



PERENNIAL™

PORCELAIN ROOFING

EXTRAORDINARY STRONG PORCELAIN ROOFING TILES

INSTALLATION GUIDE

Daltile Perennial Roofing Tile: Basic Installation Guide

It is the responsibility of the roofing contractor to abide by all local building requirements and codes. Dal-Tile makes no warranties or guaranties of any type, including the accuracy of the information in this manual. Check your geographic area for special or prevailing code requirements that may require an engineering report. As with any roofing material, considerations for weight must be made. When considering roofing material, the designer should always consider the weight of the underlayment, fastening system, roof accessories and special hip/ridge treatments in addition to the roof tiles themselves. Dal-Tile does not assume responsibility for ensuring the structural viability of the building/roof system is sufficient to support Dal-Tile roofing products. It is the responsibility of the home owner, contractor, architect or engineer to ensure the structure is viable for the application of Dal-Tile products. It is recommended that the structural design of the building itself also be evaluated by a registered engineer to determine that it can support the roof. In some cases, building codes require an engineering review.

SAFETY WARNING – TILE DUST

Roofing tiles are made from clays and other mined minerals that contain naturally occurring amounts of crystalline silica (quartz) and traces of other hazardous substances. These are released as dust when dry-cutting or grinding this product and can be inhaled if proper respiratory protection is not utilized. Do not use dry cutting equipment without integral air pollution controls. Cutting roof tiles should only be done using a “wet saw”.

WARNING: Crystalline silica is a substance known to cause cancer. Other chemicals, also naturally occurring in these products are known to cause cancer, birth defects and other reproductive harm. Please refer to Federal and State OSHA requirements for proper compliance.

Required Tools and Equipment

Safety: Safety is priority! Protect yourself and your crew by following all safety tips included in this guide, safety labels on your power tools and always follow OSHA requirements in your area.

Hand Tools:

- Hammer
- Tin snips
- Chalk line
- Tape measure
- Utility knife
- Marker/pencil
- Square
- Caulk gun
- Slate ripper



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Power Tools:

- Extension cords
- Tile saw (porcelain quality diamond blade) and/or a snap-and-cut tile cutter.
- Drill: tile quality bits 1/8"-1/4" — The key to drilling regular porcelain tile is to use a brand-new carbide-tipped masonry drill bit and a drill that has a variable-speed trigger. You never want to drill porcelain tile with the drill at high speed. The lowest speed possible, say 100 or 200 revolutions per minute, is perfect to drill standard porcelain tile.

Specialty Equipment:

- Toe jacks for toe boards
- Forklift or conveyor lift

Safety Equipment:

- Hand protection
- Eye protection
- Safety belts and harness
- Ropes and other required fall protection
- Hard hats
- Scaffolding and/or ladders



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Important Pre-Installation Notes:

- Ensure the roof decking is as flat and level as possible before starting install of Perennial Roofing System.
- For re-roof applications, inspect existing roof decking and if necessary make changes to any deteriorated, rotted roof decking and/or warped decking. This will ensure a smooth/flat surface in which to start from.
- Inspect the homes roof framing system. If structural framing needs to be straightened and/or better supported, perform all this work prior to starting install of Perennial system.
- When installing field tiles, pull each piece out of the box as it is packaged and install one after the other, right to left or left to right...horizontally. DO NOT install tiles directly out of the box and go vertical with your rows (like you may do with asphalt composition shingles). Each box of Perennial tiles is pre-packaged with the shadings mixed. There is no need for your installers to lay out all the tiles per box on the ground prior to installation to mix them up. Installing roof tiles up the roof plane vertical versus completing each row of tiles horizontally before proceeding to the next row of tiles, the shadings may not look the way they were intended.
- Use the provided 14" Perennial Interlayer under ALL TILES...Field, Hips & Ridges (maximum 10' long continuous pieces, 6" overlap at joints).
- Use 2-1/2" non-corrosive roofing nails OR screws.
- Whichever side of the roof plane you start laying roof tiles, make sure both ends of each coursing will have roof tiles large enough with pre-drilled nail holes and pre-formed bullnose edges exposed at either side. Best practice is to start at one end and lay at least a full tile or two, then stop in the middle of that run and re-start at the other end of the same course with full to semi-full cut piece(s). This way there is no field drilling of holes necessary. (Note: It is okay to vary the field tile sizes to keep with utilizing the provided nail holes).
- As you approach the Ridges (roughly 3'-5' from reaching the top), verify tile exposures for the remaining courses so no Field Tiles will need to be cut on the roof to fit. Doing so will mess up both the provided nail holes, as well as the factory bullnose edge. (Goal is to have a minimum of 3" Head-lap). If "Short-Coursing" is required to prevent the field cutting of the tiles, then perform this up the last few courses, all the way to the Ridge.



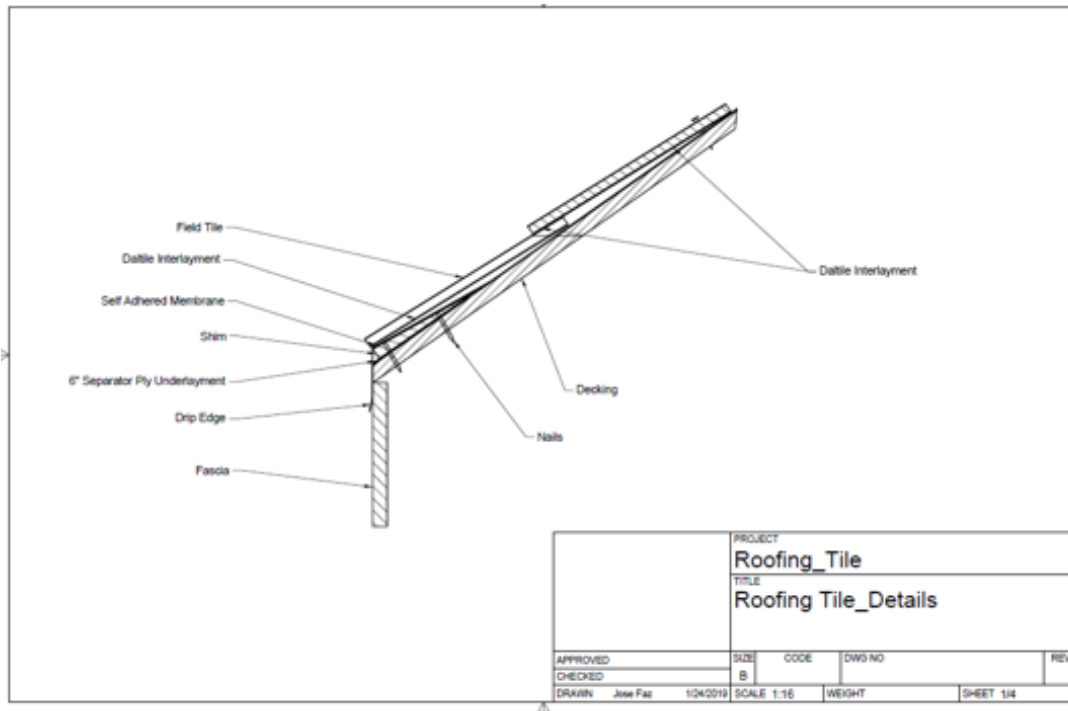
FLASHING NOTES

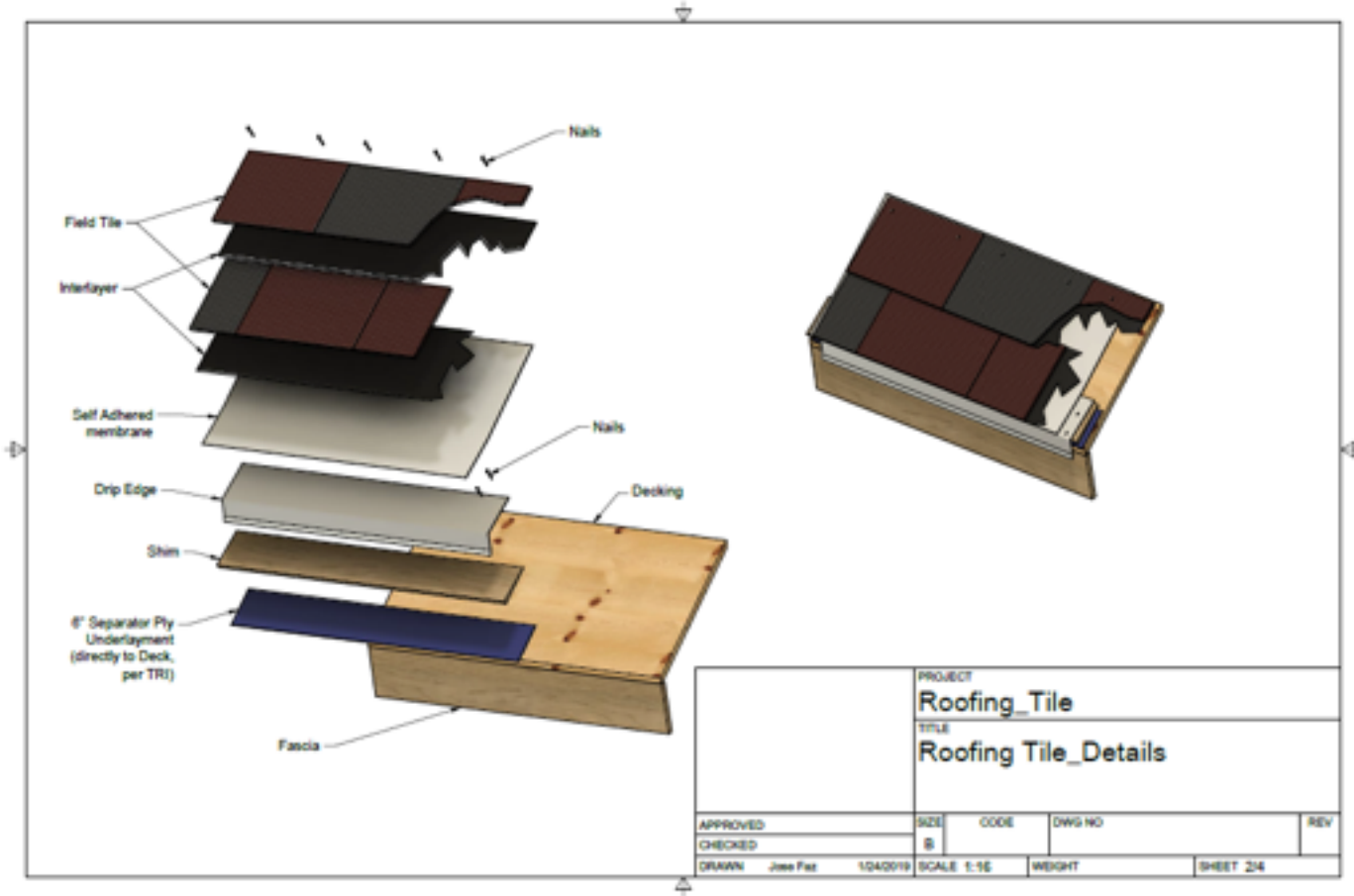
Metals

Flashing is required where a wall, chimney, vent, plumbing stack, or other structural protrusions meets the roof. Where flashing is metal, it shall be a.) 0.019" Galvanized, b.) 0.019" Aluminum, or c.) 16 oz. Copper. Flashing installations are critical for a water-tight roof. Always refer to and follow applicable building codes and standards and best roofing practices (NRCA and Tile Roofing Institute examples).

Metal Flashings

Drip Edge:





***NOTE:** We recommend 1" x 2" (3/4" maximum thickness) shims around the entire perimeter eaves.

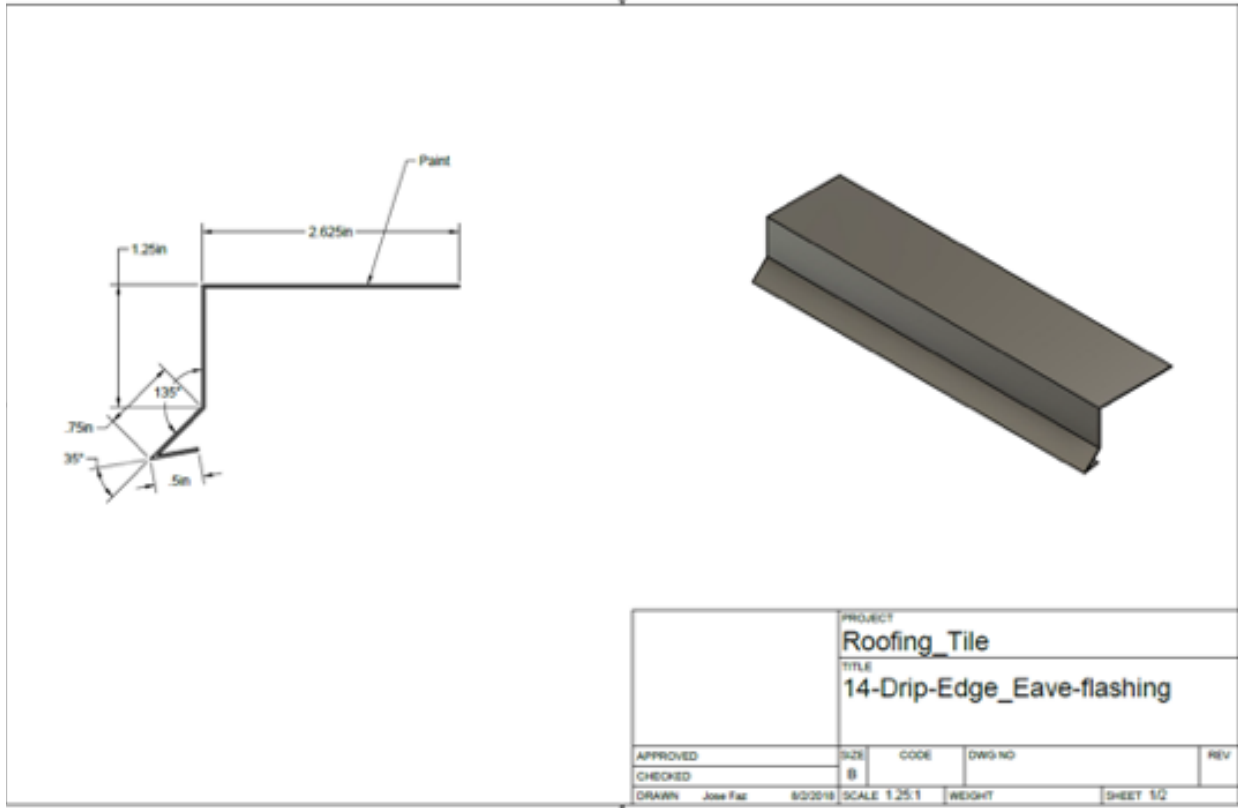


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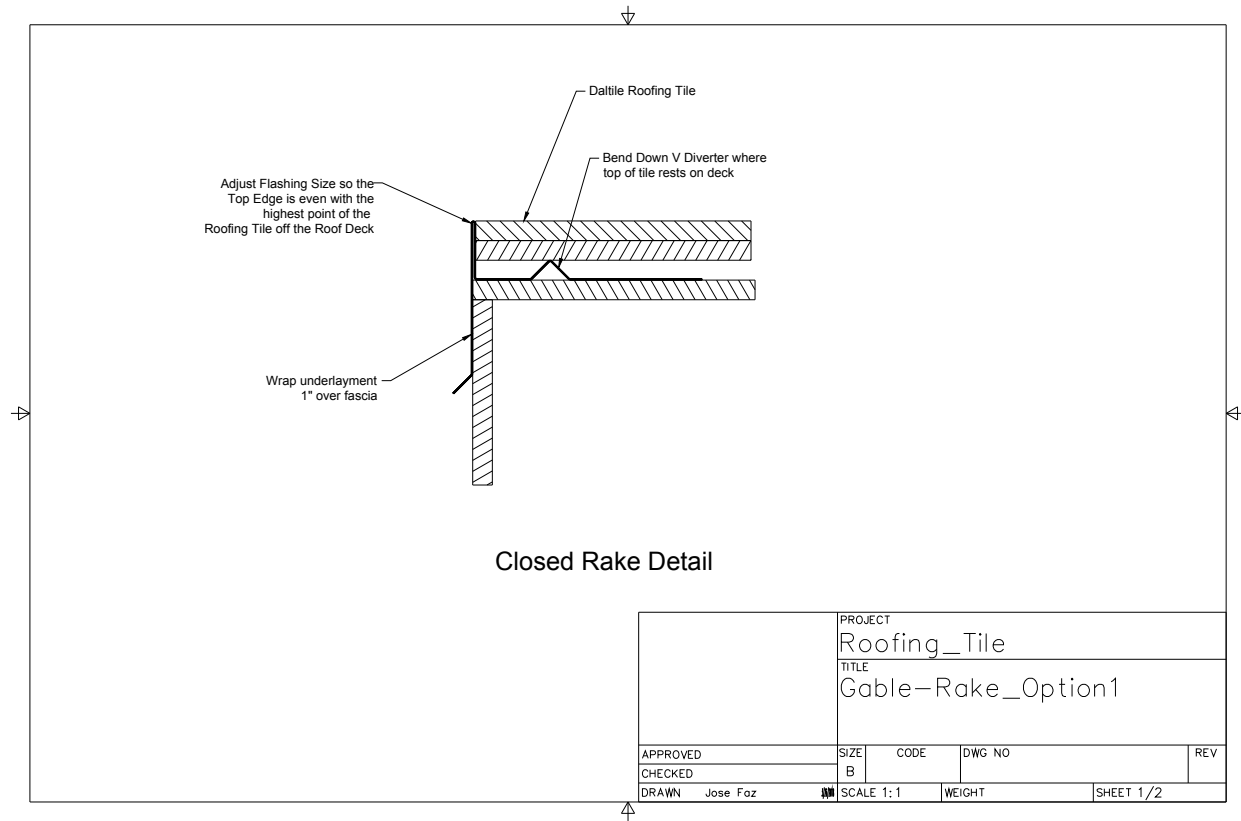
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Gable/Rake—OPTION 1- without Daltille Perennial rake piece



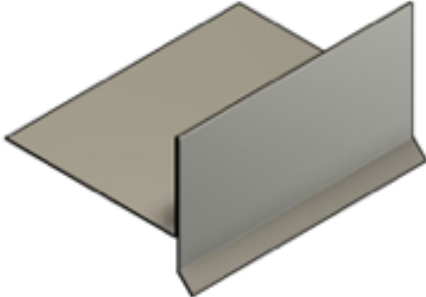
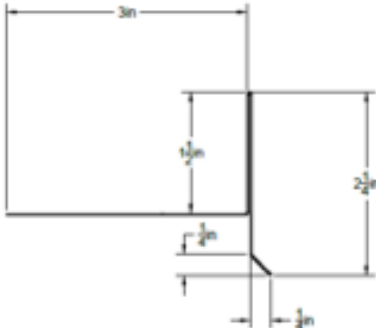


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PROJECT		Roofing_Tile			
TITLE		01-Gable-Rake_Option1-b			
APPROVED	SIZE	CODE	DWG NO	REV	
CHECKED	B				
DRAWN	Joe Far	5/24/2018	SCALE 1:1	WEIGHT	SHEET 2/2



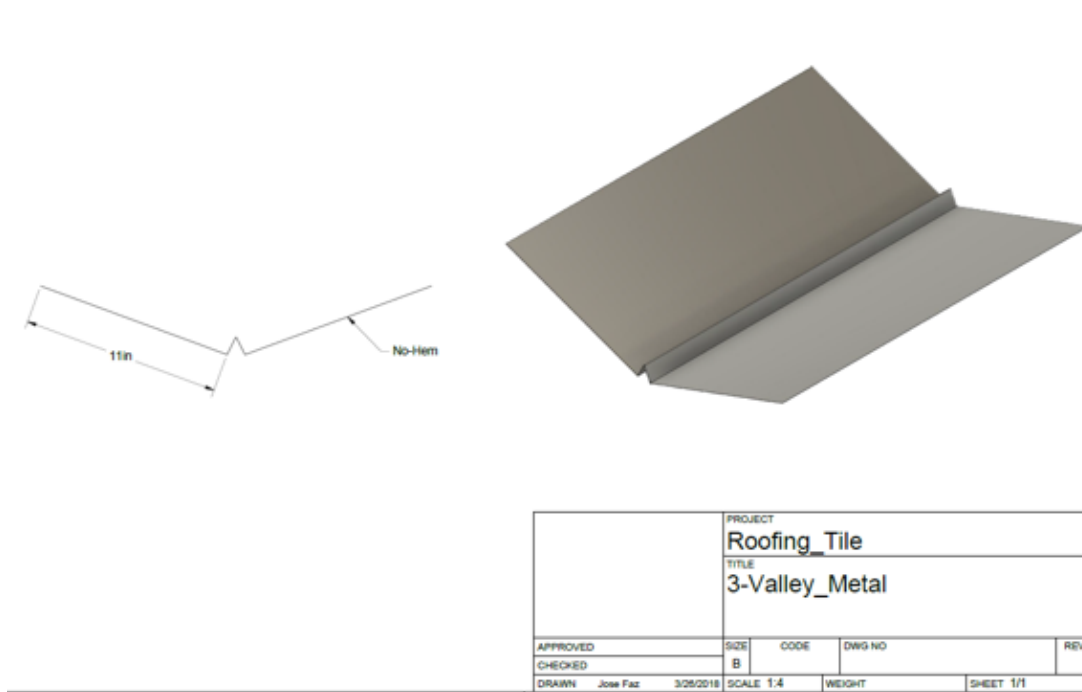
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Valley



*Nail valley metal no less than 10" from centerline of valley at 16" centers each side of valley. Nails should match the metal of the valley. (For example: if copper valley metal is used, use copper nails. If galvanized valley metal is used, use galvanized nails). **Never mix metals.**



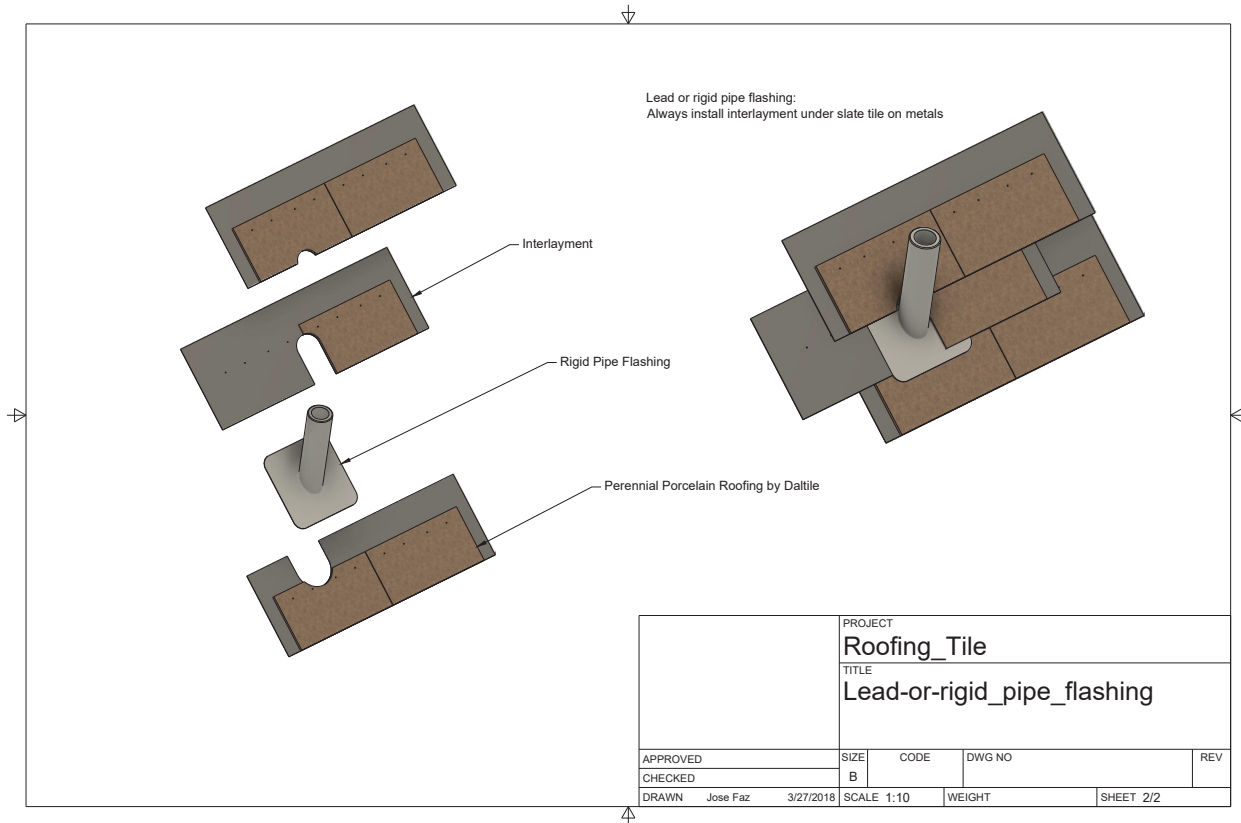
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LEAD OR RIGID PIPE FLASHING: ALWAYS INSTALL INTERLAYMENT UNDER SLATE ON METALS





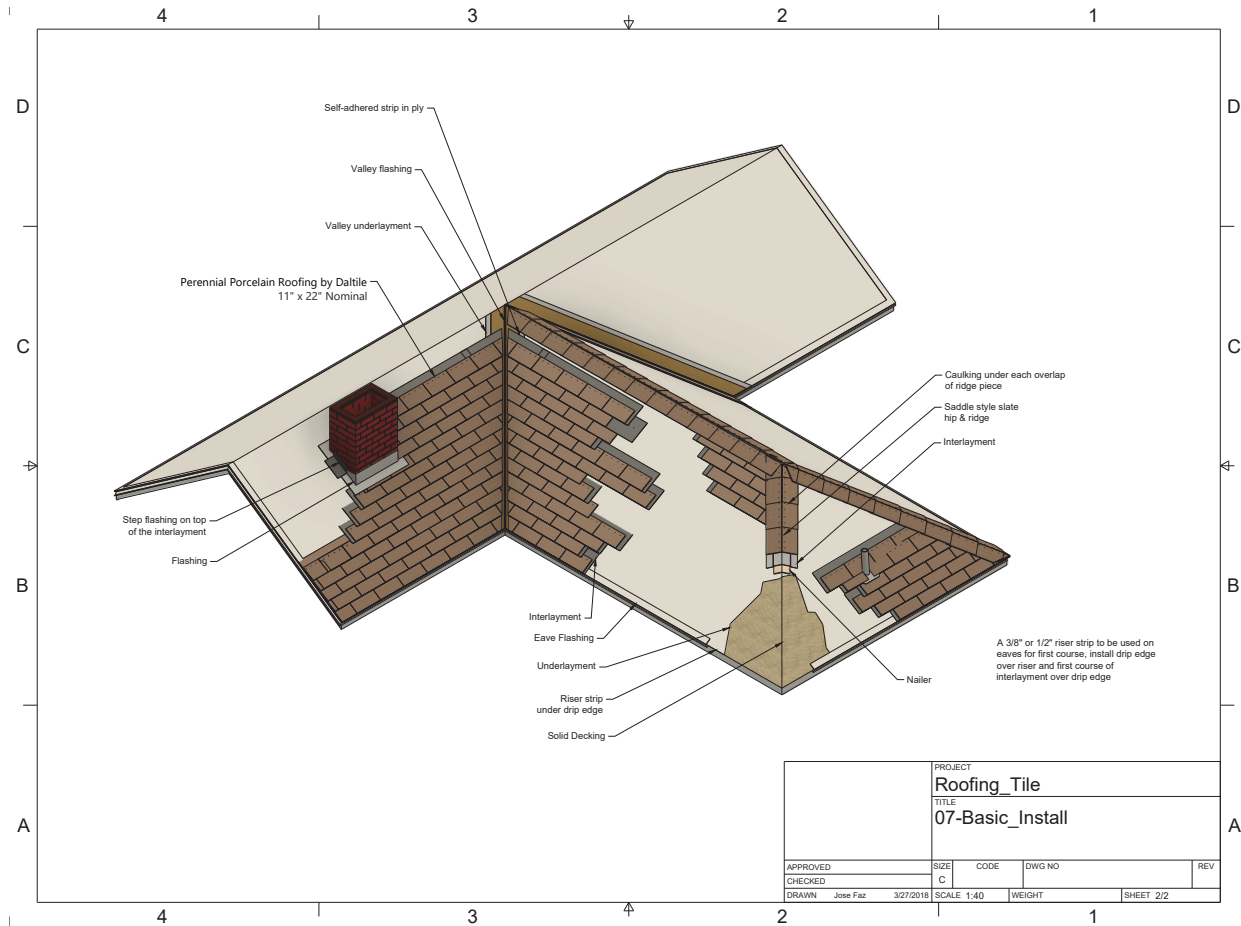
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Basic Install:





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Roof Deck Prep

Slope

Recommended for slopes 5:12 and over. *Self-adhered leak barrier (ASTM 1970) must be installed on slopes 4:12 and less.

Deck

Dal-Tile Perennial Roof Tile shall be installed only over code complying sheathing. Sheathing must be adequate to support the loads involved. Ensure the sheathing/deck material is approved by local building codes.

Underlayment

Select an underlayment product that is suitable to specific location, climate, roof pitch and attic ventilation. When selecting an underlayment, remember that Dal-Tile Perennial Roof Tile is a lifetime product, so the underlayment should be of comparable quality.

Recommended for slopes over 5:12

At all vulnerable areas (valleys, ridges & hips) use self-adhered Leak Barrier (ASTM 1970) directly to the deck.

On valleys and rakes - tape in metal with 6" self-adhered water blocking material/tape/self-adhered membrane.

On eaves (over drip edge) = use 36" ASTM D 1970 (self-adhering) type product.

For the remainder of deck, use one layer of synthetic mechanically attached roof deck protection conforming to ASTM D226 Type II (No. 30 felt) /ASTM D4869 Type IV or ASTM D 1970 (self-adhering).

***NOTE:** Roofing underlayment's should meet or exceed ASTM standards D226/D4869. Self-adhered Leak Barrier should meet or exceed ASTM D1970. Follow all installation and fastening requirements set by the manufacturer for each underlayment and self-adhered Leak Barrier product.

Required for slopes 4:12

**Use self-adhered Leak Barrier covering the FULL deck (conforming to ASTM D 1970), including all hips, ridges, valleys, rakes, eaves, gable/rake edge, around roof protrusions and any other vulnerable areas are required to be covered with a self-adhered leak barrier.

Ventilation Guideline

The need for proper attic ventilation is required by most building code authorities, in accordance with the IBC and IRC. These codes recognize that the proper ventilation is a necessary component of any successful steep slope roof system. Generally building codes require that a minimum net free ventilating area for attic vents be a 1:150 ratio of the attic space being ventilated; the codes generally allow for the reduction of the ratio from 1:150 to 1:300 if the attic vents are a balanced system on a roof and/or a vapor retarder is installed on a ceiling assembly's warm side. Check with local building official for regional requirements.



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Fasteners

Each tile will be nailed to the roof using corrosive resistant fasteners. Use roofing nails that are 2 1/2" length. The nails should be long enough to penetrate the roof sheathing at least (\geq) 3/4 inch and completely through any sheathing that is less than ($<$) 3/4 inch thick. Large, 5/16" diameter flat head with regular diamond point. Ring shank nails also known as annular thread, offer superior holding power in wood and plywood roof decks.

DO NOT nail the tiles tight to the deck. Nailing tiles too tight may result in cracking the tiles and/or breaking the tiles when walking on them. If the tile cracks or breaks when nailed, replace these cracked/broken tiles immediately before proceeding further with the installation.

Trim pieces are also fastened to the Hip and Ridge nailers on the roof, with the same type of nails as the rest of the tile installation.



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NOTE: Daltile Recommended – Order of Installation

1). At all Perimeter Eaves:

- A). 6" Interlayment Separator Ply Underlayment (conforming to ASTM D226 Type II (No. 30 felt) /ASTM D4869 Type IV or ASTM D 1970 (self-adhering).
- B). 1" x 2" Shims (to be 3/4" maximum thickness).
- C). Standard Drip Edge, per the attached Detail.
- D). Install 36" wide Self-Adhering Roofing Membrane (ASTM 1970), over drip edge.
- E). Daltile Interlayment – maximum 10' runs with 6" overlap between joints (tack one nail – both sides).
- F). Daltile Perennial Porcelain Roofing Field Tiles (make sure both ends of each coursing have at least two nail holes being utilized with each tile).
- G). Install next row of Daltile Interlayment (covering nail holes of previous row of tiles and onto synthetic underlayment above).
- F). Install next row of Daltile Perennial Porcelain Roofing Field Tiles, per the above.

*G). As you proceed up the roof plane, stop a few courses from the top of the ridge to re-measure and figure the additional rows needed to reach the top. Your field tile exposures may need to shrink to some degree on these last few rows of field tiles to not have to either cut off the tops of the pre-drilled nail holes or the bottoms of the pre-formed bullnose edges to install them. To avoid drilling holes in Perennial Porcelain Tiles, you can instead "short course" your last few rows up to the bottom of the horizontal ridges to avoid additional installation issues.

2). All Hips & Ridges:

- A). Self-Adhered Leak Barrier (ASTM 1970) directly to the deck.
- B). Double 1" x 4" nailers at both sides, nailed tight to each other. Install these nailers above the perimeter eave 1"x 2" shims.
- C). At all Hip Starters: Option 1 - Install metal flashing over the Hip Nailers (See our Hip Starter Detail) OR Option 2 - hold back the 1x4 hip nailers to allow the eave 1x4's to meet at the center of the base of the hips. Then run the first row of roof tiles all the way to the center of the base hips (cutting the roof tiles around the start of the hip nailers). Then later once you apply the first couple of Hip & Ridge Tiles, these will hide the underneath 1x4's allowing you to forgo the Hip Starter Flashing (See attached field picture).
- D). Daltile Interlayment – cut to 10' maximum lengths (adjust width as needed to just cover nailers) with 6" overlap, directly to 1" x 4" nailers.
- E). Daltile Perennial Porcelain Hip & Ridge Caps, fastened to nailers below.



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3). All Valleys:

- A). Self-Adhered Leak Barrier (ASTM 1970) directly to the deck.
- B). Exposed W-Valley Flashing (per attached Detail). Nail no less than 10” from centerline of valley, at 16” centers each side of valley. Nails should match the metal of valley.
- C). Tape in metal with 4”- 6” self-adhered water blocking material/tape/self-adhered membrane (ASTM 1970).

4). All Rakes:

- A). 6” Interlayment Separator Ply Underlayment (conforming to ASTM D226 Type II (No. 30 felt) /ASTM D4869 Type IV or ASTM D 1970 (self-adhering).
- B). Install T-Metal (See attached Detail).
- C). Tape in metal with 4”- 6” self-adhered water blocking material/tape/self-adhered membrane (ASTM 1970).

5). All other Decking Areas:

- A). Install one layer of synthetic underlayment, fastened roof deck for protection conforming to ASTM D226 Type II (No. 30 felt)/ASTM D4869 Type IV OR an ASTM 1970 (Self-Adhering), across the balance of the entire decking surface. ***(NOTE: Roofing underlayment should meet or exceed ASTM standards D226/D4896. Self-Adhered Leak Barrier should meet or exceed ASTM D1970).**

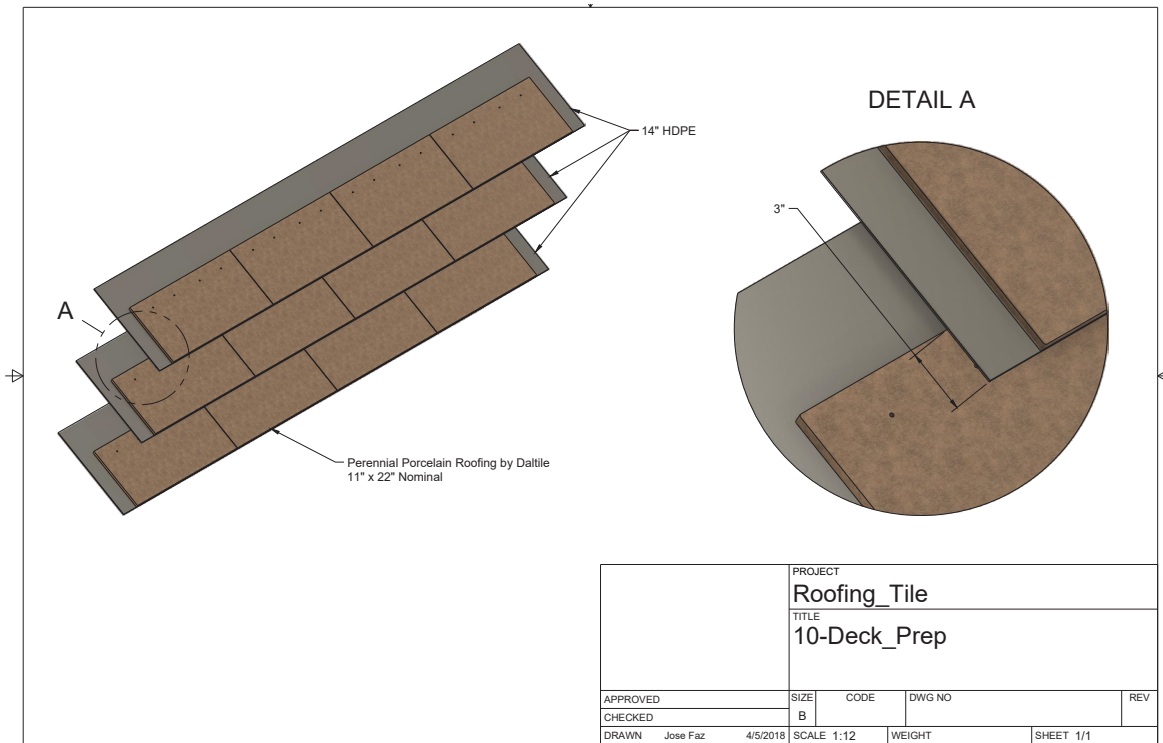


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- Deck Prep (above)
- Metal Flashings (above)
- Starter/Riser strip (1x2 - Shim) installed over 6" run of underlayment, then covered by drip edge metal, and lastly covered by a 36" run of a Self-Adhered Leak Barrier (conforming to ASTM D1970).
- **“Daltile Interlayment”** (10' max length) - one nail on each end to hold in place...mid-course overlap - 6".
- Daltile Perennial Roofing Tile fastened through holes with 2 ½" corrosion-resistant roofing nails. **Ensure tiles are not** nailed “tight” to the roof deck.
- Varied stagger of the tile vertically works best; ensure minimum 4" offset
- For best results, cut and install hips and valleys with 2 nail holes in tile to avoid field drilling holes
- To avoid cutting and field drilling roof tile at ridge
 - o Measure up to ridge nailers and adjust exposure of tile (short coursing) to avoid cutting and drilling holes
- Maximum 8.5" exposure on the horizontal runs - ensure all nail holes are adequately covered
- See above details for Gable/Rake, Valleys, Head Flashings
- See above details for Hips and Ridges



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Hip & Ridges

Install 1x4 (3/4" max height) nailers along all hips and ridges before tiling roof (over the Self-Adhered Leak Barrier). The Dal-Tile Perennial hip and ridge pieces are 16"X16" cut in half—8" tapered on either side of the peak. Install nailers tight to each other (on either side of the hips & ridges) so that the pre-drilled holes will attach in the center of the nailers. Follow chalk lines. Run the provided 14" Daltile Interlayer (cut down to correct width) on top of the hip and ridge nailers as a moisture barrier under the hip/ridge tiles.



Ensure Daltile Perennial HDPE Interlayer material is used over nailers, under tiles. Max 10' continuous pieces, 6" overlap at joints, appropriate width.



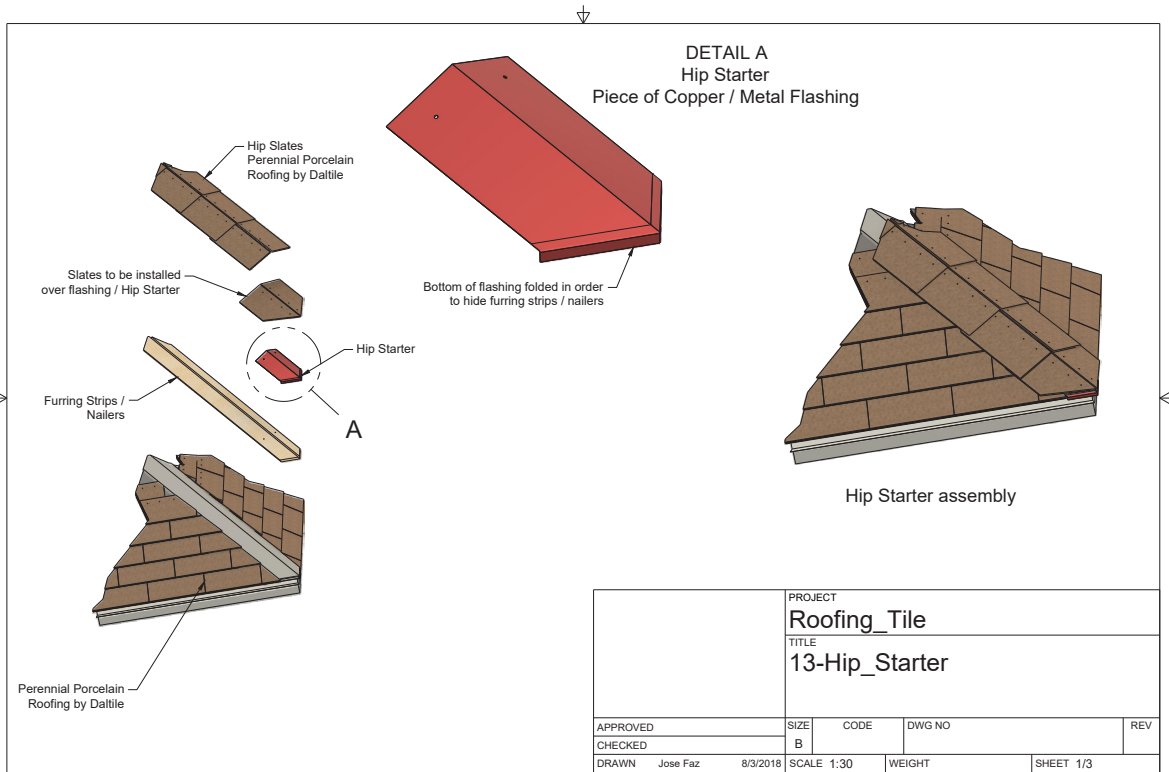
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Hip starter



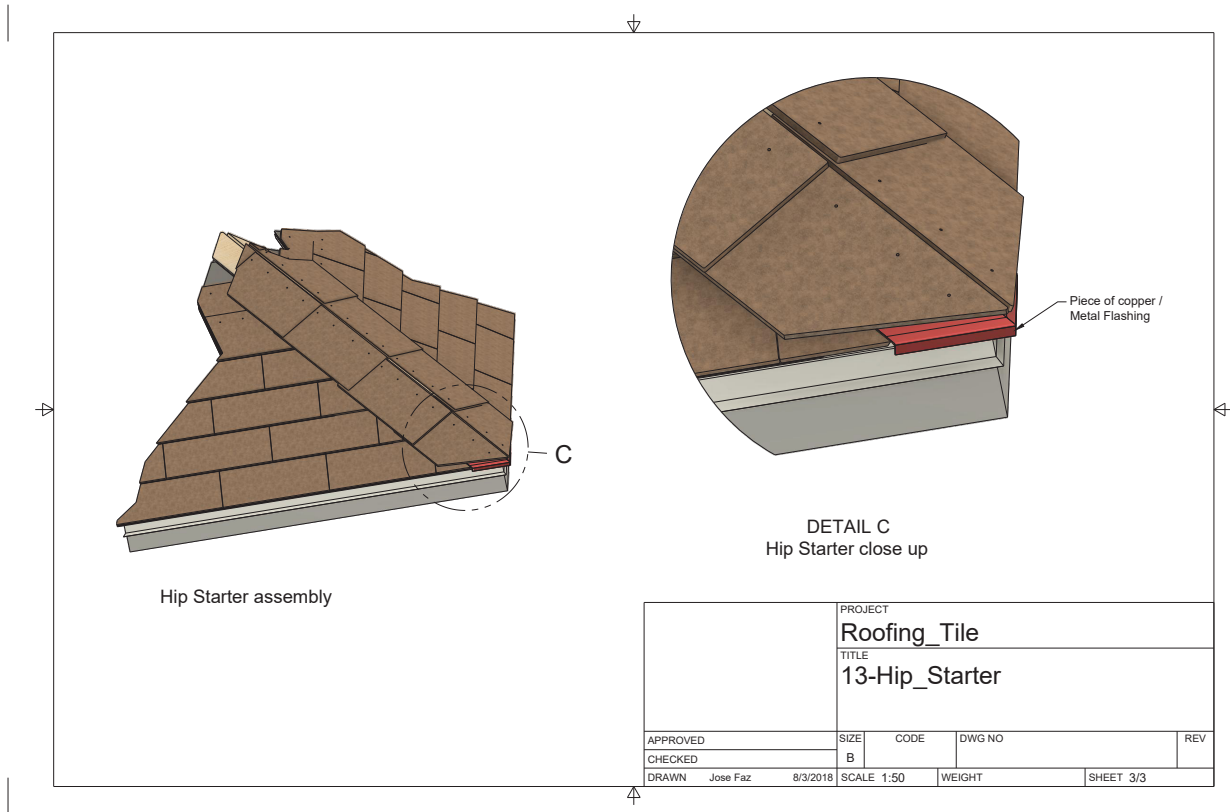


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Stacking/Roof loading recommendations for Daltile Perennial Roofing Tiles

Lay out the courses so that tile exposures are equal with a head-lap of at least 3 inches. Snap lines on the underlayment along the top of each course. One or more vertical lines can also be helpful in keeping the tiles aligned. Accurate layout is critical with most tile patterns. Next, carry tiles up to the roof and distribute the weight equally across the roof, as tiles weigh as much as 10 pounds each. Depending on the tile and the roof structure, stacks of about 6 to 10 tiles is workable.

For questions regarding installation contact:

Dal-Tile

7834 CF Hawn Freeway, Dallas, TX 75217

Michael Rocco

Technical Services Representative

Mobile: 972-415-8764

michael.rocco@daltile.com