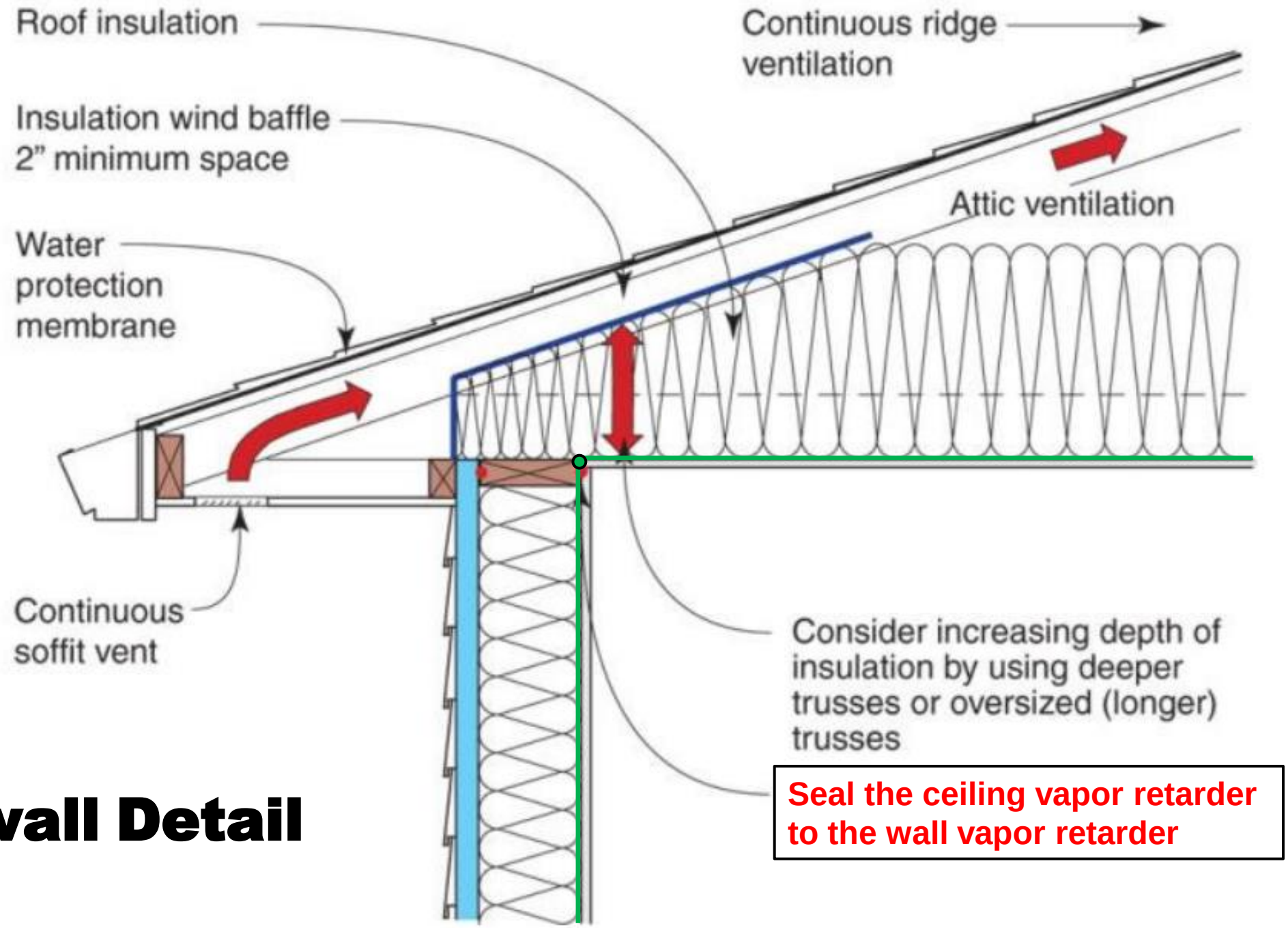
Warm air rising!

These contribute warm air into the attic:

- Mechanical equipment located in the attic
- Dryer and bathroom vents exhausting into attic
- Uninsulated or leaky mechanical ducts in attic
- Unsealed penetrations in ceiling, e.g., recessed lighting
- Whole house fans

Common Attic Air Leaks

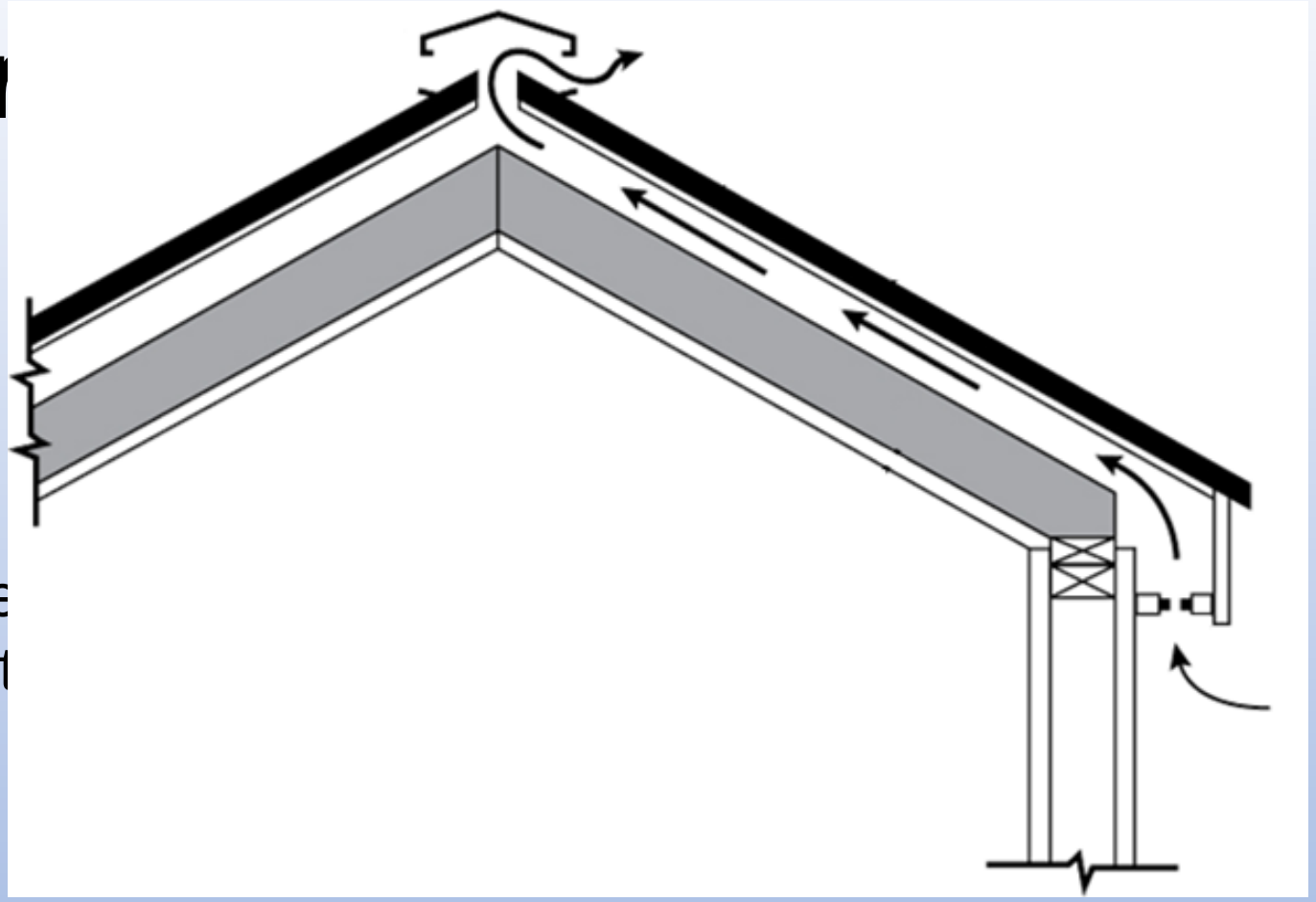




Ceiling-to-wall Detail

What about cathedral/vaulted ceilings?

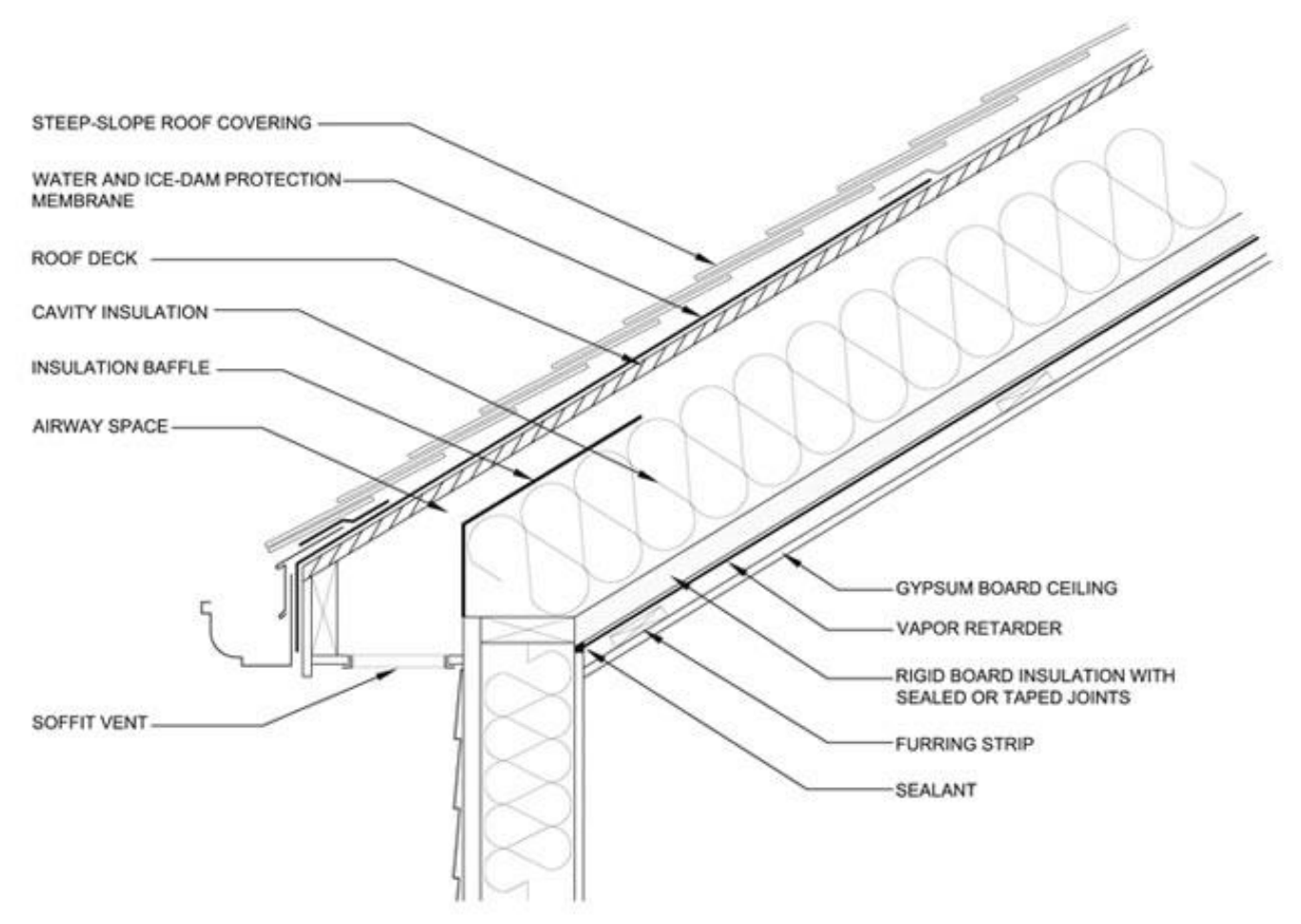
Things to ponder



- That 1” air space in numerous vente
  might not be enough for many situat
- Bigger air spaces are needed with:
  - longer eave-to-ridge lengths
  - lower roof slopes
  - assemblies with less insulation
- The shallower the roof slope, the harder it is to vent
  (warm air rises, doesn’t move horizontally on its own).

So, if you are venting a compact roof...

aka Cathedral/Vaulted Ceilings



Make sure you have:

- both intake and exhaust vents
- a sufficient amount of insulation
- an adequately sized air space
- a vapor retarder, sealed at ceiling/wall interface
- no air leakage from penetrations

A roofing dork drives by a building...

My turn to vent…

Yeah, a couple of building envelope consultants had a problem that took years to solve

“Picture Framing”

Possible Reasons

New construction:

- Moisture content of wood panels at time of shingle installation
- No accommodation for expansion/contraction of wood panels

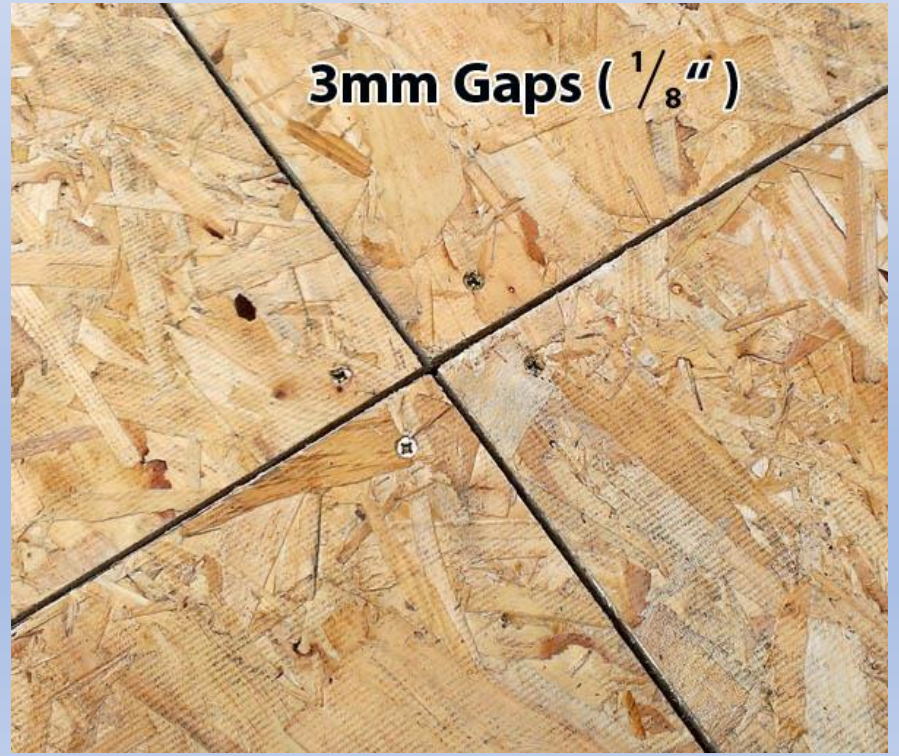
Ventilation issues:

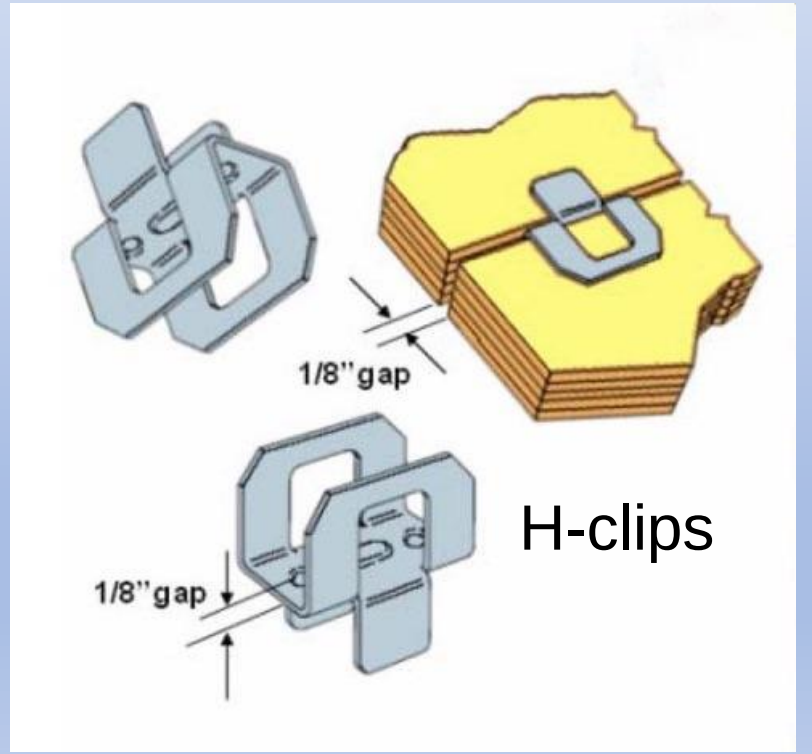
- Lack of, or not enough, intake or exhaust vents
- Blocked soffit/eave vents
- Roof deck wasn’t held back at ridge for the ridge vent
- Warm moist air is getting in the attic

Possible Reasons

- Moisture content of wood panels at time of shingle installation
- No accommodation for expansion/contraction of wood panels

Plywood and OSB sheathing should be installed with an 1/8” gap on all sides.





H-clips

Ventilation Issues

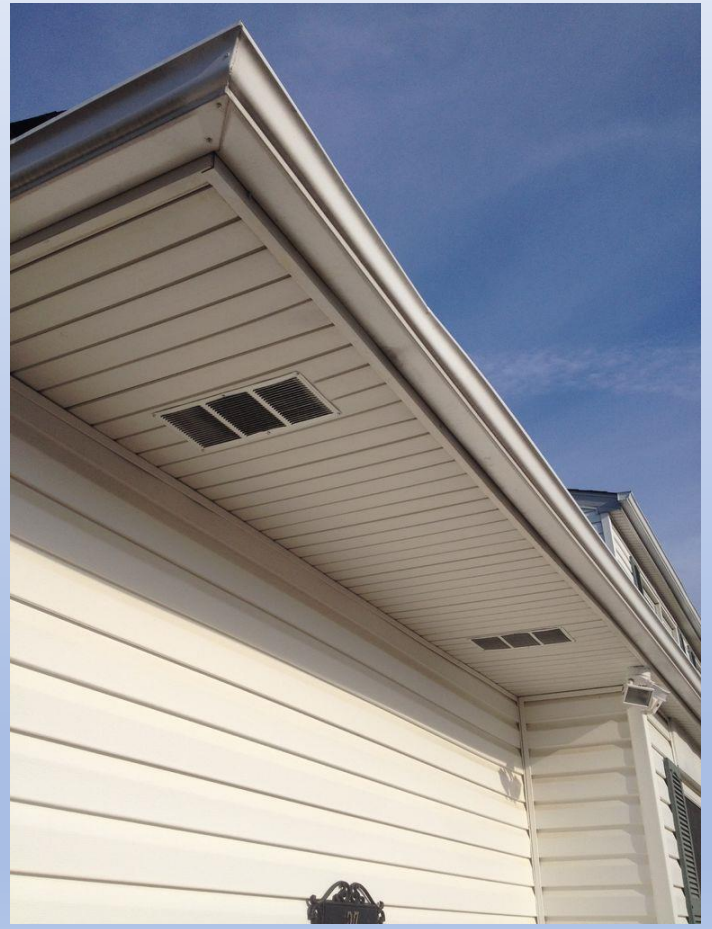
Not Enough Exhaust

Opening at Ridge

Is the gap big enough?

Ventilation Issues

Not Enough Intake



Also check for these situations…

Painted over vents

Clogged with debris

And don’t assume anything…

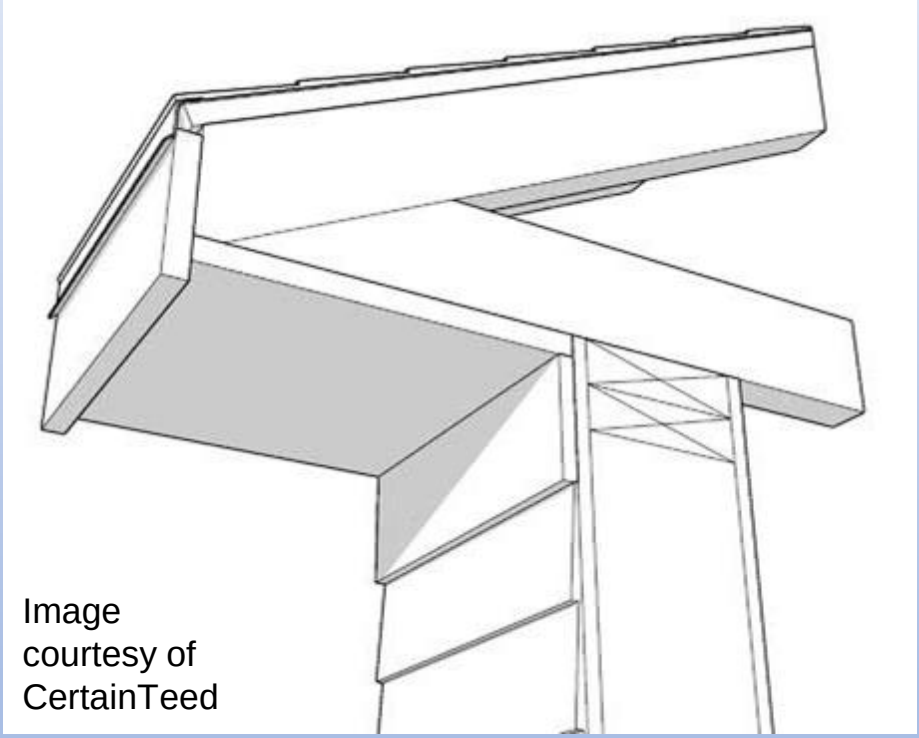
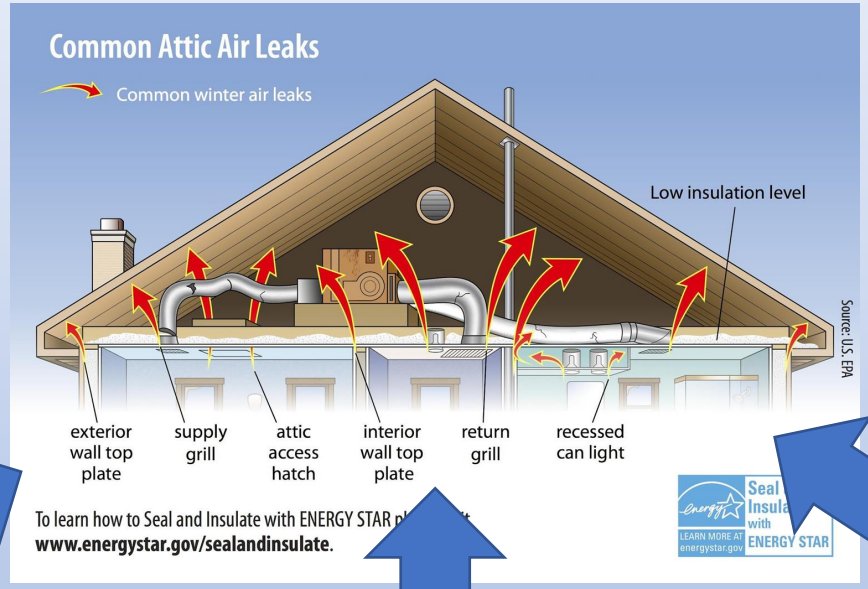
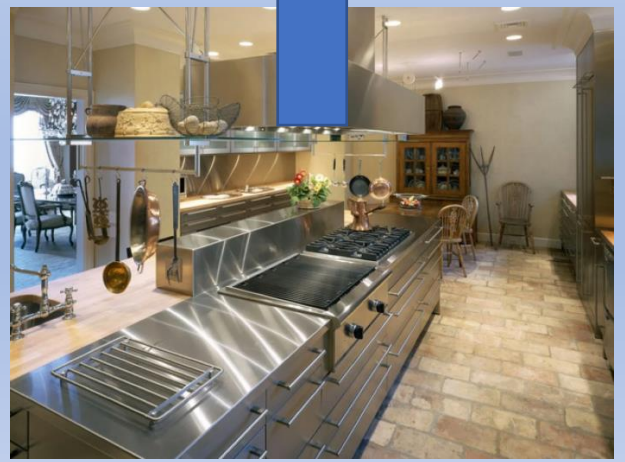


Image courtesy of CertainTeed

Verify that there isn’t solid plywood/OSB behind soffit vents, esp. with soffit panel vents…hard to tell!

Warm Moist Air Getting in Attic



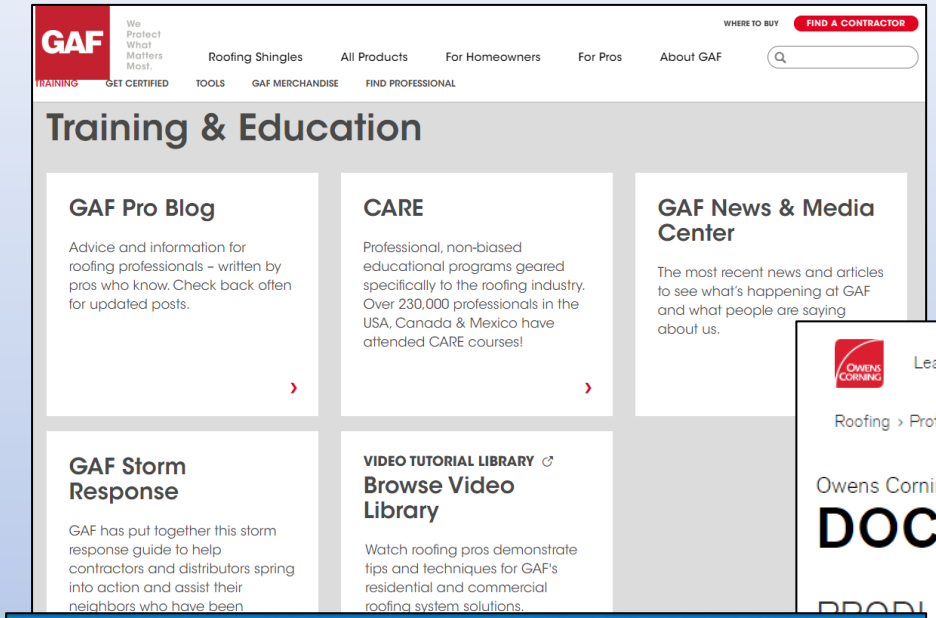


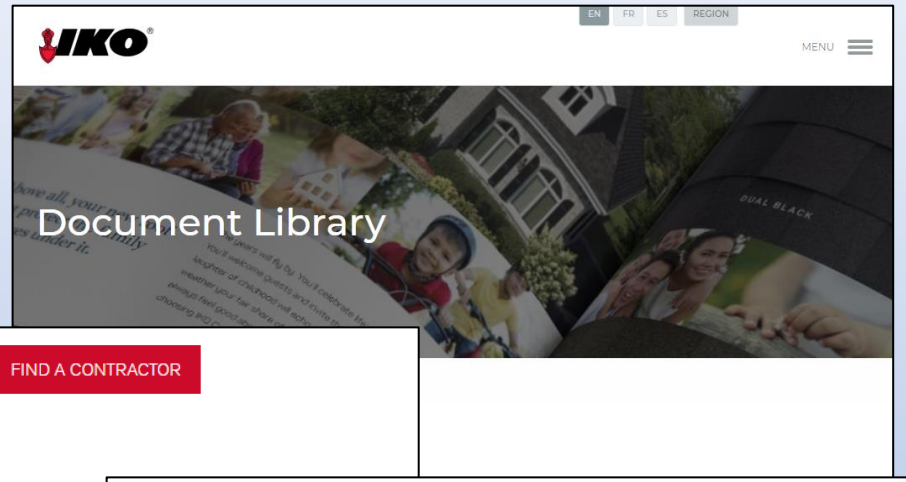
Condensation Issues

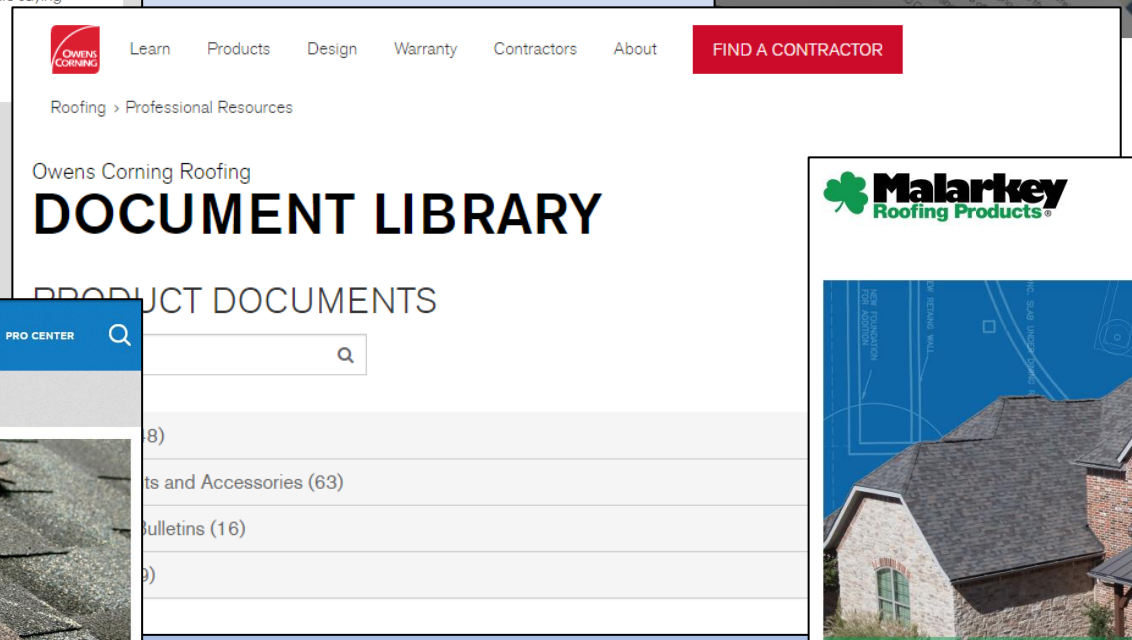
The ventilation and air leakage concepts apply here too…

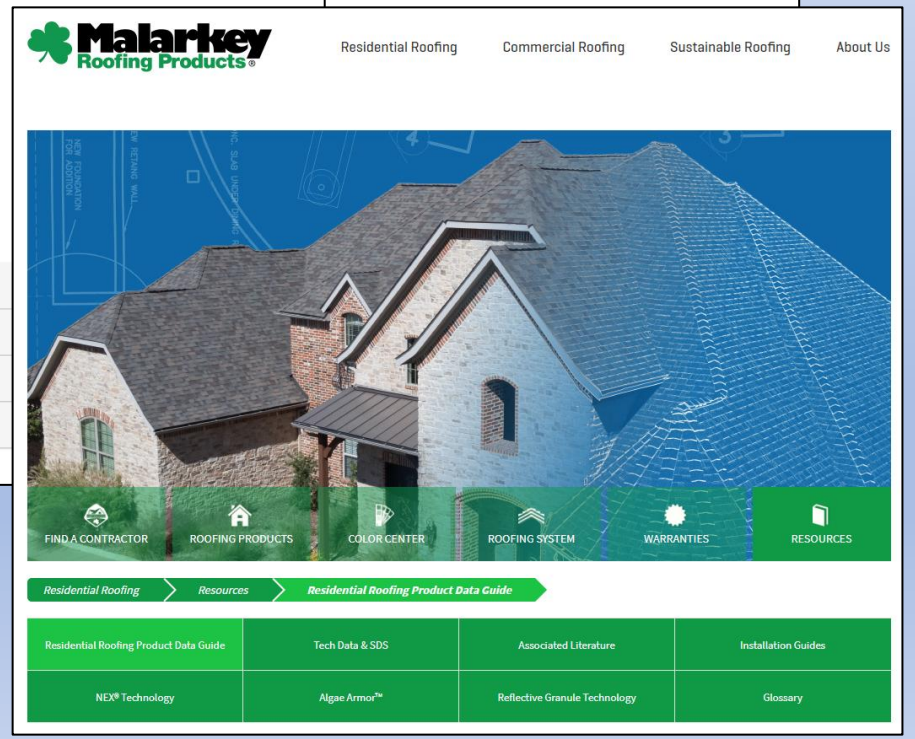
Resources

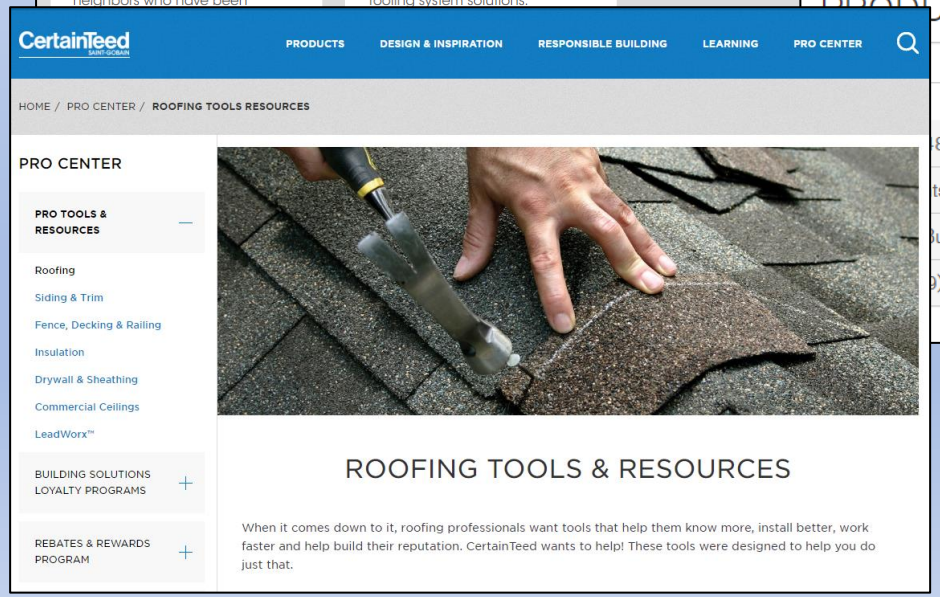
Manufacturers Websites



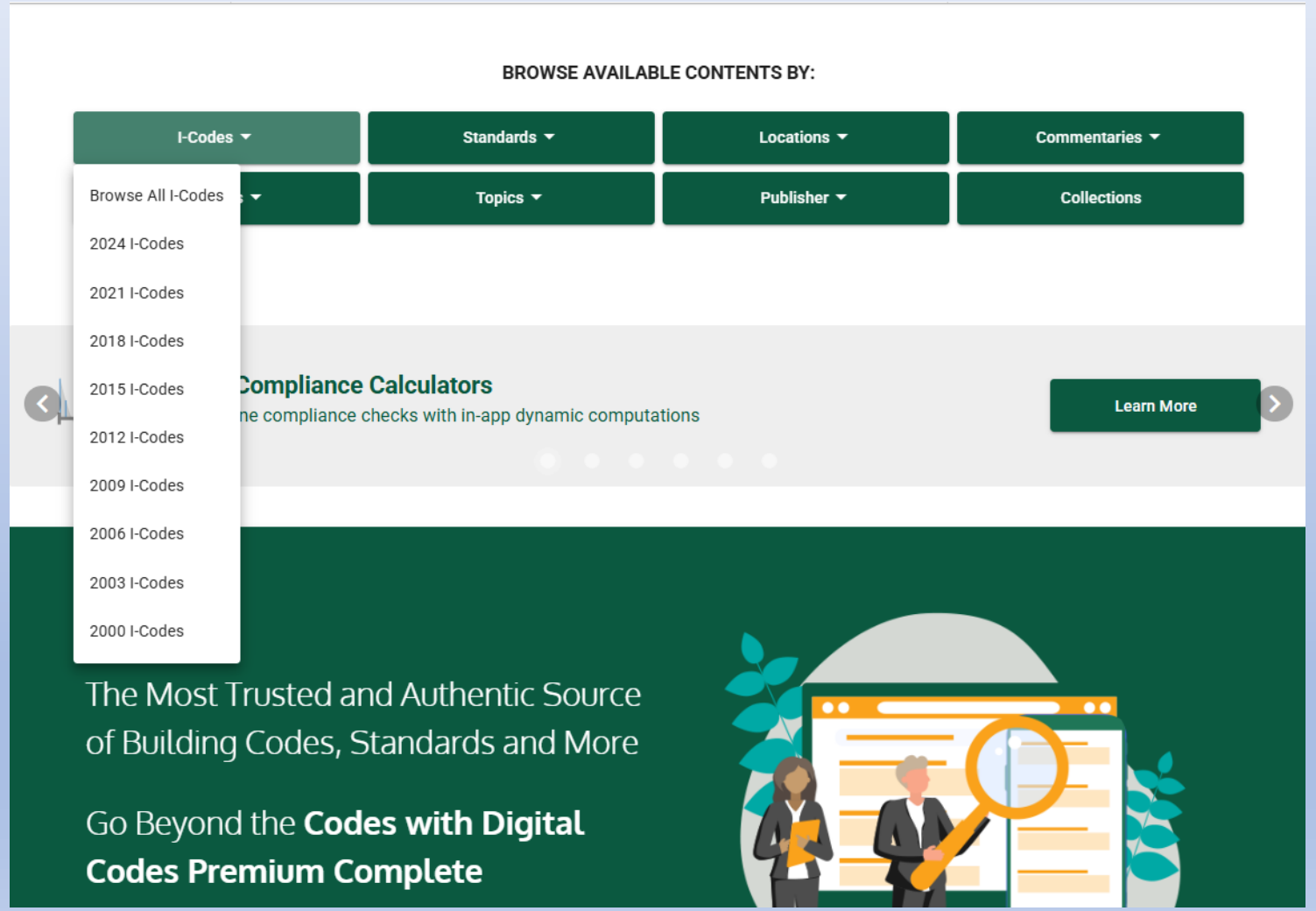








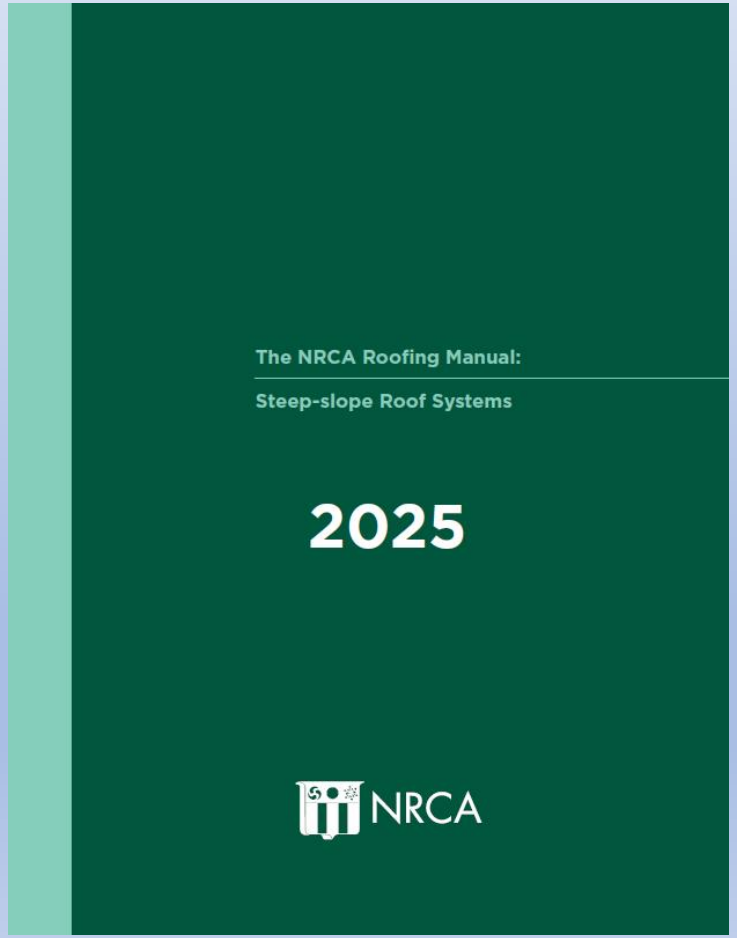
Building Code Resources

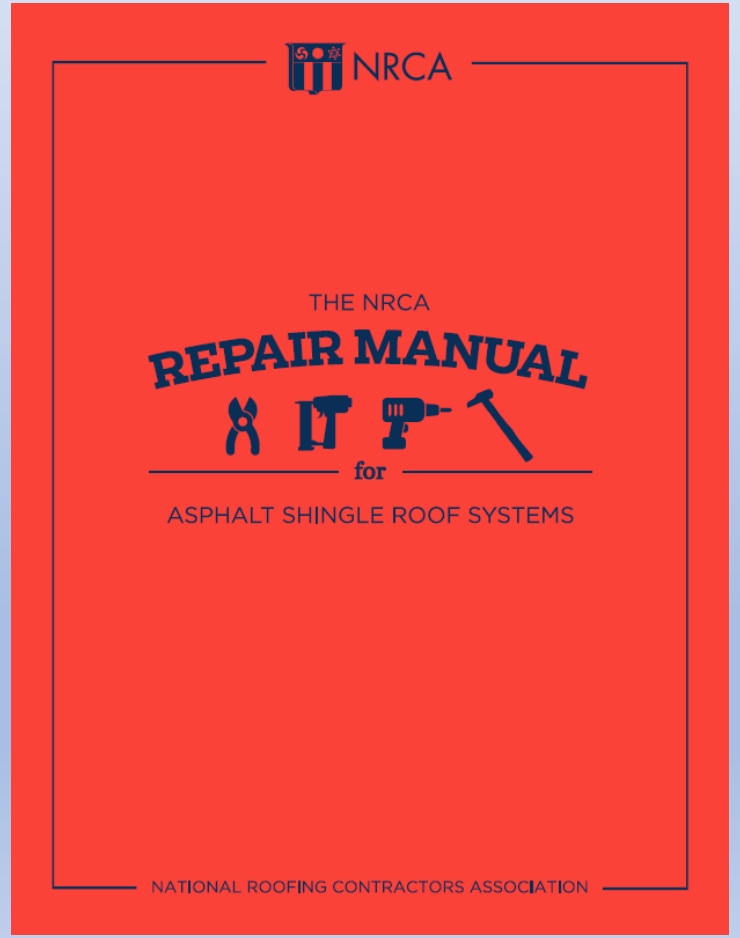


ICC codes are available for free at: codes.iccsafe.org

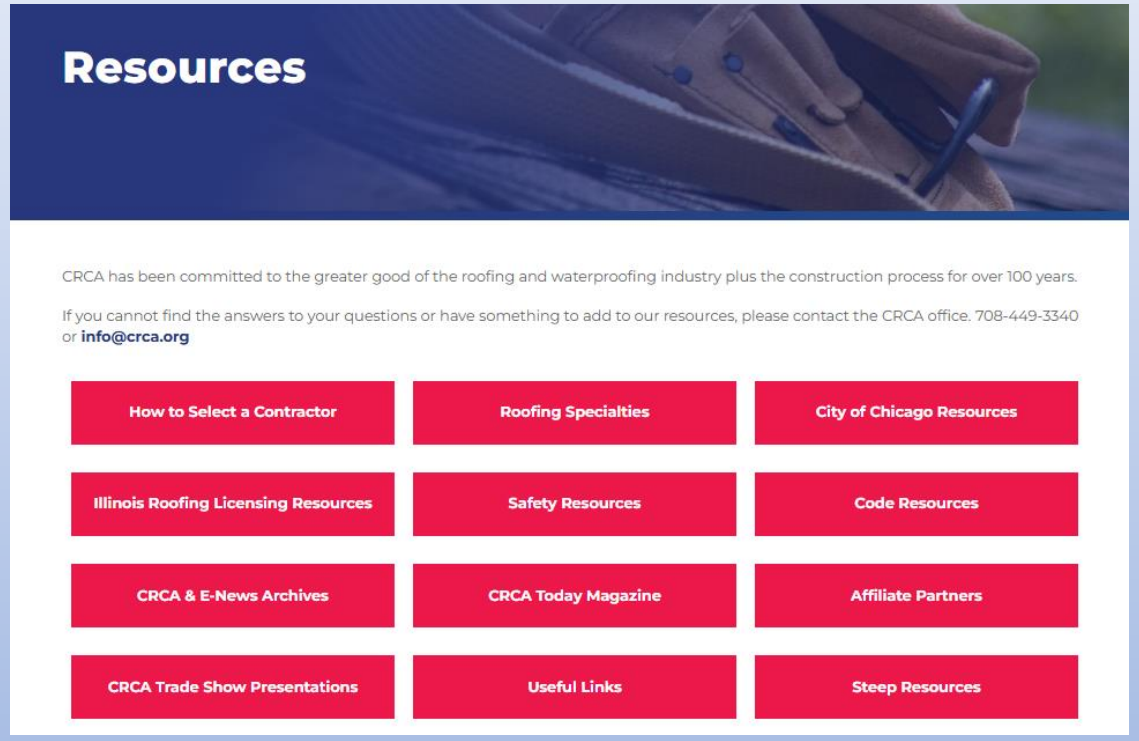
National Roofing Contractors Association

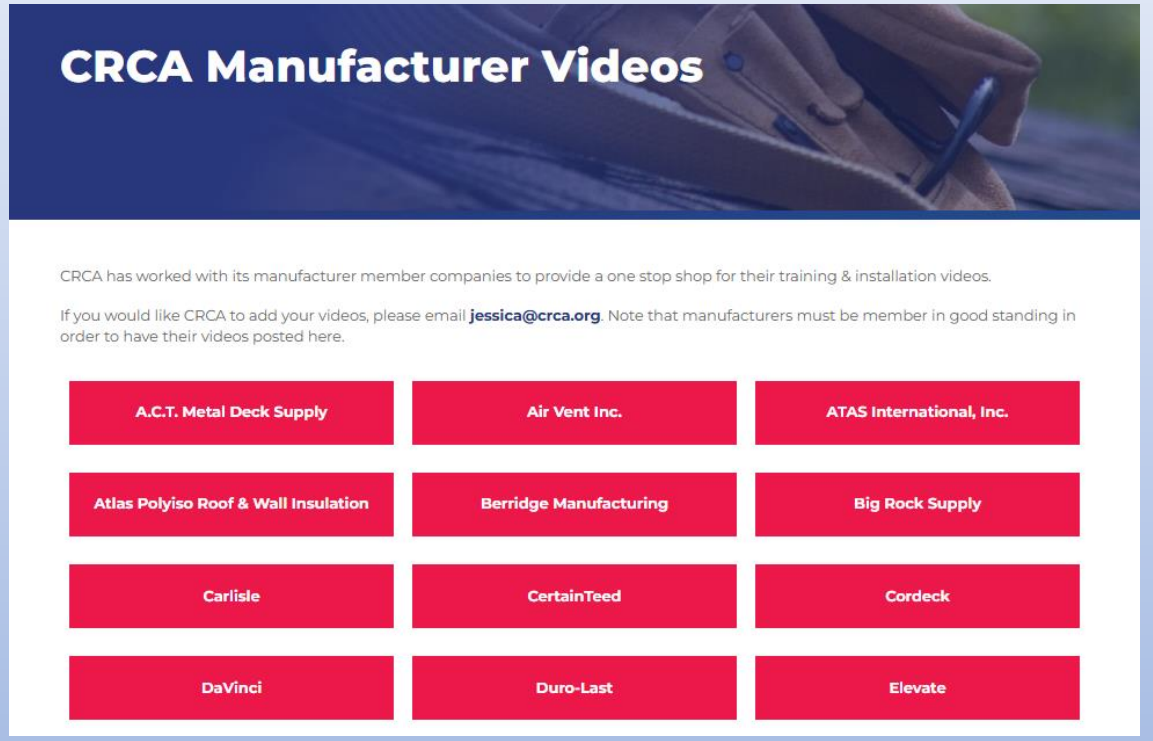
Members get pdfs of the manuals, construction details, and technical publications for free!





Chicago Roofing Contractors Association





And if you aren't involved with CRCA, get involved!

Questions?

And
thank you!