



Oregon Roof Consulting and Inspection

No-Nonsense Roofing Advice for Property Owners: Affordable ~ Thorough ~ Versatile ~ Capable

Serving the Portland Metro area and all of Oregon: (503) 654-4612

Oregon CCB: 199121 ~ WA Lic: OREGORC871MR

PO Box 220190, Milwaukie, OR 97222

Resume' ~ Track Record ~ Experience ~ Qualifications ~ History

Please note : I have 44 years of legitimate verifiable experience as a laborer / grunt / gopher for my brother's roofing business in the 60's, the better part of 3 decades as a roofing contractor, 6 years as an estimator / project manager for 2 large roofing companies and am now nearing the end of my 10th year as the owner / operator of Oregon Roof Consulting and Inspection. I have personally installed over 1,000 roofs and have done at least 14,000 roofing estimates back in the roofing days. Oregon Roof Consulting has participated in 5 courtroom hearings and 16 arbitration hearings in Oregon and Washington and 19 on site CCB mediation meetings in Oregon - all as an expert witness, so, we are somewhat familiar with the roofing trade.

I have done work for but not limited to : Homeowners; Businesses and corporations of all sizes; Insurance companies; Banks; Churches; Relocation companies; Roofing contractors; Investment groups; HOA's; Apartment complexes of all sizes; The State of Oregon; Multiple school districts including West Linn; David Douglas; and every elementary, middle, and high school in both Hood River and Wasco (The Dalles) counties; United States Coast Guard in Astoria; etc. I have done jobs all over Oregon and Washington; All over the San Francisco Bay Area including San Francisco, Oakland, Napa, Richmond, Alameda, Fremont, Pleasanton, Berkeley, Fresno, Sacramento and Reno Nevada. We have also helped with two shingle roofing projects on the remote South Pacific island of Rarotonga (Cook Islands). This is all on my website. See www.oregonroofconsulting.com

Thank you,

Owner of Oregon Roof Consulting & Inspection

Oregon Roof Consulting and Inspection No-Nonsense Roofing Advice for Property Owners



- Affordable ~ Thorough ~ Versatile ~ Capable
- Roofing in Oregon Since 1973
- Project Management & Monitoring
- Inspections ~ Certifications ~ Owner Advocacy

www.oregonroofconsulting.com

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PO 220190 Milwaukie, OR 97222

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Joe Sardotz, Owner Operator



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Roof Inspection for :

Job Address :

Lake Oswego, Oregon 97035

I inspected this roof on April 18th 2023. I met the owner, got in the attic and got on the roof. The roof is a 1-1/2 year old 30 year factory warranted asphalt laminated shingle. One layer over plywood. Documents from shingle manufacturers and other entities will be sent. Separate photo emails will be sent. Each photo email will be numbered to correspond to the numbered items on the summary report. Shingle manufacturers and the Oregon Residential Specialty Code have been referenced. The following items should be noted :

1. All contractors are legally required to give clients / potential clients three state forms : one regarding liens; one regarding 'procedure'; and one regarding homeowners rights. According to the owner these were not supplied.
2. There is no signed by both parties contract. This is a legal requirement. ORS701.305. There are 2 'invoices', one for \$19,335 dated 9/29/21 and another for \$13,640 dated 10/21/21. The first invoice says 'Owens Corning Duration' shingles (these are not OC Duration shingles), the 2nd invoice just says 'asphalt shingles' and does not specify shingle manufacturer name or product name Owner could not provide a detailed contract signed by both parties. Same with the underlayment. There is no mention of the manufacturer of the underlayment or the product name, just 'synthetic underlayment'. 10 square rolls of synthetic costs from 99\$ to 250\$ per roll. Paperwork says 6 rolls of underlayment at \$119 per roll. This underlayment is paper thin which indicates an inexpensive entry level product. The \$119 per roll price indicates 10 square rolls. That would be 60 squares of underlayment. This roof is only 22 squares. I can't say 100% for certain that 10 square rolls were ordered but it sure looks that way. Maybe call the roofing distributor or the roofer to find out what was ordered / delivered. This is why contracts **must** be detailed and specify exactly what is going on the roof. *This is a legal requirement.*
3. There are nails blowing through the open overhangs. ****While all shingle manufacturers want nails to go completely through the deck the industry standard is to use a shorter nail at open overhangs and add 2 extra nails to each full shingle to compensate for the minimal deck penetration. It is extremely rare that I see so many nails blowing through the plywood.**

4. Intake vents on the house are 8' apart. Code is 4' apart. There are no intake or exhaust vents at all to ventilate the garage attic which is enclosed and must be ventilated.
5. According to the owners the bathroom fan was not connected to a stem vent. Instead the vent hole was eliminated by a new sheet of plywood so this bathroom fan was venting large amounts of water vapor / moisture into the attic for 1-1/2 years. Code requires that '**mechanically vented air must be discharged outdoors**'. Because of this there is extensive mold throughout the attic. Shingle nail tips are rusted after only 1-1/2 years. Galvanized nails should not be rusty. there are several sheets of damaged / broken plywood. Moisture meter readings indicated readings of 34,38,43,48,56% of moisture within the sheets and one sheet topped out at 100%. Plywood should be dry and not saturated with moisture. Plywood should be a bright light brown color not various shades of black, white, brown, and gray. There is buckled plywood all over the roof.
6. As always I check for proper fastening by carefully lifting shingles. Once the factory applied / sun activated sealant is adhered then the shingles become one, a monolithic membrane, and can't be separated without damaging them. Fortunately, this house is surrounded by very large trees so at some points of the roof the shingles were barely 'glued' and came apart with very little effort. I looked at about 130+ random nails. Nearly all nails are above the nail zone. This zone is where the 2 parts of the shingle overlap. ALL of the shingle manufacturers want the nails where the 2 parts overlap which is the strongest part of the shingle. These shingles have 2 parts : The 'Blank' or underlay and the 'Sawtooth' or overlay. Also, a majority of nails are over driven. Nails must be flush with shingle surface. **An email with documents about nailing will be sent**.
7. There are 4 minor issues that would be easy to rework : A) Flanges of all vents and pipe flashings are loose and should be secured tight to the deck. B) There is 1 missing diverter / kickout flashing. C) There is a loose piece of drip flashing in front. D) Drip / eave metal must be under the underlayment. Here the metal is on top. See photos.
8. There are issues with the large pipe and components. There are nail holes in the flange right next to the side of the flashing. Water goes in here every time it rains. Also the sealant is inadequate. See photos.
9. The invoice dated 9/29/21 says 52 sheets of plywood was replaced. I was not able to get in the main attic to count but it does not appear there are 52 new sheets of plywood on this roof. The owners should attempt to make a count. If this roof ends up being done again then an accurate sheet count can be easily made once the shingles are removed. **I saw no expansion joint between the new sheets observed. Joints are tight. Plywood must have a 1/8" expansion joint at ALL seams. **An email will be sent with documents about plywood spacing**. If plywood is wet with no expansion joint then the sheets

will swell and buckle. There is evidence of this in the attic and on the roof.

10. Invoices say 3 boxes of coil nails. There are 7,200 nails per box of 1-1/4" nails. It takes 264 nails to 4 nail fasten a square of shingles. This roof is 22 squares. $264 \times 22 = 5,808$ nails. Box of 1-1/4" nails has 7,200 nails.
11. Pipe jacks are the entry level 'no-caulk' type. The rubber collars on these always fail long before the shingles fail. (If these get no direct sunlight then they will last). They (do) make long lasting pipe jacks out of copper, sheet metal, lead, silicone. At some point buy new collars (only) and slide collars down pipes on to existing collars.

Conclusion : Law requires a detailed signed contract signed by both parties. Law requires 3 notices be given to any homeowner by any contractor. There is damaged, broken, cracked plywood. There is plywood saturated with water. There is buckling plywood all over. Plywood joints are tight. Shingle nailing is not remotely close to any shingle manufacturer's instructions / specifications. The only way to correct everything is to do it again. This is my opinion. I can't tell anyone what to do.

It is any Contractor's responsibility, obligation, and requirement to 1) Know how a roof system should be installed. 2) Install that roof system correctly.

*** The Oregon Residential Specialty Code R102.7.1 : 'Additions, alterations or repairs (excluding ordinary repairs) to any structure shall conform to the requirements for a new structure without requiring an existing structure to comply with all of the requirements of this code, unless otherwise stated. Additions, alterations or repairs **shall not cause an existing structure to become unsafe or adversely affect the performance of the building.....**'. R905.1 : 'Roof coverings shall be applied in accordance with the applicable provisions of this section and manufacturers installation instructions'. R903.1 : ' Roof Assemblies shall be designed and installed in accordance with this code and the approved manufacturers instructions such that **the roof assembly shall serve to protect the building or structure** '. R105.2 : 'Exemption from permit requirements of this code shall not be deemed to grant authorization for any work to be done in a manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction'. **** A permit may or may not be required in your area. To inquire call local building officials.***

Thank you,



Owner of Oregon Roof Consulting & Inspection

****This document carries no warranty or guarantee. It is an opinion based on industry standards (how experienced, legitimate, qualified, professionals do it), manufacturers specifications / instructions / requirements, local codes and my 44 years of experience****

PABCO PREMIER®

LAMINATED FIBERGLASS SHINGLES

Nailing Instructions

General Instructions

PABCO® recommends the use of nails. The local building code may require nails. Use four nails per shingle for normal application, as shown on page 2.

Nails must be corrosion resistant. They are commonly galvanized or aluminum. Use 3/8" diameter heads, 11 or 12 gauge roofing nails. They must be long enough to penetrate through the roofing materials and at least 3/4" into the deck. If the deck is less than 3/4" thick, the nails must penetrate through the boards. Use 1" minimum nails for new construction. Applying these shingles over existing shingles will require longer nails. Nails may be hand driven standard roofing nails or pneumatically driven nails.

Nails must be driven flush with the shingle surface. Do not under drive or over drive the nails. Under driven nails may damage the overlaying shingle by tearing through that shingle as it settles down over the nail's head or if stepped upon. An under driven nail may hold the overlaying shingle up, providing an opportunity for wind damage. An over driven nail will tear through the shingle, allowing a path for water intrusion and reducing the shingle's resistance to wind damage. A nail that is driven at an angle may cause any or all of the problems from under driven and from over driven nails.

Nails must be properly positioned on the shingle. See the figures on page 2. The nail zone is indicated by a pair of paint lines on the face of the shingle spaced about 1/2" apart, about 6" up from the bottom edge of the shingle. If nails are placed below the nail zone, the nail heads may not be covered by the overlaying shingles. If nails are placed above the nail zone, the wind resistance of the shingles is reduced and damage may occur which allows an extra path for water intrusion. The indicated positions across the shingle are to assure the nails are not near the end-to-end joints of the overlaying shingles.

Special Applications

Steep Slope Application: On slopes greater than 21" per foot (Mansard type roofs), 6 nails are required. Shingles must be hand sealed when applied with asphalt roof cement complying with ASTM D4586 Type II. Apply 4 quarter sized spots equally spaced along the nail zone, above the exposed area of the shingle. See the figure on page 2 for nail and roof cement placement.

High Wind Application: For areas where local knowledge indicates exposure to high winds is likely (or where required by the building code), shingles must be applied with 6 nails and sealed to qualify for the wind damage warranty coverage. See the figure on page 2 for nail and roof cement placement. PABCO® shingles have self-sealing asphalt strips that must be subjected to heat and time to fully bond the shingles together. Direct warm sunlight can seal a roof in one day in hot climates. In other locations, the time needed to reach a fully sealed roof will be longer. If it is safe to allow the seal strip to bond the roof, that bond is generally stronger than a hand sealed roof. If it is not reasonable to wait for the seal strip bond, hand sealing (as detailed above) is appropriate.



PABCO® Roofing Products
Exceptional People. Remarkable Products.®

📍 1476 Thorne Road, Tacoma, WA 98421

☎ 253.272.0374 🌐 www.pabcoroofing.com

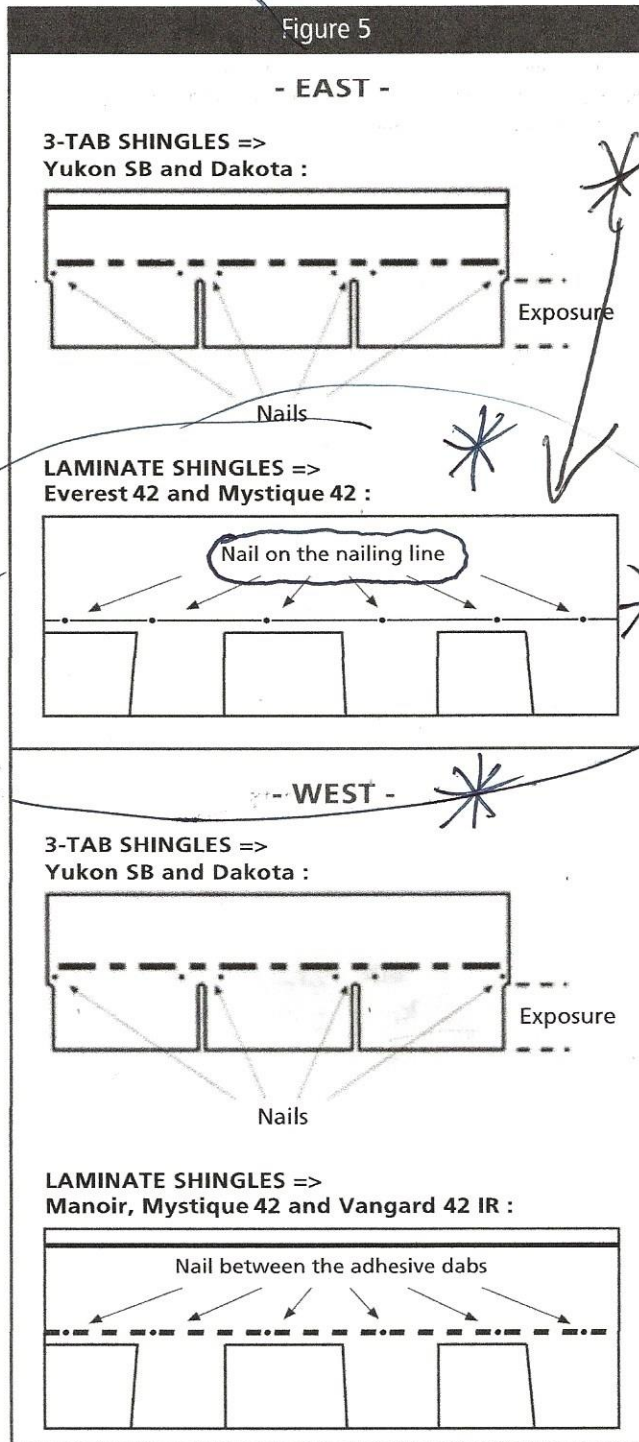
BP NAILING GUIDELINES < SEE BELOW

SEAL DOWN SHINGLES IF INSTALLED:

- In high wind areas;

(ITEM 2 - PAGE 1)

- On slopes greater than or equal to 15/12. Please refer to **Section 3.1-D** and see **Figure 4** ;
- At a temperature that will not activate the self-seal adhesive, refer to **Section 3.1-F** (BP recommends that hand sealing should be done from September 21st to March 21st) ;
- In areas subject to high dust conditions.



When cementing shingles, apply a small dab of Asphalt Plastic Cement, the size and thickness of a 25¢ – or a 16 mm (5/8") bead, 1.5 mm (1/16" thick) – located 2.5cm (1") and 30 cm (12") in from each end. Shingles must be pressed firmly into Asphalt Plastic Cement (see **Figure 4**).

C – Protective Tape :

Do not remove parting strip of protective tape from the shingle underside. Its purpose is to prevent the shingles from sticking together while in the bundle. It does not affect the application or the effectiveness of the product.

D – Application on roofs with slopes greater than or equal to 15/12 :

On such slopes, use six (6) nails per shingle instead of four. For nailing positions refer to **Section 4** for 3-tabs and **Section 5** for Laminates. See also **Figure 5**. After nailing, apply a small dab of Asphalt Plastic Cement (refer to **Section 3.1-B**). Excess application of Asphalt Plastic Cement can cause blistering. For Laminate shingles, apply Asphalt Plastic Cement 2.5 cm (1") and 30 cm (12") in from each end for a total of four dabs. Shingles must be pressed firmly into Asphalt Plastic Cement (see **Figure 4** and **5**).

E – High Wind Warranty Installation :

To qualify for High Wind Warranty, which warrants against wind damage or shingle displacement for winds between 200 km/h (125 mph) and 220 km/h (135 mph), shingles must be fastened using 6 nails and all shingles located at the roof edges must be cemented together with a 10 cm (4") wide layer of Asphalt Plastic Cement. If above special application instructions are not followed, shingles will be warranted for winds up to 180 km/h (110 mph). See **Table 1a – EAST** and **Table 1b – WEST** for wind speed warranty.

NATIONWIDE
AVAILABILITY



Timberline® Shingles are available nationwide.

STACKING AND
STORAGE...

- **Proper storage of Timberline® Shingles...** Proper storage is important for installer safety as well as shingle handling.
- **Store Timberline® Shingles properly...** out of the weather in a covered, well-ventilated, dry area to keep the shingles from possible damage.

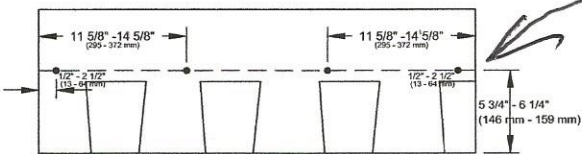
INSTALLING
STARTER
COURSE...

Use WeatherBlocker™ Premium Eave/Rake Starter Strip... Follow application instructions starting on page 143.

NOTES ON HIGH
NAILING...

- EXTREMELY IMPORTANT:**
High-nailing Timberline® Shingles can cause product failure.
- **Laminated shingles have two parts...** these parts are laminated together.
 - **Your nailing is designed to keep both parts together...** Combined with the lamination adhesive, it helps hold these two pieces together.
 - **Nails must penetrate the double-ply area...** Your nails must be placed through both sections, catching 1/4" (6 mm) of the backer strip.
 - **High nailing weakens wind resistance...** Wind can lift shingles off a roof when they are nailed too high.
 - **Simply use the nail guide line...** that is painted on every GAF Timberline® Series Shingle as a guide to ensure proper nailing.

CORRECT NAILING PATTERN FOR
GAF TIMBERLINE® SERIES SHINGLES...



Standard Nailing Pattern - four nails per shingle

HIGH
NAILING

USE
NAILING
LINE

TIMBERLINE®
SERIES SHINGLES

Correct Fastening

8



NAIL LENGTH

YOUR OBJECTIVE:

To learn CertainTeed's recommended methods for fastening shingles.

GENERAL FASTENING GUIDELINES

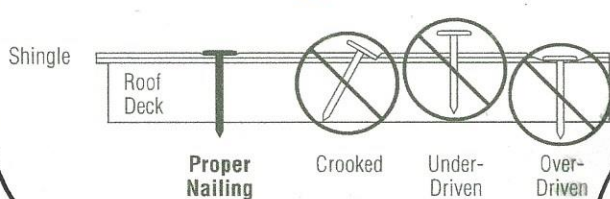


Figure 8-1: Fastening three-tab, strip-type shingles.

Proper placement of fasteners is important for shingle performance and warranty protection. Ideally, placement of fasteners should be as specified according to the precise locations shown for each shingle. However, in practice some variation (dimensional tolerance) is acceptable.

- ◆ When fastening a typical three-tab, strip-type shingle, CertainTeed requires that at least four fasteners be used.
- ◆ Nails are strongly recommended instead of staples. (*Nails MUST be used with Hatteras, LandMark TL, Presidential TL, Carriage House and Grand Manor shingles.*)
- ◆ Nailing locations vary by shingle style and by roof slope. It is critical to fasten the shingles in the proper locations in order to achieve designed performance. Improperly fastened shingles may blow off or slip out of place. The use of asphalt roofing cement in small quarter-size dabs to hold the shingle down is required on most shingles when applied to steep slopes exceeding 21/12 (60 degrees). Consult individual shingle application instructions for details on the above, including fastening points.
- ◆ When fastening a heavier and thicker premium product, like Carriage House Shingle™ or Grand Manor Shingle®, CertainTeed requires longer nails.
- ◆ Nails with a barbed or rough shank are recommended. Smooth pneumatic nails are also acceptable.
- ◆ Nail shanks must be either 11- or 12-gauge.
- ◆ Nail head diameter must be at least 3/8".

- ◆ Nail shanks must be long enough to penetrate the roofing and then go 3/4" into solid wood, plywood or non-veneer wood decking, or through the thickness of the decking, whichever is less.
- ◆ Be sure fasteners are driven straight, with nail heads flush with the shingle surface and never cutting into the shingle (Figure 8-1).
- ◆ All nails must be corrosion resistant; for example, double-dipped galvanized steel, aluminum, copper, or stainless steel.
- ◆ To prevent shingle distortion, do not attempt to realign a shingle by shifting the free end after two fasteners are in place.
- ◆ Fasteners should not go into, above, or between the self-sealing strips (except for Hatteras and Highland Slate). If they do, the shingles may not seal properly and will be more likely to blow off.
- ◆ If a nail is underdriven, be sure that it is hammered down **flush**.
- ◆ Seal overdriven nails with asphalt roofing cement and install another nail nearby.
- ◆ Fasteners must not be exposed; i.e., visible on the finished roof.

ARE STAPLES ACCEPTABLE?

Both ARMA and CertainTeed **strongly recommend** that properly driven and applied roofing nails be used as the fastening system for asphalt shingles. Staples can perform acceptably if properly applied, but proper alignment and application is more difficult with staples than with nails, making shingle damage and blow-offs more likely. (*Nails MUST be used for Hatteras®, Landmark™ TL, Presidential T/L, Carriage House and Grand Manor shingles, plus in high-wind areas and to qualify for an increased wind warranty if available.*)

Caution: Check your local Building Code for applicable fastener requirements.

Succeeding courses are full-width, the first course completely overlapping the starter, and followed by courses half-lapped over preceding courses, on up the roof.

Fasten as described above. (See Figure 4)

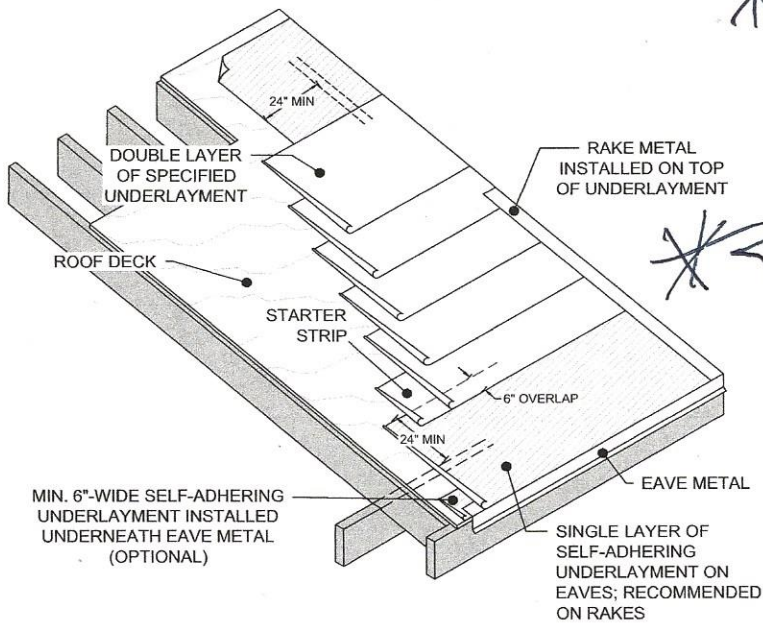


Figure 4 - Application of Self-Adhering and Field Underlayments on Roof Slopes 2:12 Up to 4:12 (Ice Dam Regions)

SHINGLE FASTENING

Type of Fasteners: Fasteners must be minimum 12-gauge (0.105 inch [3 mm]) shank, galvanized steel, stainless steel, aluminum or copper roofing nails, with a 3/8" (10 mm) head, compliant with ASTM F1667, and long enough to penetrate through all layers of roofing materials and at least 3/4" (19 mm) into the roof sheathing. Where the roof sheathing is less than 3/4" (19 mm) thick, the fasteners shall penetrate through the sheathing.

Malarkey approves the use of hand-nailing and/or pneumatic nailers for applying fasteners, but nails must be driven flush to the shingle surface and not overdriven, underdriven or driven at an angle, especially on low slope installations where water runs off less freely and leaks could result. When fastening adjacent shingles, butt them loosely together to prevent buckling.

The use of staples is not an approved fastening method. (See Figure 5)

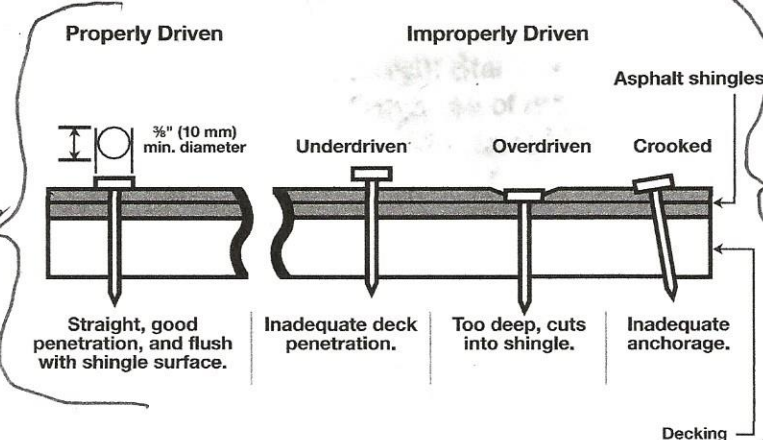


Figure 5 - Nailing Instructions

Nailing Pattern: Under normal conditions, use four (4) fasteners for each full shingle.

Fasteners must be placed in the nailing area approximately 1" (25 mm) in from each edge and the remaining fasteners evenly spaced between. Malarkey laminate shingles feature The Zone®, an enlarged, 1 5/16" (33 mm) wide nailing area that helps ensure correct fastener placement. (See Figure 6)

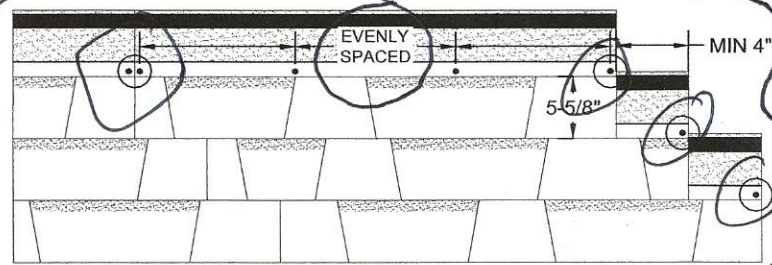


Figure 6 - Laminated, 4-Nail Fastening Pattern

Wind Resistance and Hand-Sealing: Malarkey shingles are manufactured with strips of a factory-applied, thermal sealant that is activated by the heat of the sun after the shingle is on the roof. Exposure to the sun's heat bonds each shingle to the one below for wind resistance.

A variety of conditions like cold weather, high winds or blowing dust, however, can affect the ability of the sealant strip to activate and prevent shingles from self-sealing during, or shortly after, installation. If shingles have not sealed after a reasonable time period, hand-sealing (also called hand-tapping) is strongly recommended.

Note: Malarkey's wind warranties apply only when shingles are sealed, whether by hand-sealing or activation of the self-sealing strips. Failure to seal under adverse circumstances like those described above is not a manufacturing defect.

To hand-seal a shingle, apply four (4) quarter-size dabs of asphalt roof cement conforming to ASTM D4586 evenly spaced under each shingle, and press shingles firmly into the cement. Excessive use may cause blistering; correct amounts should not bleed out from under the shingle. (See Figure 7)

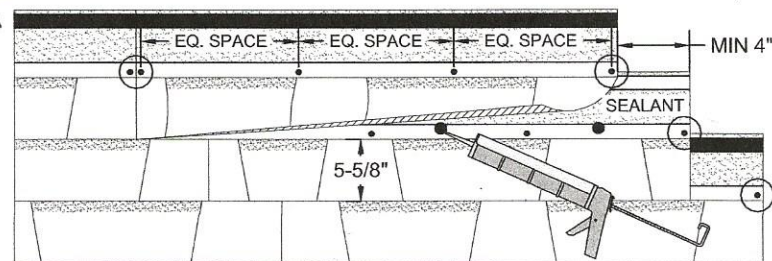
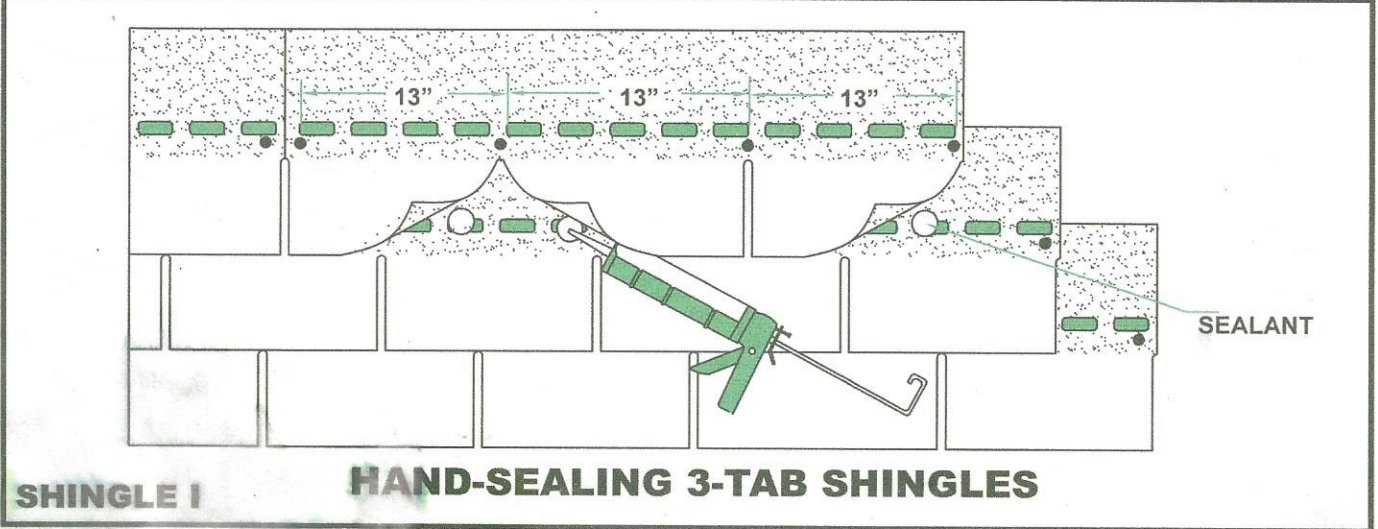
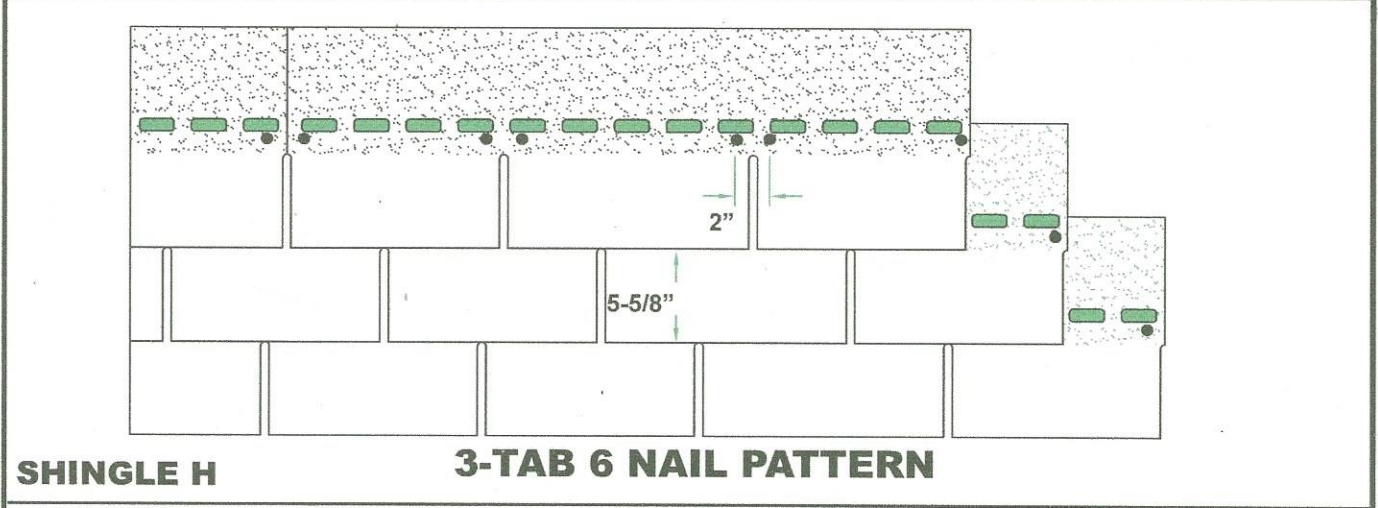
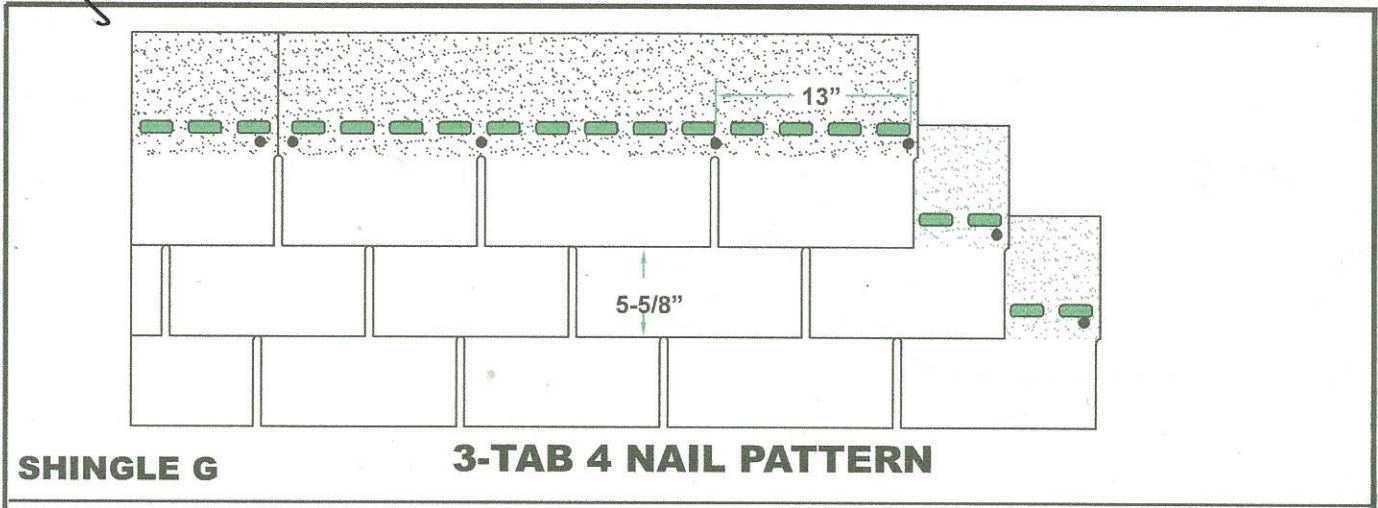
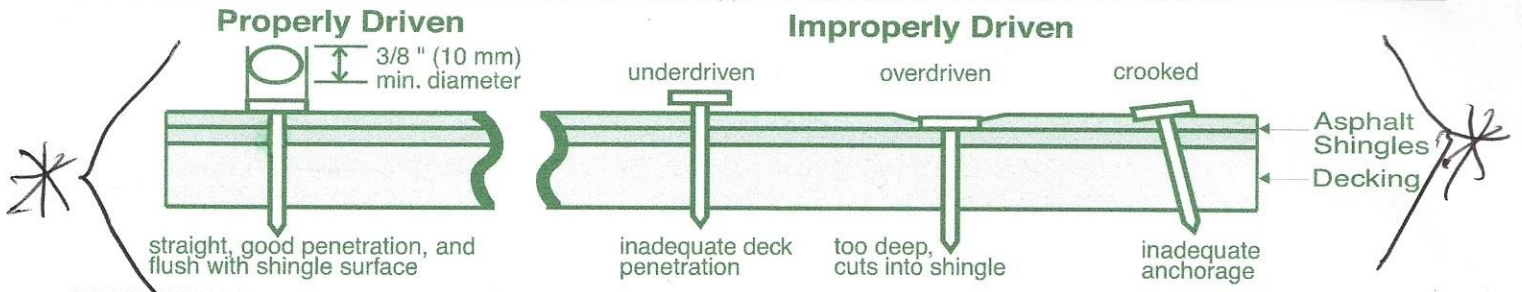


Figure 7 - Hand-Sealing Laminated Shingles

Steep Slope Fastening of Laminated Shingles: Roof decks with slopes greater than 21" (533 mm) per 12" (305 mm) require installation with six (6) fasteners per shingle and hand-sealing underneath.

Fastener location must be in the nailing area approximately 1" (25 mm) in from each edge and the remaining four (4) fasteners evenly spaced between. (See Figure 8)



TECHNICAL BULLETIN

PROPER USE OF PNEUMATIC COIL NAILERS

SUPERSEDES PREVIOUS BULLETINS

Issue Description:

The proper use of pneumatic coil nailers for the installation of asphalt shingles.

Recommendations:

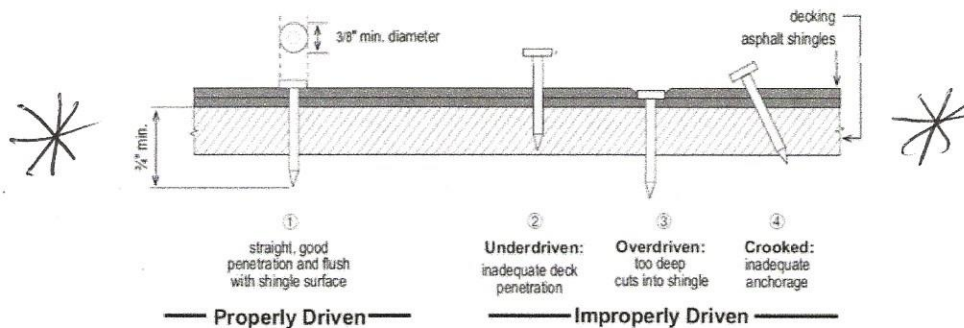
Proper setup and use of pneumatic coil nailers is critical for correct installation of Owens Corning® asphalt shingles. Improper use of pneumatic coil nailers may lead to shingle damage and/or shingle failures during a high-wind event. Ensuring proper nail gun setup will:

- ✓ Prevent over-driving the nails, which can cause the nail head to blow through the shingle.
- ✓ Prevent under-driving the nails, which can prevent shingles from laying flat and sealing properly.

Key Considerations:

- Use regulated compressed air and never apply more air pressure than is necessary to properly drive the fasteners.
- Most pneumatic coil nailers operate at optimum efficiency when the pressure is set between 80 and 95 psi.
- Most coil nailers are equipped with a depth adjustment knob. Adjust the settings for the nail heads to be driven flush.
- The startup and cutout pressures on the compressor should be set to maintain optimum operating pressure in the compressor tank at all times.
- Air hose length and diameter should be considered when setting psi at regulator.
- Operating more than one coil nail gun from a single compressor may affect how well the fasteners penetrate the shingles.
- Use corrosion resistant 11 or 12-gauge nails with a minimum 3/8-inch diameter heads, complying with ASTM F1667.
- Unusually cold or hot temperatures may require additional tuning of the compressor for optimum nail driving performance.
- Always read and be familiar with the operating instructions for the compressor and nail gun.
- When using pneumatic coil nailers, **always ensure that the nail is driven flat and flush with the shingle.**

Any shingle into which an overdriven fastener has been installed must be repaired by either replacing the shingle or covering the fastener with asphalt roofing cement and installing an additional fastener within 1-inch of the overdriven fastener.



Please contact 419-248-6557 for additional information.
Email: gettech@owenscorning.com

Disclaimer of Liability

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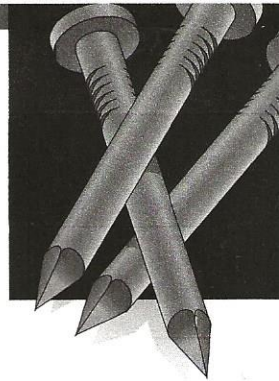


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PROPER INSTALLATION OF APA RATED SHEATHING FOR ROOF APPLICATIONS

ITEM 5 ON SUMMARY



Like all construction materials, APA Rated Sheathing panels must be installed correctly to insure best performance. Nearly all roof sheathing complaints are due to incorrect installation. Following these simple construction steps will provide best performance and minimize complaint callbacks.

STEP 1. Always check for level nailing surface. This can be done with a piece of lumber (6 feet to 10 feet long) or a long carpenter's level. Trusses or rafters should be shimmed as necessary to provide a level nailing surface.

If top chords of trusses or rafters are warped or bowed, install blocking to straighten.

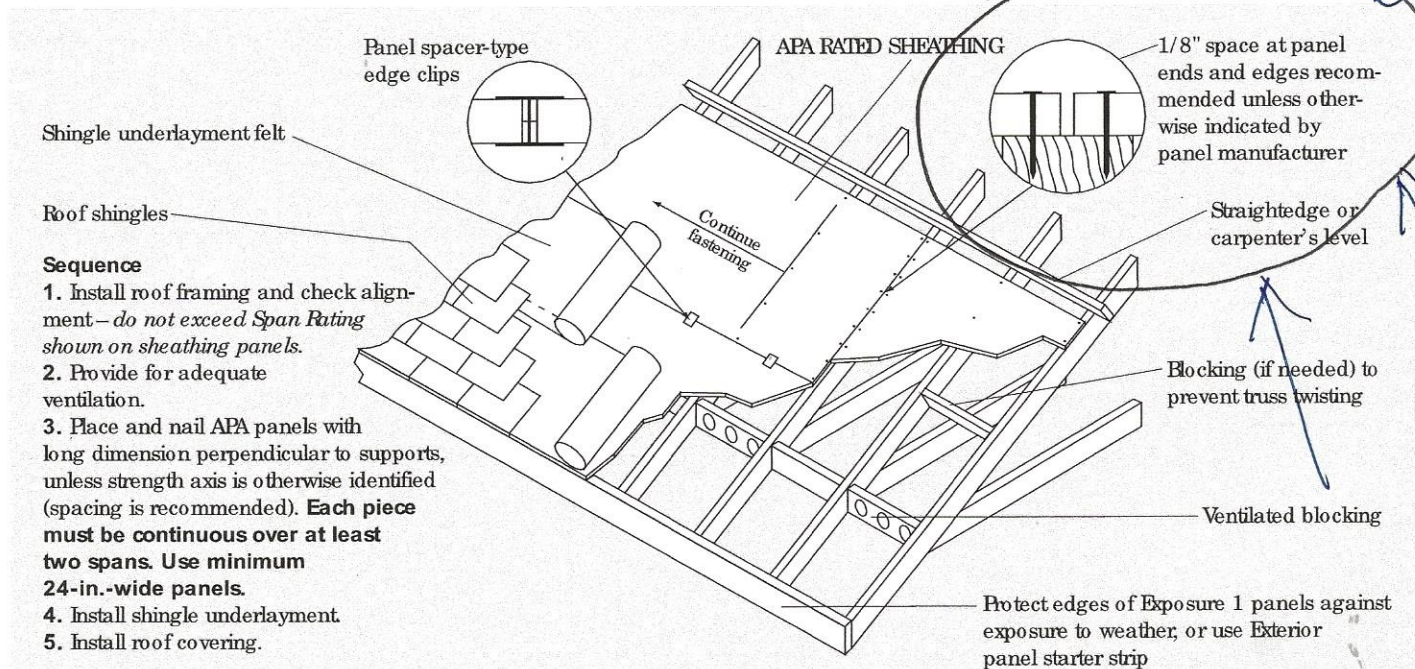
STEP 2. Provide roof ventilation according to building codes (see *hints* below).

Ventilation hints

1. Minimum net free ventilation area of 960 square inches for each 1,000 square feet of ceiling area is required. When vents are located at eaves or soffits and near peak or along ridge for maximum air flow, free vent area may be reduced (minimum 480 square inches per 1,000 square feet).
2. Vent exhaust air from kitchens and bath to outdoors with vent pipes that run through the roof cavity or attic to roof ventilators. **Do not vent exhaust air directly into roof cavity or attic.**
3. Install baffles providing a minimum of 1 inch of clear space between framing and/or under roof sheathing at eaves to

insure that ceiling or roof insulation does not block ventilation paths. For vaulted or cathedral roof construction, provide free ventilation path from eaves to ridge between all rafters.

STEP 3. Panels should be fastened with a minimum of 8d common nails spaced at a maximum of 6 inches on center at supported panel ends and edges. At intermediate supports, fasten panels 12 inches on center. In high wind areas more fasteners may be required. Fasteners should be nominally 3/8 inch from panel ends and 3/8 inch from panel edges (see hints on following page). **For pitched roofs wear skid-resistant shoes. Place screened surface of panel or side with skid-resistant coating up.**



Sequence

1. Install roof framing and check alignment—do not exceed *Span Rating* shown on sheathing panels.
2. Provide for adequate ventilation.
3. Place and nail APA panels with long dimension perpendicular to supports, unless strength axis is otherwise identified (spacing is recommended). **Each piece must be continuous over at least two spans. Use minimum 24-in.-wide panels.**
4. Install shingle underlayment.
5. Install roof covering.

APA

The Engineered Wood Association

GAF

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TIMBERLINE Natural Shadow
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GENERAL INSTRUCTIONS

- **MATERIAL SAFETY DATA SHEETS:** When using GAF products, e.g., shingles, underlayments, plastic cement, etc., please refer to the applicable MSDS. The most current versions are available at www.gaf.com. GAF does not provide safety data sheets or installation instructions for products not manufactured by GAF. Please consult the material manufacturer for their MSDS and installation instructions where appropriate.
- **ROOF DECKS:** Use minimum 3/8" (10mm) plywood or OSB decking as recommended by APA-The Engineered Wood Assn. Wood decks must be well-seasoned and supported having a maximum 1/8" (3mm) spacing, using minimum nominal 1" (25mm) thick lumber, a maximum 6" (152mm) width, having adequate nail-holding capacity and a smooth surface. Do NOT fasten shingles directly to insulation or insulated deck unless authorized in writing by GAF. Roof decks and existing surfacing material must be dry prior to application of shingles.
- **UNDERLAYMENT (LEAK BARRIER):** Install GAF leak barrier at the eaves in localities where leaks may be caused by water backing up behind ice or debris dams.
- **UNDERLAYMENT (ROOF DECK PROTECTION):** Underlayment beneath shingles has many benefits, including helping to prevent wind-driven rain from reaching the interior of the building and to prevent sap in some wood decking from reacting with asphalt shingles. Underlayment is also required by many code bodies and is required to maintain the shingles' UL Class A fire rating. When an underlayment is installed, use a breather-type underlayment, such as GAF Shingle-Mate® or Deck-Armor™ underlayments. GAF Tiger Paw™ underlayment, with its moisture control design, can also be used. Always have a design professional review ventilation requirements when using a moisture control design underlayment.
- **FASTENERS:** Use only zinc-coated steel or aluminum, 10-12 gauge, barbed, deformed, or smooth shank roofing nails with heads 3/8" (10mm) to 7/16" (12mm) in diameter. Fasteners should be long enough to penetrate at least 3/4" (19mm) into wood decks or just through the plywood decks. Fasteners must be driven flush with the surface of the shingle. Overdriving will damage the shingle. Raised fasteners will interfere with the sealing of the shingles and can back out.
- **ASPHALT PLASTIC CEMENT:** Use asphalt plastic cement conforming to ASTM D4586 Type I or II.
- **WIND RESISTANCE/HAND SEALING:** These shingles have a special thermal sealant that firmly bonds the shingles together after application when exposed to sun and warm temperatures. Shingles installed in fall or winter may not seal until the following spring. If shingles are damaged by winds before sealing or are not exposed to adequate surface temperatures, or if the self-sealant gets dirty, the shingles may never seal. Failure to seal under these circumstances results from the nature of self-sealing shingles, and is not a manufacturing defect. If shingles are to be applied during PROLONGED COLD periods or in areas where airborne dust or sand can be expected before sealing occurs, the shingles MUST be hand sealed. See Nailing Instructions / Hand Sealing.
- **MANSARD AND STEEP SLOPE APPLICATIONS:** For roof slopes greater than 21" per foot (1750mm/m), shingle must be hand sealed. DO NOT use on vertical side walls.
- **RELEASE FILM:** Plastic film strips are present either on the back or face of each shingle. The film strips are to prevent shingles from sticking together while in the bundle. Do not remove the film strip before or during the application.
- **THROUGH VENTILATION:** For optimal shingle life and to help prevent mold growth, all roof structures must have through ventilation to prevent entrapment of moisture-laden air behind roof sheathing. Ventilation must be designed to meet or exceed current F.H.A., H.U.D., or local code minimum requirements. Note: Minimum net free ventilation area of 1 sq. foot per 150 sq. feet (1 sq. meter per 150 sq. meters) of ceiling area is required. When vents are located at the eaves and near the roof's peak (balanced) for maximum air flow, ventilation may be reduced to 1 sq. foot per 300 sq. feet (1 sq. meter per 300 sq. meters).
- **EXPOSED METAL:** Paint all exposed metal surfaces (flashing, vents, etc.) with matching GAF Shingle-Match™ roof accessory paint for best appearance.
- **NOTE:** All drawings not drawn to scale.

INSTRUCCIONES GENERALES

- **HOJAS DE DATOS DE SEGURIDAD DE LOS MATERIALES (MSDS):** Cuando utilice los productos de GAF, tales como tejas, bases de pisos, cemento plástico, etc., consulte las MSDS correspondientes. Las versiones más actuales están disponibles en www.gaf.com. GAF no proporciona hojas de datos de seguridad ni instrucciones de instalación para productos que no sean fabricados por GAF. Consulte al fabricante del material para sus MSDS e instrucciones de instalación según corresponda.
- **PLATAFORMAS BASE DE TECHOS:** Use una plataforma base de 3/8" (10mm) de madera terciada u madera aglomerada orientada (OSB por sus siglas en inglés) como mínimo según lo recomendado por la Asociación Americana de Madera Terciada (APA por sus siglas en inglés). Las cubiertas de madera deben estar bien preparadas y apoyadas, con un espacio máximo de 1/8" (3mm), con un espesor mínimo nominal de 1" (25mm), con un ancho máximo de 6" (152mm), y una capacidad de retención de clavos adecuada y una superficie suave. NO asegure las tejas directamente al aislante o a la plataforma base aislada a menos que sea autorizado por escrito por GAF. Las plataformas base de techo y material de superficie existentes deben estar secas antes de la aplicación de las tejas.
- **CAPA BASE (barrera contra goteras):** Instale barrera de filtraciones de GAF en los aleros en lugares donde el estancamiento de agua detrás de hielo o desechos podría causar filtraciones.
- **CAPA BASE (PROTECCIÓN PARA CUBIERTAS DE TECHOS):** La capa base debajo de las tejas tiene muchos beneficios, incluyendo el ayudar a evitar que la lluvia arrastrada por el viento alcance el interior del edificio y evitar que la savia de algunas plataformas de madera reaccione con las tejas asfálticas. La capa base también es requerida por muchos códigos de construcción para mantener la calificación Clase A de UL contra incendios. Donde vaya a instalar una capa base, use una de tipo respirable como las capas base ShingleMate® o Deck-Armor™ de GAF. También se puede utilizar la capa base Tiger Paw™ de GAF, con su diseño de control de la humedad. Siempre pida a un profesional en diseño que revise los requisitos de ventilación cuando utilice una capa base con diseño de control de la humedad.

TECHNICAL BULLETIN

ASPHALT SHINGLE BUCKLING

SUPERSEDES PREVIOUS BULLETINS

Issue Description:

The appearance of buckling of asphalt shingles is generally due to an uneven roof deck, wrinkled underlayment and/or movement of roof sheathing. As a result, newly installed shingles may appear wavy or wrinkled because asphalt shingles will conform to imperfections in the underlayment and the roof sheathing, causing irregular shapes to transfer through the surface of the roof covering.

Several causes may contribute to the appearance of buckling on roofs with asphalt shingles:

- Organic asphalt felt underlayments may can wrinkle when exposed to rain prior to the installation of asphalt shingles. When the felt underlayment and asphalt shingles are installed over wet roof deck moisture may be trapped below the roof covering for a period of time and may result in the movement of the deck materials and/or wrinkling of the underlayment leading to the appearance of buckling of asphalt shingles.
- Self-adhered underlayments may also wrinkle if there is poor adhesion to the decking materials, especially in cold temperatures and wet conditions.
- When rain occurs or high relative humidity is present in the air following a shingle tear off, the exposed wood deck may absorb moisture. This increase in the moisture content of the exposed wood can cause movement of the deck materials
- Inadequate ventilation of the roof deck may reduce drying, and may cause condensation and/or accumulation of moisture in the roof sheathing leading to the appearance of buckling.
- Improper spacing of roof sheathing may cause the appearance of buckled shingles due to expansion/contraction. For proper spacing of plywood and Oriented Strand Board (OSB), the Engineered Wood Association (APA)¹ recommends minimum 1/8-inch and maximum 1/4-inch space between panel edge and end joints.
- Finally, compressible underlayment materials such as foil faced reflective insulation blankets, may also be the cause of buckling of asphalt shingles.

Recommendations:

Provide adequate roof ventilation to allow moisture to escape from the roof system. Consult local building code requirements for guidance on the correct levels of air exchange, intake balance and exhaust venting.

If wrinkling is not resolved with the improved roof ventilation measures, remove the shingles from the affected area. Cut out the wrinkled felt and replace with new underlayment, and install new asphalt shingles. Make sure to apply shingles in accordance with Owens Corning's written installation instructions. Consult the services of a licensed/certified roofing professional.

¹The Engineered Wood Association (APA) (formerly the American Plywood Association) (<http://www.apawood.org>)

Please contact 419-248-6557 for additional information.
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