

SECTION I FIRE-RESISTIVE REQUIREMENTS FOR ROOFING

Pitkin County no longer allows wood shakes or shingles to be installed on homes in Starwood, regardless of whether it is a new home or a home which already has wood shakes or shingles. There is a fine line that determines the point a “roof repair” becomes a “re-roof” and is subject to requirements for a roofing permit and compliance with the new requirements. Any licensed roofing contractor should be able to make that determination and advise a homeowner.

Pitkin County has implemented 1041 Hazard Reviews for all projects in Starwood, and one of the risks evaluated in the 1041 review is wildfire hazard. County staff explains that Starwood is generally mapped as being in the “Low / Moderate” classification as regards wildfire hazards, but there is no objective, concrete mapping of: 1) which lots are rated as “Low / Moderate” and, 2) which lots are rated as “Severe”, the next higher classification. Each lot is evaluated by a County staff person at a site inspection based on its specific slopes, exposures, native and irrigated vegetation, and so forth.

The initial assumption is that Starwood lots are usually “Low / Moderate” unless it has the combination of risk factors which, according to the Colorado Department of Forestry Guidelines that the County uses as a reference, it would fall into the “Severe” classification. A homeowner or architect will not know the exact wildfire classification or preventative requirements until the 1041 site inspection has been completed, but that is a relatively simple process to go through, at least for small additions. New homes are another matter.

There are, however, guidelines for types of fire-resistive construction that will be required, depending on the wildfire risk classification:

A roof construction consists of two types of fire resistive classifications; ratings or classifications for the materials alone, and ratings or classifications for the overall roof assembly.

- A roof material may be combustible [e.g. wood shakes, asphalt or composition shingles, etc.] or non-combustible [e.g. metal roofing, slate, cement tiles, etc.].
- Roofing surfaces may also have fire-resistance classifications such as Class A or Class B based on testing by entities such as UL and others.



WOOD SHAKE AND SHINGLE ROOFS ARE NO LONGER ALLOWED BY THE COUNTY

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For instance, the manufacturers of some types of membrane roofing and composition tile roofing have obtained Class A ratings for their products based on certain tested installation requirements, while other membrane roofing or composition shingle materials do not have Class A ratings and cannot be used without the addition of a fire-resistant underlayment. The source for determining whether a roofing material or system has a Class A rating is the manufacturer's literature and/or your roofing contractor; there is no single listing of such products or systems. Products that have a Class A rating, or can achieve a Class A rating with the proper underlayment, will generally state that fact in their printed literature.

Important Point: The materials and construction of new roofs and replacement roofs to meet County requirements depends on variables that are site specific, so no simple guidelines can be given in this memo for compliance with county requirements.

REQUIREMENTS IN "LOW / MODERATE" WILDFIRE AREAS

In "Low / Moderate" wildfire hazard areas, which is probably the prevalent classification in Starwood, the only County requirement is apparently that the roof covering have a Class A rating. This would allow the use of a variety of roofing materials, including metal roofing, slate, concrete or synthetic tile, certain composition shingles, and certain membrane roof materials.

Important Point: All roofing installations in Starwood must now use, at a minimum Class A roof coverings as the exposed roof covering materials. Combustible or non-combustible materials with Class A ratings may be used in "low/ Moderate" wildfire areas, while only non-combustible materials with a Class A assembly rating may be used in "Severe" wildfire areas.

REQUIREMENTS IN "SEVERE" WILDFIRE AREAS

In "Severe" wildfire hazard areas the requirements are more stringent. Roof coverings must be both non-combustible [such as slate, metal, tile, etc.] and must be installed over a Class A rated assembly. This usually involves the addition of a layer or two of a fire-resistant underlayment between the roof covering and the wood framing underneath, using products such as Versashield or Densdeck.

A homeowner's architect or roofing contractor will be able to advise them on the construction necessary to install a non-combustible roof covering over a Class A assembly for their particular home.

According to the County, asphalt or composition shingles do not meet the requirement of non-combustibility, even if they are Class A rated. Nor do membrane roofs unless they are ballasted. Nor do any type of wood products, even if they have Class A ratings or are part of a Class A assembly.

SECTION II ROOFING MATERIALS USED IN STARWOOD

The prevalent roofing material for sloped roofs in Starwood used to be wood shakes or shingles. Flat roofs are typically a dark [black] membrane, either with or without roof ballast [ballast consists of small rocks or aggregate], Roofs which have any significant amount of reflectivity, including bright copper, all types of painted metal roofing, and any bright or unfinished metalwork such as flashing or chimney caps, are generally regarded to not be "approvable" in Starwood and many such requests have been turned down.

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MARK NOEL - STARWOOD ARCHITECTURAL ADVISOR

Starwood Homeowners Association | (970) 379-3778 | mark@mnarchitect.com
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There are, however, some painted metal roofs in Starwood pre-dating 1994 for reasons that are not known. There is also one house with a terne metal roof [a lead and tin alloy] which is generally regarded to meet the expectation for non-reflectivity and has not been a problem.

In the past several years, many new roofing materials have been proposed and approved by Starwood, including the following:

- oxidized steel roofing [usually corrugated] has been approved for several homes and barns,
- corrugated steel roofing which has been painted to simulate rusted or aged metal [Field],
- several types of oxidized copper roofing,
- natural slate, and
- cementitious or other manufactured, synthetic roof tiles.

The Architectural Committee has broad latitude to determine what roofing materials are suitable for Starwood. There is not a list of “approved” roofing materials; just precedent as to what has been approved over the years. The usual criteria applied to roofing approvals have been 1) non-reflectivity, 2) use of compatible colorings and medium to dark values that harmonize with the natural surroundings, 3) visual impacts of rooflines and roof areas, including where the house is located, heights of trees on the property relative to the house height, and visibility from other homes in Starwood.

SECTION III CURRENT FIRE-RESISTIVE ALTERNATIVES TO WOOD SHAKE / SHINGLE

A. COMBUSTIBLE ROOFING MATERIALS THAT CAN BE CLASS A RATED

WOOD SHAKES or WOOD SHINGLES

There are wood shingle and shake products that are treated to be fire resistant and to meet Class A or B requirements, but they are not allowed in Pitkin County.

MEMBRANE ROOFING

Suitable for slopes from flat to 1:12. Some types of membrane roofing materials have Class A ratings, while others do not. According to the County, ballasted membrane roofs with Class A materials can be used in Severe wildfire areas. Unballasted membrane roofs with Class A materials can be used in the parts of Starwood with Low/ Moderate wildfire classifications.

ASPHALT SHINGLES

Asphalt shingles are often referred to as composition shingles. They vary widely in cost and - even more so - appearance. They are generally suitable for roofs with pitches of 4:12 or steeper. Advantages include relatively low cost, lighter weight [suitable for re-roofing], 20 - 50 year life, and low maintenance. Disadvantages include they are not typically allowed in high-end subdivisions, man-made appearance, and colors are often not very natural in appearance. The general perception is that they are “cheaper looking” than alternatives.

BUILDERS' GRADE, or 3-tab shingles, are the normal, relatively thin composition shingle with a granular coating. They have never been used in Starwood for primary residences, nor are they recommended for approval.

LAMINATED SHINGLES, also called Architectural Grade shingles, are thicker, have a heavier butt section and slightly stronger shadow line, and often have varied coloring. Some of these have been considered for new homes and re-roofing existing homes, but the Committee has not actually been asked to approve any. Quality and appearance in this general classification varies widely. A good example of an installation that created a surprisingly convincing illusion of slate is at the bank building just up valley from the El Jebel City Market. From a distance, they have a much better appearance than "normal" asphalt shingles.

SIMULATED SLATE AND SHAKE, sometimes called shingles. There are now 3 and 5ply laminated asphalt shingles which are intended to replicate the appearance of slate or wood shake roofing by overlaying multiple layers of shingles or by using extra-thick buildup of laminations. They are very thick and rather heavy, weighing around 2.0 to 2.5 times as much as the wood shake roof they might be replacing, so structural adequacy could be a concern for some homes. Some products in certain colors look quite good, while others seem to imitate nothing so much as asphalt shingles stacked on top of each other.

B. NONCOMBUSTIBLE ROOFING MATERIALS THAT CAN BE CLASS A RATED

METAL ROOFING

Virtually any type of metal roofing can be used to meet the two levels of wildfire risk that may apply in Starwood. Historically, metal roofing usually meant painted metal standing seam or roll roofing and such roofing was always understood to not be allowed in Starwood, even though there were examples of red, green, or brown metal roofs to be found. Such metal roofing has a level of reflectivity that is not acceptable in Starwood. Metal roofing is suitable for roofs with 4:12 or steeper pitches, but can also be used on roofs with 2:12 or 3:12 pitches with suitable waterproof membranes and detailing. Metal roofing alternatives that



BUILDER'S GRADE 3-TAB ASPHALT SHINGLES. THIS HOUSE USES BETTER QUALITY WITH COLOR VARIATIONS.



AN EFFECTIVE EXAMPLE OF SHADOW LINES & COLORING IN A MODERATELY PRICED LAMINATED SHINGLE

2015 v. 1_2015.11.20

MARK NOEL - STARWOOD ARCHITECTURAL ADVISOR

Starwood Homeowners Association | (970) 379-3778 | mark@mnarchitect.com

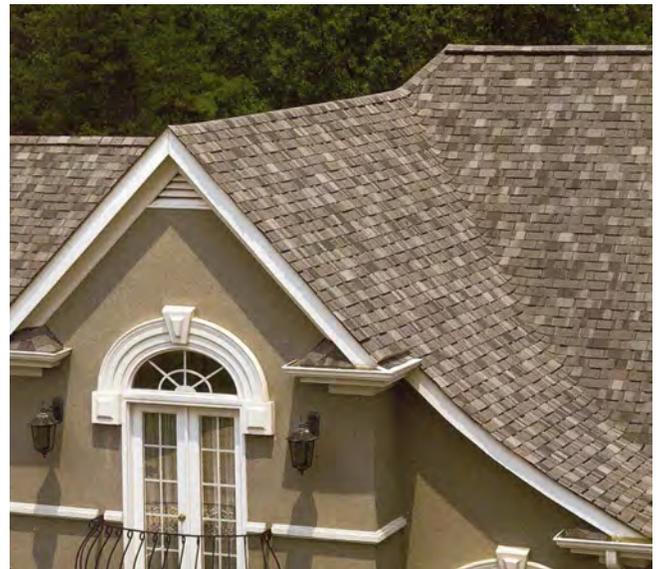
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have been successfully used in Starwood include the following:

COPPER ROOFING including copper shingles [more expensive] and copper standing seam [less expensive than shingles] roofing. Starwood requires that these roofs be pre- oxidized to an approved level of darkness so that they are not raw copper when installed. When so treated, they have been well received in Starwood. Copper roofing has a very long service life. It has a higher material cost, but the labor cost is the same as other metal roofing and so the cost differential is less than people generally think it would be.

PAINTED METAL No painted metal roofing has been proposed in many years that the Architectural Committee has found to be acceptable. Reflectivity is the usual problem, but visual impacts of colors is also a major concern; the colors tend to be rather strong, even when using “natural” colors. Less expensive material cost than copper, but labor and is the same. A very low maintenance roof. Painted finishes tend to fade and weather over 30 years.

COATED METAL & ALLOYS There are a variety of architectural grade metal roofing products, in both shingles and standing seam or roll roofing, that use either coatings or a solid alloy to provide a long-lived, low maintenance roof. Revere also makes coated shingles and roofing which have a nice, grey terne metal appearance. These products can be obtained with very soft colors and non-reflective surfaces, although they need to be specified properly. The materials are generally more expensive than copper and sometimes very much more expensive. Labor cost should be comparable, and long service life can be expected. They are often not dark enough to blend in, in certain types of wooded locations, but look quite good with blue sky as a background.



INDEPENDENCE “SHANGLE” WITH COLOR VARIATIONS AND SHADOW LINES CREATED BY THICKER LAMINATIONS



COPPER ROOF SHINGLES BEFORE BEING TREATED WITH MILD ACID TO ACCELERATE OXIDATION



THE TWO MAIN OBJECTIONS TO PAINTED METAL ROOFING IN STARWOOD HAVE BEEN THE REFLECTIVITY AND THE STRONG COLORING / PIGMENTATION

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MARK NOEL - STARWOOD ARCHITECTURAL ADVISOR

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COR-TEN OR OXIDIZED METAL ROOFING is available in corrugated roll roofing, standing seam roofing, and possibly other configurations. It is typically either plain steel which is acid washed to accelerate oxidation and which results in a medium brown patina of rust, or Cor-Ten steel which is specifically designed to oxidize to a controlled depth and which has a deeper, reddish purple patina of rust. Oxidized steel roofs are relatively new to Starwood, but have been very well received.

SLATE and OTHER STONE ROOFING MATERIALS are very high end roof products. Slates come in a range of colors and have varying degrees of reflectivity. They often dull over time. Slate is a heavy roof and is generally not practical for re-roofing due to the structural problems of a heavier roof. It is one of the most highly regarded, beautiful, long lived, and expensive roofing alternatives, but is not exactly indigenous to the American West.

ROOFING TILES

As with metal roofing, virtually any type of tile roofing can be used to meet the two levels of wildfire risk that may apply in Starwood. Tile roofing is suitable for pitches of 4:12 or steeper. Impact resistance, freeze / thaw performance, weight, and cost have always been considerations in using tiles, especially in our mountain environment.

HEAVY TILE includes a number of natural and synthetic roofing products. Clay tiles are virtually never used in the mountains due to problems handling the freeze / thaw cycles. Concrete or cementitious tile roofs were thought to address that problem and have been used in some locations such as the Pitkin County Library, but they have also had problems coping with freeze / thaw and with damage from icing due to their brittle nature. Cement-based tiles can be acceptable in Starwood, but reflectivity and color are both issues that have had to be addressed; many tiles would be found to be unacceptable, but others could be used effectively. Some of these products have rather noticeable coloring that would draw attention to the roofing unnecessarily, similar to composition roofing.

CEMENTITIOUS TILES were the first efforts to blend the fire resistance of clay tile roofs with the warmth and natural textures of wood shake roofs. They could be very promising someday, but weight will always be a consideration and they have been fraught with freeze / thaw and ice impact problems in our climate.

SYNTHETIC TILE is a catch-all category that includes all sorts of composite and other manufactured materials which are formed or extruded into roofing pieces and intended to be a fire-resistant replacement for wood shakes. The manufacturers often do not even ship them to high altitude, snowy locations because they cannot stand up to our weather.

SLATE REPLICA SYNTHETIC TILE include EcoStar and Lamarite tiles. These formulations have apparently addressed the weaknesses of some other synthetics as they have Class 4 impact resistance ratings and are

marketed as being suitable for our climate. Fairly new products, so the long-term future is unknown. Costs more than copper. Products offering a Class 4 impact resistance rating may result in insurance discounts for homeowners, but that may be limited to areas with frequent hailstorms.

Not everyone wanted a slate look, so they started developing wood shake patterns...

WOOD SHAKE REPLICA SYNTHETIC TILE is starting to hit the market as wildfire safety standards are being implemented in “wood shake” communities such as Starwood. Concerns over the fire safety of wood roofing products and local code restrictions are certainly not confined to Pitkin County or Colorado, and roofing manufacturers are already applying considerable R&D efforts to the development of synthetic substitutes, with lower weights and costs than the cementitious tiles that were originally developed for this purpose. They have Class A fire ratings with underlayment applied and some now have Class 4 impact resistance ratings. Coloration of these products and the unnatural uniformity of the tile colors are currently issues with these products.

SECTION IV CONCLUSIONS and RECOMMENDATIONS

The pressing need is to find fire-resistive alternatives to wood shake and shingle roofing since it is now banned for Starwood and similar areas in the County. In fact, there is already a significant selection of fire-resistive materials that have been used in Starwood, including:

- Oxidized steel / Cor-Ten sheet and roll roofing,
- A variety of copper products,
- terne metal and similar alloys, and
- Slate and slate replicas

Re-roofing shake roofs will almost certainly result in an aesthetic change, although we have seen manufactured or replica roofing materials grow quickly in terms of availability and increase in quality. In general, changing shake roofs to an acceptable type of metal or synthetic roofing would be preferable to allowing asphalt shingles to be used in Starwood. The primary purpose for the recommendation to this approach is: 1) to maintain the quality standards that characterize Starwood as regards one of the most character-defining architectural elements in subdivisions, 2) to avoid the connotations that are inevitably attached to asphalt shingles, and 3) to protect property values of existing homes. The Architectural Committees recommendations are as follows:

1. ADOPT GENERAL STANDARDS (to be included in the Architectural Procedures):

- A. Use of all roofing material options would continue to be dependent on project- specific Architectural Committee approval for the design, configuration, and site- specific impacts of the building design.
- B. Recommendations to allow certain roofing systems does not imply that any “approvable” system would be allowed under all circumstances.



A LESS SUCCESSFUL INSTALLATION OF ECOSTAR SYNTHETIC SLATE TILES - SLOPE IS TOO VERTICAL FOR THESE TILES AND COLOR ACCENTUATES MONOCHROMATIC “MANUFACTURED” QUALITY

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- C. Require approval, on site, of 4'x8' samples [one full sheet of plywood] for all new roofs and re-roofs unless matching an existing home in Starwood.

2. SLOPED ROOFS [2:12 OR STEEPER]

The following types of roofing materials would generally be allowed:

A. METAL ROOFING

Certain metal roofing systems would be acceptable subject to approval for coloring, reflectivity, design, and location.

- i) pre-rusted steel [or faux painted to give same effect]
- ii) pre-oxidized copper [or faux painted to give same effect]
- iii) terne metal or similar alloys

B. NATURAL MATERIALS

These would be generally acceptable subject to approval for coloring, reflectivity, design and location.

- i) slate
- ii) concrete tile [not generally used in mountain climates, however]

C. SYNTHETIC SHINGLES AND SLATE TILES

Certain types of these would be acceptable as a fire-resistive imitation of wood shake roofing

- i) synthetic replica "shakes" or "slate" in certain colors only [black, dark greys, grey-greens].

The following types of roofing materials would generally not be allowed:

D. METAL ROOFING

- i) Berridge and similar baked enamel standing seam roofs
- ii) clear-coated or bright copper or other metal

DI. ASPHALT OR COMPOSITION ROOFING

- i) Standard 3-tab or similar grade asphalt shingles would not be allowed, even if premium coloring or texture
- ii) Architectural grade [also known as laminated] shingles would not be allowed, even if premium coloring or texture
- iii) "Shingles" and other heavyweight laminated asphalt shingles

3. FLAT ROOFS [1:48 TO 1:12 PITCHES]

All roofing accessories for flat roof systems [flashing, terminations, etc.] would have to be dark colored or oxidized copper or other approved material. Bright or galvanized metal would not be acceptable.

- A. Select certain membrane colors that will be considered without any ballast, depending on visibility and site-specific circumstances:

- i) black always okay



A SAMPLE OF ECOSTAR SYNTHETIC SLATE TILE ON A CONDOMINIUM BUILDING IN ASPEN

- ii) greys and tans might be approved
 - iii) light greys and white never approved unless completely hidden from all viewable locations
- B. Ballasted roofs are generally okay, depending on approval of ballast [rock] coloring.
- i) dark color ballasts [dark red, black, dark greys and browns] generally okay
 - ii) natural river rock, other light rock, and polychromatic mixes generally not okay unless completely hidden from all viewable locations

Asphalt shingles would be approved only under the following circumstances:

1. There would be a very small list of specifically acceptable products and colors developed - perhaps just two or three specific products in selected color ranges - that have been reviewed by the Committee in advance and determined to be good imitations of the texture and shadowing of wood shakes.
2. Approvals would be based on the usual criteria and the asphalt shingles might not be acceptable in all circumstances.