07 30 00 | Steep Slope Roofing

Section includes various finished roofing materials (shingles, slate, metal) & accompanying materials.

This design guideline is written to the designer of record (DOR). This guideline is written to document UA standards of work, assist the designers in ensuring UA standards are incorporated into the contract documents and provide a resource to facilitate the design process. It is the designer of record's responsibility to coordinate the criteria set forth in these design guidelines and in conjunction with the manufacturer requirements and use the most stringent standard.

Steep sloped roofs are defined as roofs having slopes of 2 vertical to 12 horizontal or greater. This design guideline is written to the designer of record (DOR). This guideline is written to document UA standards of work, assist the designers in ensuring UA standards are incorporated into the contract documents and provide a resource to facilitate the design process. It is the designer of record's responsibility to coordinate the criteria set forth in design guideline and in conjunction with the manufacturer requirements and use the most stringent standard.

General Philosophy and Approach

All roofing shall be designed and installed with attention to decoupling of the roofing from other building elements. For example, a roof shall not be installed such that major parts of veneer elements (brick, stucco, metallic copings, flat roofing, etc.) must be removed to properly repair a roof or reroof a building. Similarly, a roof shall not be installed such that removal of the roofing is required to properly repair veneer or low sloped roofing elements. This will simplify maintenance and future roof replacement projects.

Roofing shall be designed and installed to allow for roof replacement without requiring the removal of mechanical elements from curbs. Counter flashing at adjacent vertical elements will allow for roof replacement without removal of mechanical and electrical elements.

Reference Standards

The Designer of Record is to reference, design and specify roofing systems to comply with the guidance and industry standards set forth by the following industry resources:

1. International Building Code and applicable codes
2. NRCA
3. SMACNA
4. Relevant ASTM requirements

Scoping

1. DOR to ensure adequate ventilation or active systems are integrated into the roof design to meet building code and manufacturer warranty requirements.
2. The DOR shall make all effort to use soffit intake and ridge exhaust vents. Decorative veneer elements shall be designed to allow adequate ventilation space. Painted metal vented soffit accessories shall be punched and not deformed to limit clogging of the vent space with paint or other substances. For continuous venting, aluminum insect screens are to be provided.
3. No deck vents or turbines shall be used without written UA approval.

4. Exhaust venting at head walls shall be coordinated with the head wall flashings.

5. Wedge type, under shingle venting (Smart-Vent) shall not be used without prior approval from UA.

6. Unless permitted otherwise, all new buildings will require a mockup of the roofing system. DOR shall include detailed drawings of the mockup in the 60% review documents. Mockup shall include the following elements:

    a. Eave
    b. Rake
    c. Stepped flashing complete with counter flashing below adjacent wall elements
    d. Apron flashing / head wall flashing

Finished Roofing Materials

1. Roofing type and color to match adjacent or similar structures. Engage UA staff to determine which adjacent roofing elements to be matched.

2. Slate, Polymeric slate, shingles and metal are used on steep sloped roofs. It is the responsibility of the DOR (designer or record) to engage UA staff to determine which product is to be used on each roof.

3. Material Requirements:

    a. **Synthetic Slate**
    Basis of Design: Ecostar Majestic Slate, 12" Class A, midnight gray polymeric slate. Confirm color with UA Architect.

    b. **Fiberglass Shingles**
    Basis of Design: Tamko Heritage Premium shingles or equal from GAF/Elk, CertainTeed, and Owens Corning or provided the shingles meet the following criteria:

        i. Self-sealing, 300 lb. per square (minimum) architectural heavy weight shingles matching colors dictated otherwise. Manufacturers change their product often to maintain a competitive cost advantage. Inform UA if matching shingles are not available at this weight.

        ii. Double layer fiberglass mat, random-cut saw tooth design.

        iii. Algae resistant

        iv. Impact Resistance: Meet UL 2218, Class 4 or FM 4470 Severe Hail Rating, AND pass ASTM D3746 impact testing.

        v. Wind Resistance: Meet ASTM D7158 Class D and ASTM D3161, Type 1, Class F (110 mph) wind resistance.

        vi. Shall comply with requirements of ASTM D3462, and ASTM D3018, Type 1 and FM 4475 Class 1A.

        vii. Fire Resistance: Roofing material shall meet Exterior Fire-Test Exposure: ASTM E 108 Class A, or UL 790 Class A for application and roof slopes indicated, FM 4475 Class 1A and shall pass UL Standard 997

c. **Standing and Flat Seam Metal**
Provide copper, zinc, or pre-finished aluminum depending on the location and project budget. Review proposed metal system with UA during design.

d. Provide 2% Attic Stock for maintenance.

Underlayment & Flashings

1. Underlayment shall be permeable material that is mechanically fastened to the deck to ease shingle removal for future roof replacement projects (GAF Tiger Paw or equivalent). ASTM 226 No. 30 felt also acceptable. Underlayment must be approved (if applicable) by the roofing manufacturer.

2. SBS underlayment shall be 40 mil cross laminated, high-density polyethylene film and self-adhesive SBS asphalt sheet (SBS underlayment) embossed with or without a slip resistant or sanded surface and with removable contact/release paper or approved equal capable of withstanding 250 degree temperatures and self-healing at fastener penetrations. Use WR Grace Ice and Water Shield or equal.

3. Metal flashings shall be minimum 0.040" Kynar aluminum, 16 oz. copper, 26 gauge stainless steel, or brushed stainless. Thicker material may be required depending on the installation. Galvanized painted metal shall not be used without prior UA approval.

Accessories

1. Nails: Hot-dip galvanized or stainless steel 11 or 12-gauge, sharp-pointed, conventional roofing nails with barbed or ringed shanks, minimum 3/8" diameter head, and of sufficient length to penetrate 3/4" into solid decking or to penetrate through plywood sheathing. Gypsum substrates will require different types of fasteners as approved by the deck manufacturers. All fasteners shall be approved by the roofing manufacturer. Zinc plated fasteners are not allowed. All shingles to be hand nailed. Coiled nails not permitted.

2. Fasteners other than that required for attaching roof cladding, to be stainless steel or contain a corrosion resistant coating to resist 1000 hours of 5% salt spray testing per ASTM B117 without showing red rust, and meet FM 4470 corrosion resistance requirements. Fasteners for pressure treated wood shall be stainless.

3. Drive pin expansion anchors typically used to anchor metallic elements to concrete and masonry are not allowed. SS hammer screws shall be used instead.

4. All exposed sealants shall be silicone.

Warranties

Warranties change quickly. DOR is to verify availability of the warranty requirements below and report any discrepancies to UA. Specifications shall ensure the following warranty requirements:

1. The following shall be specified in the manufacturer's warranty for shingles.

    a. 50 year material warranty for slate and 40 year material warranty for shingles, prorated no sooner than 10 years. 20 year material color warranty for metal roofing.

    b. Arbitration is not allowed.

c. 15 year wind warranty. DOR to verify at least two manufacturers can offer this warranty.

d. Warranty shall be adjudicated in Alabama.

e. Be warranted for wind speeds up to 90 mph as defined by the three second gust listed in ASCE-7.

f. Warranty shall include labor and material to repair leaks resulting from manufacturer defects. This shall include tear-off and all materials required to replace defective shingles.

g. Time limits for legal action shall be established by state and local statues and may not be changed by the warranty.

h. Require not less than 30 day notice to manufacturer after observance of a potential warranty defect.

2. The installer shall provide a 5 year water tight workmanship warranty.

3. Longer duration warranties may be desired based on the elevated risks of damage to building and contents on a case by case basis. In such cases, the DOR to make a recommendation to Owner for manufacturer held workmanship warranty requirements.

Design & Documentation Requirements

A. Scoping and Detailing

1. Contract drawings shall include details for the following conditions. The contractor may use these details as the basis for shop drawings. DOR to specifically require shop drawings for these conditions.

a. Eave. Show dimensions on eave flashing with dimensioned shingle/slate/metal lap over back leg of gutter. Roof covering (shingles, slate, and metal) shall extend a minimum of ½ inch past the face of eave drip metal. Show SBS underlayment lapping over top of eave metal. Eave drip shall lap 2 inches over back leg of gutters.

b. Rake flashing at face of gables. Dimension metallic flashing. Use 2 inch minimum vertical leg with hemmed drip. Show SBS underlayment below rake drip metal.

c. Step flashing complete with counter flashing shall be installed below adjacent wall elements at rake conditions that decouples roofing from wall systems. Show counter flashing (CF) covering step flashing such that it that can be reroofed without removing siding. One piece of siding removal is acceptable. Reference SMACNA or NRCA standards.

d. Saddle flashing (crickets on uphill side of penetrations). Use saddles when width of the roof penetration exceeds 24".

e. Apron flashing (downhill side of penetrations). Use cleat to anchor head wall flashing. Head wall flashings shall be design to allow reroofing with minimal removal of head wall vertical elements.

f. Corners of saddle and apron flashing shall turn and extend 3" at the sides and be fabricated water tight beneath or above adjacent step flashing.
g. Any unusual condition that may not be covered by SMACNA or NRCA standard details. For reroofing projects, these areas are typically those with three or four layers of sealant installed to stop previous leaks.

h. Metal flashings at the intersection of roofs, adjoining walls, or projections through the deck such as vent stacks.

i. Water tightness shall not be maintained by sealant joints. Counter flashing shall be used at over sealant joints at roofing and flashing terminations. These sealant shall not be left exposed to UV.

B. Roof Covering

1. Use a minimum of six nails per shingle or slate or the manufacturer's standard nail pattern, whichever is greater. Using less than six nails will require a statement from the manufacturer that using less than six nails will be detrimental to the system. Inform Owner if manufacturer prohibits using 6 nails per shingle.

2. Shingles are to be hand nailed only. Nail guns are not permitted.

3. Use starter shingles at eaves and rakes.

4. Use manufacturer's hip and ridge shingles. Cut 3 tab shingles are not allowed.

C. Flashings

1. Install SBS underlayment up 30 inches around the perimeter of all deck discontinuities (ridges, eaves, rakes, valleys, changes in slope).

2. Lap mechanically attached underlayment over SBS underlayment at roof deck perimeter elements. 2 layers of underlayment are required for slopes less than 4 to 12.

3. SBS underlayment is not allowed as underlayment immediately below the roof covering elements unless required by the manufacturer.

4. Use only open valleys. Line valleys with a single 36 inch wide strip of SBS underlayment centered on the valley in addition to that required at the deck element perimeter. Show underlayment lapping a minimum of 3 inches over valley metal. Lap roof covering a minimum of 5" over valley metal. Valley metal shall be copper, brushed stainless, zinc or prefinished aluminum for polymeric slate. DOR to review with Owner for the appropriate metallic flashing material and color for each building. Written approval is required to use prefinished aluminum with shingles because granules can wear off the finish.

5. No penetrations are allowed in valley flashings.

6. SBS underlayment shall be installed below metal flashings and contractor fabricated metallic roofing elements.

7. Step flashing is required at side wall rake conditions. Runner flashing not allowed except for use with barreled clay or concrete tile roofs.

8. Last piece of step flashing at eave to be formed into a kickout flashing to divert water away from the end wall and into the gutter.

9. Flashing anchorage shall meet SPRI ES-1 Standards.

10. DOR to specify or detail minimum anchorage of wood blocking to be No. 12 screws installed at 12 inches on center staggered. Anchor lengths to be sized to provide adequate strength to resist induced loads.

11. No fasteners through exposed sloping legs of vents or boots. Strip in upper half of vent and boot flanges with SBS underlayment.

D. Penetrations

1. Penetrations of numerous conduit or pipe shall be grouped and routed through metallic goosenecks pointing down the slope. Goosenecks to contain 6" flanges all around fabricated on the slope of the deck. No exposed fasteners are allowed on the lower flanges.

2. Individual pipe and conduit penetrations shall be flashed with membrane flashings set in cut off mastic against the face of the penetrating element, held tight with a stainless steel clamp band. As metallic rain collar is required above the flashing termination to protect the sealant from UV exposure.

3. Hot pipe flashings shall extend a minimum of 6" above the roof deck.

4. Handrails, balustrades and other horizontal elements above the roof shall extend at least 6 inches above the plane of the roof to allow access for installation and repairs.

5. Posts, newels and other penetrations shall be detailed such that reroofing and repairs can be made without removal of the penetrating element.

6. Use lead vent flashing boots.

7. All vent stacks, penetrations are to be prefinished or field painted to match roof color. Consult UA Architect.

E. Gutters

1. Minimum material thickness of gutters and downspouts shall be 0.040" aluminum or 20 oz. copper. Thicker material may be required by SMACNA standards based on geometric shapes used. All aluminum to be Kynar 500 prefinished paint.

2. Eave flashing should lap 2" down over back leg of gutters. Lap 3" minimum if gutter slopes to allow for slopes. Show detail on drawings with dimensions. Include provisions for tight trimming of eave flashing at gutter hangers.

3. Back leg of gutters to always be at least 2" higher than front of gutters. This must be shown on drawings because some premanufactured gutters are not constructed with an extended back leg.

4. Unless specifically permitted by UA, exterior gutters shall be hung and shall not rest on top of other building elements. This creates a condition conducive to trapping water behind or beneath the gutter.

5. Gutter straps and hangers shall allow for adjustment of the gutter height to allow some variance between the plan of the roof deck and the plane the gutter.

6. Gutter splices shall be per SMACNA standards and shall be cold soldered.

7. Show gutter expansion joints on roof plan. Expansion joints are required every 50 feet. This spacing may be slightly exceeded if conditions dictate. Reference the specific gutter EJ desired from SMACNA or NRCA.

8. Show downspouts on roofing plans, site plans and building elevations.

9. Specify that gutters shall not pond more than ½ inch of water.

10. Only use solid flanges on gutter outlets. Snipped and tabbed flanges are not allowed.

11. All outlets shall have stainless steel debris screens. Cold solder screens to the outlets.

12. DOR to provide downspout dimension off the face of veneer and coordinate this with changes in the vertical plan of the veneer.

13. Downspouts shall terminate in the standard UA boot at grade level. DOR to coordinate elevation of top of boot with varying grade elevations and below grade piping around the building. Designers are to dimension downspout locations to fully coordinate with site, hardscape, landscape, masonry control joints, etc..

14. Fabricate aluminum gutters in minimum lengths of 25 feet.

F. Roof Access

1. Provide roof access plan to meet building code. Present and coordinate plan with UA Architect for approval of locations, materials, etc. prior to incorporating into working drawings. Generally, all roofs two floors high or more will have an access hatch or other means of access without using an exterior ladder.

Submittals

Designer of Record to ensure specifications require the following:

1. Product Data: Submit technical product data, installation instructions and requirements from shingle manufacturer.

2. Samples: Submit full range of sample panels for color and texture selection. Panels shall be approximately 24" square. After selection, submit 2 full-size shingles for verification of each type/color/texture shingle used in work.

3. Submit job specific shop drawings showing the details required in the "Design" section below. The DOR shall specifically enumerate which details are required to be submitted for approval.

4. Manufacturer shall issue intent to warrant letter from the roofing manufacturer listing all products to be used in the roofing system and a statement of compatibility of those products, and a sample of the warranty. The preinstallation meeting shall not be held until the sample warranty has been approved.

5. A letter from the manufacturer stating the installer is approved by the manufacturer to install the product.

Re-Roofing Projects

1. DOR to assess condition of existing deck, wood blocking and framing and estimate the quantity of deteriorated material that needs to be replaced. Include unit allowances per square foot, board foot or other appropriate units for replacing deteriorated materials. Include a unit rate for contract adjustments after the work is complete. In some cases, wholesale deck overlays may be more cost effective than numerous isolated repairs.

2. DOR to ensure existing deck is acceptable for new roof covering—including condition, type and thickness. If destructive observations are required, this can be facilitated by UA staff. Coordinate with UA PM.
3. DOR to ensure existing deck and enclosed space ventilation meets building code and roofing manufacturer warranty requirements.

4. It is preferred that existing shingles and roofing system be removed down to the roof deck prior to reroofing. Install new roofing over existing only with UA approval.

5. Replace metallic flashing as needed at adjacent walls. Use face mounted counter flashing (CF) on all masonry exhibiting deteriorated mortar joints. Otherwise remove existing reglet mounted CF and reinstall new reglet mounted CF in existing reglet. Seal with silicone sealant.

6. Inform Owner if new roofing membrane is being installed above existing through wall flashing (TWF) that drains a veneer drainage cavity. In these cases, the scope may entail installing new TWF.

Lightning Protection

1. Lightning protection routing shall be coordinated by Designer. Routing shall be shown on line diagram plan, unless the system is to be removed and reinstalled.

2. Waterproofing of lightning protection penetrations shall be shown by roofing designer or record.

3. A lightning protection pre-installation meeting is required. Lightning protection sub, lightning protection manufacturer, roofing sub, GC, and owner are required to attend

4. The DOR shall make all effort to avoid penetrating the sloped roof deck with terminals. Terminals penetrating the roof deck shall be detailed by the roofing DOR. Route cables and mount terminals through ridge vents and other water tight elements.

5. Re-Roofing

    a. DOR to request a UA in-house review of the existing lightning protection system.

    b. After the inspection, UA will advise if existing lightning protection can be removed, must be removed and reinstalled, must be replaced, and/or needs to be recertified.

Construction & Quality Control

A. Quality Control Expectations

1. A pre-installation meeting is required with contractor, installer, owner, and roofing manufacturer.

B. Inspections and Manufacturer Field Requirements

1. Manufacturer's technical representative shall be on site during the first day of roofing installation to ensure all installers have been properly trained to install the roofing.

2. Manufacturer's technical representative shall visit the jobsite once during each week the roofing system is being installed.

3. Manufacturer's technical representative shall issue a written report digitally to all parties within 3 days of the jobsite visit.

4. Manufacturer shall conduct all visits required to ensure the roofing is installed properly and can be warranted per project requirements.

5. For reroofing projects, the DOR is expected to conduct two site visits per week for the first and last week of the installation. One site visit per week is required otherwise. Additional site visits may be required based on the specifics of the project.

- End of Guideline –

CHANGE LOG		
Date	Section Page	Notes
10/2018	2:3.b.i	Changed minimum shingle weight per square
10/2018	3:3.b.vii	Added Class A after UL 790
10/2018	3:3.d	Added 20% attic stock requirement
10/2018	3:1	Added some types of felt are acceptable as mechanically fastened underlayment
10/2018	3:3	Added Kynar coating on Aluminum flashings
10/2018	3:1	Added additional requirements for fasteners for gypsum decks
10/2018	4:1.c	Removed “Tuscaloosa” from warranty adjudication requirements
10/2018	3 & 4	Modified warranty requirements
10/2018	4;A.1.a	Added requirement to lap eave 2” over back leg of gutters.
10/2018	5:A.1.i	Added requirement on exposed sealants
10/2018	5:B.3	Added requirement for starter shingles at rakes
10/2018	5:B.4	Added requirement for hip and ridge shingles / cut 3 tab not allowed
10/2018	5:C.2	Added clarification for mechanically attached underlayment.
10/2018	6:D.7	Added requirement for color matching metallic flashings
10/2018	6:E.1	Added requirement that all aluminum to be prefinished Kynar
10/2018	7:E.8	Added the requirement to show downspouts on site plans
10/2018	7:E.13	Added requirement to coordinate downspout locations with other disciplines
10/2018	7:E.14	Added requirement to fabricate gutters in minimum 25 foot lengths
10/2018	7:F	Added roof access section
10/2018	NA	Removed Asphalt Shingle and Polymeric Slate Tile sections in their entirety.