

Confidential Inspection Report (Re-Roof)

05/07/2019

LOCATION

TYPE: Townhome, built 1982; Gable roof w/ 4:12 slope, Truss frame w/ spans 24 inches on center

OVERVIEW / DISCLAIMERS

The scope of this inspection is to provide an additional qualified opinion on the readily observable soundness and quality of the overall roof covering system as it relates to the re-roof installation completed on 01/10/2019 by the homeowner's contractor, Martellini Construction, Inc. Although not required, the roof was inspected from the rooftop, by ladder at eaves and rakes, and from inside the attic space. Because we understand that investing in home improvements adds to the soundness, beauty and value of a home, any issues that appear problematic or substandard to what we have come to expect in purchasing a new roof will be noted as specific defects – i.e. material, major, minor or cosmetic defects.

While home inspections are not required to determine compliance with local building codes/regulations or with manufacturer's installation recommendations, there are many standards and common building practices that can be checked during a typical home inspection. The International Residential Code states: "R903.1 General. Roof decks shall be covered with approved roof coverings secured to the building or structure... Roof assemblies shall be designed and installed in accordance with this code and the approved manufacturers installation instructions such that the roof assembly shall serve to protect the building or structure." Frequently, building codes don't address many of the details required for a complete and proper installation of the many available roofing products. If you are looking to code to provide information about what to inspect at the roof system, you won't find much detail. When the code says something like "in accordance with the manufacturers installation instructions" – that should not be taken lightly.

Contractors and installers who do not follow manufacturers' recommendations, but instead rely on their own past experience, may considerably diminish the quality and workmanship of roofs so that the structures may not perform as well or last as long, had they followed the manufacturers' recommendations during installation. Manufacturers of building materials test their own products and know how they will react to damaging and deteriorating forces, so they're better equipped than an outside agency at choosing the installation method which will maintain warranties and maximize the long-term service life. So, when building code is silent on many aspects of roof covering, the manufacturer's installation instructions are the single best source for many of the requirements dictating the correct application of roof coverings. Although it goes well beyond the requirements of inspection standards of practice, when possible, this report includes identifying the brand and model of the material used, researching the installation requirements, and confirming compliance.

MATERIALS USED

- **Laminate Asphalt Roof Shingle**_ BRAND: GAF; MODEL: Timberline HD (Charcoal)
- **Starter Strip Shingles**_ BRAND: GAF; MODEL: Pro-Start
- **Ridge Cap Shingles**_ BRAND: GAF; MODEL: Seal-A-Ridge (Charcoal)
- **Ridge Vent**_ BRAND: GAF; MODEL: Cobra Snow Country Advanced
- **Deck Sheathing**_ 7/16-inch OSB (Exposure 1)
- **Attic Vent**_ BRAND: Lomanco; MODEL: LomanCool 2000 Power Vent
- **Underlayment**_ **[Unable to Identify]**
- **Roofing Nails**_ BRAND: Stinger; MODEL: 1 ¼ inch Smooth Shank Electro Galvanized Nails
- **Plumbing Vent Boots**_ BRAND: IPS Roofing Products; MODEL: #AB31, Size: 1 ½", 2", or 3"

USEFUL REFERENCES

- [GAF Product Doc. Online Library; Manufacturer's Recommended Installation Instructions](#)
- GAF Technical Services can be contacted at 1-800-ROOF-411 (1-800-766-3411)
- [Building Codes \(PG County\)](#)
- [Department of Permitting, Inspections and Enforcement \(DPIE\); PG County](#)
- [Maryland Home Improvement Commission](#)

SUMMARY OF FINDINGS / ISSUES

DECK SUBSTRATE

“CODE 1503.1 GENERAL: Roof decks shall be covered with approved roof coverings secured to the building or the structure in accordance with the provisions of this chapter. Roof coverings shall be designed in accordance with this code, and installed in accordance with this code and the manufacturers’ approved instructions.” Although replacing roof coverings doesn’t require a permit, replacement of roof decking (i.e. the sheathing under the shingles) does require a permit.

OBSERVATIONS:

- Based on photos taken prior to roof replacement and observed post-construction debris left in attic, new 7/16-inch OSB Exposure 1 sheathing (which meets minimum code), was used to replace several water and mold damaged sections of 3/8 inch wood ply decking. Except where missing, H-clips are installed at each horizontal joint in the center of each rafter bay for the purpose of providing added support to the unsupported edges of sheathing panels.

CONCERNS:

- *Cutout at Ridge for Ventilation*__ [Material Defect] The sheathing cut out at the ridge to allow for proper ventilation was not cut to proper specifications. Sheathing was cut jagged with no uniform gap, the entire length of the ridge, from rake end to rake end. Manufacturer’s installation instructions specify cutting a slot opening of 7/8-inch slot on each side of ridge (1 ¾-inch slot total) for roofs with no ridge board. As a substitute for sheathing substrate removed at roof ridge ends, 8-inches of either starter shingles or ice barrier was attached over decking to terminate the opening 6-inches before end of ridge vent atop roof. Comment from GAF: “This does not conform to the manufacturer’s recommended installation instructions for the ridge vent installed and will effect proper ventilation and could create possible points of water entry at rakes into roofing system. The ventilation slot in decking needs to be cut per instructions and the missing decking at ridge ends needs to be replaced with a like material.” (Also see below: “VENTILATION; Ridge Vent”).
- *Panel Spacing*__ [Possible Major Defect] There should be a minimum 1/8-inch space at panel ends and edges to allow for panel expansion and contraction. From inside attic, the damaged panel sections that appear to have been recently replaced are cut very jagged and have sections with no gap left between panels (buted together) to as much as a 3/8-inch gap between panels. If asphalt shingles are installed over sheathing with gaps exceeding 1/4-inch, over time, these gaps may telegraph through and become visible. And panel expansion in hot, humid weather could buckle panels at edges, prematurely damaging roof covering materials and creating points of entry into roofing system.
- *Narrow-Width Roof Panels*__ [Possible Major Defect] The majority of damaged sections of decking was replaced at the ridge vent, where 9-inch-wide strips of OSB panels were installed without replacing original H-clips or adding supports to newly created unsupported panel edges. Viewing from attic space post-install, it’s also impossible determine if these narrow-width panels extend over only one span (i.e. two truss supports) or more. Although it is very common for OSB panels to be cut to a width less than four feet to accommodate the size and shape of the roof system, whenever possible, panels should be laid out so that the minimum panel is 24 inches – even if that creates two panels less than full width. This is because allowable uniform roof live loads typically apply to panels tested 1) at least 24 inches wide, 2) with the long dimension perpendicular to supports and installed continuously over two or more spans (i.e., three or more truss supports) with the strength axis of the panel perpendicular to the supports, and 3) with end joints of each adjacent piece of decking staggered, and panel edge H-clips installed (if they are recommended by the manufacturer). Ultimately, the decision to use H-clips is an architect’s or structural engineer’s call, and the lack of them is not a defect unless you know that they were required in the jurisdiction in which the home is located at the time the home was built. If panels must be cut to less than 24 inches in width, though, it is often recommended to provide sufficient edge support to ensure adequate panel performance.
- *Fastener Penetration into Deck at Rakes*__ [Possible Material Defect] When testing if shingles on rooftop were firmly nailed to decking at rake ends (prone to wind damage), several sections of shingle/underlayment/fasteners lifted easily out and off of deck sheathing. Fastener and nail penetration does not appear to be the issue; possible issue with integrity (‘nailability’) of substrate.
- *Roof Decking and Permit Requirements*__ [Code Required] Although replacing roof coverings doesn’t require a permit, replacement of roof sheathing (i.e. the plywood under the shingles) does require a permit. When checked, there was no indication that a permit was acquired or any inspections done for the partial decking replacements that were made.

RECOMMENDATIONS:

- Nothing is more important in roofing than preparing the surface under the shingles. With a roof tear-off, when the old materials are removed, you’ll have a clean deck that allows you to see any potential problems that need to be fixed. This could range from rotten wood to cracked boards to an unsound deck that won’t hold nails as well. Application of replaced sheathing is messy and does not follow manufacturer’s recommended installation instructions. Correction and further evaluation by a code inspector and a qualified professional roofing contractor is recommended.

UNDERLAYMENT

The proper installation of high-quality roof deck protection is the foundation on which a good roof system is built. 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 must be installed under an asphalt shingle roof system, but thoroughly inspecting the underlayment is impossible at an existing roof.

OBSERVATIONS:

- A non-asphalt-saturated, poly-blend type of underlayment appears to have been used and is partially visible from the rake ends of the roof beneath the shingles. Without knowing the standard designation number and type of underlayment, there is no way to tell if this product is compatible with your roof system.

CONCERNS:

- *Underlayment Placement and Deck Coverage*__ Several sections of bare wood decking are exposed due to insufficient and incorrect application of underlayment.
 - Locations of Incorrect Application:
 - 1) North-facing rake end at front slope of roof; underlayment is cut short and placed on top of the drip edge instead of underneath the drip edge.
 - 2) South-facing rake end at front slope of roof; underlayment is cut short and placed on top of the drip edge instead of underneath the drip edge.
 - Locations of Insufficient Deck Coverage:
 - 1) North-facing ridge at back slope; underlayment is missing from high-risk corner where two sloped roofs intersect.
 - 2) North-East corner of eave at back slope where gutter meets sidewall; underlayment is missing from high-risk corner where sloped roof drains stormwater into gutter next to sidewall without kickout flashing. (Also see “DRIP EDGE” concerns below).

RECOMMENDATIONS:

- The rake ends, ridge and corners at eaves where sloped roofs drain into gutters at sidewalls are all critical roof sections that are prone to water infiltration and wind damage. The only way to correctly apply underlayment is when the roof is being replaced and you have a clean deck free of obstructing materials. After the roof covering has been installed, the only way to mitigate the absence of critical water-shedding materials is to re-install the entire roof or patch repair these areas with some form of counter flashing and sealants, which is less reliable. – Application of underlayment is careless/incomplete in key locations and does not follow manufacturer’s recommended installation instructions. Correction and further evaluation by a qualified professional roofing contractor is recommended.

ROOF COVERING

OBSERVATIONS:

- Roof covered by laminated architectural shingle, measuring 13 1/4-inch x 39 3/8-inch). Application of courses appear to have uniform color distribution and proper parallel alignment with eaves.

CONCERNS:

- *Overhang at Eaves and Rakes*__ [Major Defect / Cosmetic Defect] Shingle overhang on drip edge at eaves and rakes varies from 7/8-inch to 1-½-inch, well beyond the manufacturer’s recommended overhang of ¼-inch to 3/4-inch. Excessive overhangs increase the chance of breakage and blow-off. Many shingles at perimeter of roof are cut jagged, giving a poorly finished look.
- *Ridge Vent Installation*__ [Material Defect] Several ridge cap shingles have under-driven and crooked nail fasteners, preventing self-sealing of asphalt shingles. Raised fasteners will interfere with the sealing of the shingles, leading to shingle blow-off. Also, for applications over laminated shingles, manufacturer’s instructions suggest applying a small bead of silicone caulking or roof cement to the underside of the outer baffle of along the entire ridge vent and at exposed edges so that the gaps are filled.
- *Shingle Overlap in Course*__ [Minor Defect and Cosmetic Defect] Several locations in field of roof where adjacent shingles in same course overlap one another where they are supposed to sit flush.
- *Offset Pattern*__ [Possible Defect] Shingles do not appear to conform to manufacturers installation instructions for offset pattern guidelines for first four courses repeated up slope. Response from GAF technical services: “The offset pattern provided on the packaging enhances the visual appearance in the roof field, but it also provides a uniform overlap of seams between subsequent courses of shingles – ensuring adequate shedding of water down the slope.”
- *Wind Resistance/Hand Sealing*__ [Possible Defect] Shingles installed in dead of Winter on January 10, 2019 were not hand sealed (per manufacturer’s instructions), and may have experienced wind damage not visible to the eye from significant wind events following install. The few shingles that still haven’t self-sealed are due to improper install, i.e. under-driven fasteners. Comment from GAF: “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, per the manufacturer’s instructions. Shingles installed in fall

or winter may not self-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.”

RECOMMENDATIONS:

- The most important factors affecting the long-term service life of an asphalt shingle roof are shingle quality and proper installation that follows the manufacturer’s recommendations. Correction and further evaluation by a qualified professional roofing contractor is recommended.

VENTILATION

OBSERVATIONS:

- Roof ventilation system uses a ridge vent with intake at soffit/eaves, as well as powered attic fan. [“Roofing Code: Weather Protection: 1503.4 ATTIC AND RAFTER VENTILATION_ Intake and exhaust vents shall be provided in accordance with Section 1202.2 and the vent product manufacturer’s installation instructions.”]

CONCERNS:

- *Ridge Vent__* [Material Defect] See comments above: “DECK SUBSTRATE; *Cutout at Ridge for Ventilation*”
- *Powered Attic Fan__* [Material Defect] No part of this attic fan installation was done correctly by roofers and needs to be completely redone.
 - Live electrical wire was cut during roof install to remove old fan. Aside from the live, bare wire left dangling directly above homeowner entrance to attic, the switch to attic lights [on same circuit] is not functional and may have shorted-out.
 - Opening in deck exceeds the 14-inch opening required for new attic fan. Also, new fan was placed considerably off-center of existing opening, leaving only a small portion of integrated flange overlapping top right section of roof deck. This decreases fan performance, increases noise output and chance of water leakage around integrated flashing.
 - Fan is secured to decking with an inadequate amount of mechanical fasteners and roofing cement – applied only at lower end of flange atop shingles. Fan moves significantly up/down at top and sides, which is exacerbated by inadequate fastening and application of shingles around top of fan.
 - The opening cut out in shingles to install new attic fan does not follow correct layered flashing technique – i.e. cutting out shingles tight at top of flange and tapered out uniformly at sides to allow debris to wash away. Here, the opposite was done, and a significant amount of debris is already building up and trapping moisture under shingles at top of flanges, inevitably leading to premature decay of shingles/sealants and possible leakage. (Also see below: “FLASHING AREAS, Powered Attic Fan”).

RECOMMENDATIONS:

- Attic light bulbs were tested at separate fixtures and are in working order; use caution, issue may be within switch. New attic fan has been disconnected and I recommend that it remain that way until all ventilation and electrical issues are further evaluated, corrected and re-installed by a qualified professional roofing contractor and a licensed electrician, respectively.

DRIP EDGE

OBSERVATIONS:

- Aluminum drip edge is installed under shingles at rakes and eaves.

CONCERNS:

- *Damaged and Incorrectly Placed Drip Edge__* [Material Defect and Cosmetic Defect] Several sections of bare wood decking are exposed due to insufficient and incorrect application of drip edge. Several sections of aluminum drip edge were installed pre-damaged and/or damaged during install. In addition, fastening of drip edge to deck is insufficient in several areas along eaves, indicated by excessive movement off of deck.
 - Locations of Damage:
 - 1) South-facing rake end at front and back slope of roof_ Drip edge was installed damaged. Material is significantly bent/deformed, affecting performance of intended use. Damage is visible even at ground level, giving a poorly finished look.
 - 2) West-facing eave at front of home above front door entrance gutter area_ Drip edge is significantly smashed in, possibly by hammer during fastening to deck. At time observed, wood sheathing behind smashed section of drip edge was soaked with water and crumbled plywood was resting in gutter below area.
 - Locations of Incorrect Placement:
 - 1) North-facing rake end at front slope of roof_ Drip edge is placed underneath underlayment instead of on top, partially due to underlayment being cut too short to reach edge of deck.

- 2) North-East corner of eave at back slope where gutter meets sidewall; drip edge stops a few inches short of high-risk corner where sloped roof drains stormwater into gutter next to sidewall without kickout flashing. (Also see “UNDERLAYMENT” concerns above).

RECOMMENDATIONS:

- The Asphalt Roofing Manufacturers Association recommends that drip edge should normally be fastened every 12 inches. Recommended best practice is to place drip edge over the underlayment at the rakes and place drip edge underneath underlayment at the eaves [by gutters], letting the bottom edge of the underlayment extend and overhang 1/4 inch to 3/8 inch beyond the edge of the metal drip edge.
- The rake ends and eaves near corners where sloped roofs drain into gutters at sidewalls are roof sections that are prone to water infiltration and wind damage. The best way to integrate drip edge sealed to ice barrier and tucked over/under underlayment is when the roof is being replaced and you have a clean deck free of obstructing materials. After the roof covering has been installed, this becomes more difficult and sometimes requires patch repairing these areas with some form of counter flashing and sealants, which is less reliable.
- Application of drip edge is careless in key locations and does not follow manufacturer’s recommended installation instructions. Correction and further evaluation by a qualified professional roofing contractor is recommended.

FLASHING AREAS

OBSERVATIONS:

- Step flashing appears to have been applied at sidewall where townhome units meet, which is important.

CONCERNS:

- *Penetration Flashing*
 - Powered Attic Fan_ [Major Defect] Asphalt shingle cut out and application is jagged and not contoured around integrated metal flange of attic fan, which has created large voids and pockets between flashing and shingles where significant amounts of wet debris is accumulating under shingles above and at sides of accessory. Excess shingle material remains at sides of flashing, which is lifting edges of shingles up off of deck, increasing potential of shingle breakage and premature failure.
 - Plumbing Vent Pipe Jacks_ [Minor Defect] Metal flanges on the two pipe jacks on the roof are slightly mangled and should be pressed flat to be flush with roof surface. Asphalt shingle cut out and application is jagged and not contoured around pipe jacks, which has created voids and pockets between flashing and shingles where wet debris is accumulating under shingles above and at sides of penetrations. Excess shingle material remains at sides of flashing, which is lifting edges of shingles up off of deck, increasing potential of shingle breakage and premature failure.
- *Roof Valley Flashing*
 - At the North-facing ridge, the design of the staggered roofs where two townhome units intersect has, for the lack of a better term, created a type of roof valley – i.e. an intersection of two down sloping roof planes where roof-covering materials are interrupted by the change in roof direction. Any interruption in the layered roof-covering material increases the vulnerability of the roofing system to water intrusion. The shingle and counter flashing application in this location appears to be in unreliable condition, especially in light of missing underlayment (See: “UNDERLAYMENT, Locations of Insufficient Deck Coverage”) and missing sheathing cut out to the very end of the rakes (see: “DECK SUBSTRATE; *Cutout at Ridge for Ventilation*”).
- *Kickout Flashing*
 - North-East corner of eave at back slope where sidewall meets gutter_ Kickout flashing should be installed to prevent runoff from entering behind the vulnerable exterior wallcovering where the flashing ends. Kickout flashing is typically required regardless of the type of roof-covering material or exterior wall covering (with the exception of brick and concrete block), whether or not gutters are present.

RECOMMENDATIONS:

- Flashing areas, if not installed correctly, are frequently the first locations to fail and produce leaks. The shingle application around penetrations, especially around the uncentered attic fan, do not demonstrate proper layered flashing technique – i.e. cutting out shingles tight at top of flange and tapered out uniformly at sides to allow debris to wash away. Here, the opposite was done, and a significant amount debris is already building up and trapping moisture under shingles at top of flanges, inevitably leading to premature decay of shingles/sealants and possible leakage. Attic fan and all noted flashing areas and respective shingles should be further evaluated, corrected and/or reinstalled by a qualified professional roofing contractor following manufacturer’s recommended installation instructions.

Inspection Summary (Re-Roof)

