
Tile Roofing Inspection
www.TileRoofing.org
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Tile Roofing Inspection
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John Jensen
Jensen Roofing Inc.
TRI Training Program Manager
TILE ROOFING INSTITUTE
JENSEN
ROOFING COMPANY, INC.
EXPERT TILE ROOF CARE

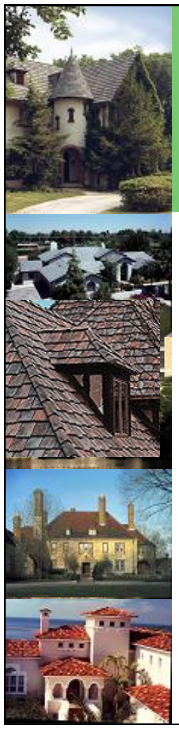
What you can see, and what you can't

1. What is TRI? What is tile? What isn't tile?
2. Clay and Concrete Tile Installation Guide
3. Upgrades, Options and Adaptations.
4. Inspecting: What you can/can't see
5. Trouble Spots, Clues and Solutions
6. Question & Answer Session
7. Walking on the tile.

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TRI - a coalition of manufacturers

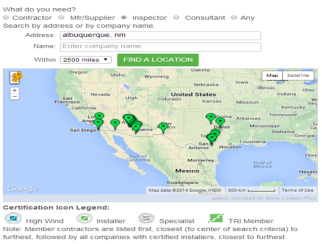
BORAL ROOFING
EAGLE ROOFING PRODUCTS
LUDOWICI Trusted. Timeless. Terra Cotta.
CROWN ROOF TILES
MCA Superior Clay Roof Tile
BARTILE
GLADDING, McBEAN
VANDE HEY RALEIGH
ENTEGRA ROOF TILE
REDLAND CLAY TILE
OFING TUTE 4



Tile Roofing Institute

Training, Technical Support, Referrals





Ask the Expert

Since 1975 the Tile Roofing Institute has been the industry resource for the technical advancement of tile roof manufacturing and installation. Ask our resident expert, Rick Olson, TRI's Technical Director by submitting the form below.

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This is Tile. Clay and Concrete



Not Tile



Not Tile

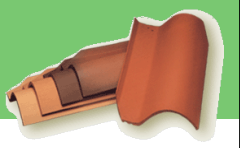


Clay and Concrete Tile

Not wood fiber
Not particle board
Not plastic
Not painted
Not pressed cardboard

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Clay & Concrete



Integrally colored concrete.



Slurry coated concrete



Glazed Clay





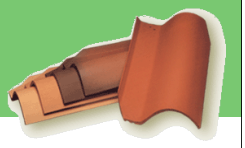
Natural Clay



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Color Types

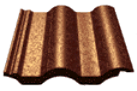




Integrally colored concrete.



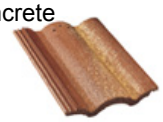








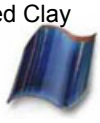
Slurry coated concrete





Glazed Clay











Natural Clay

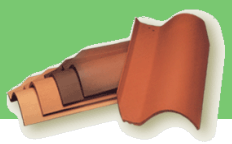


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Tile Profiles









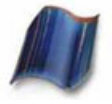








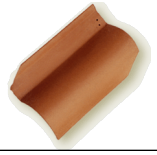












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Tiles with anchor lugs



Tile with lugs on batten



Tiles without anchor lugs

Fasten in accordance with Table 1A



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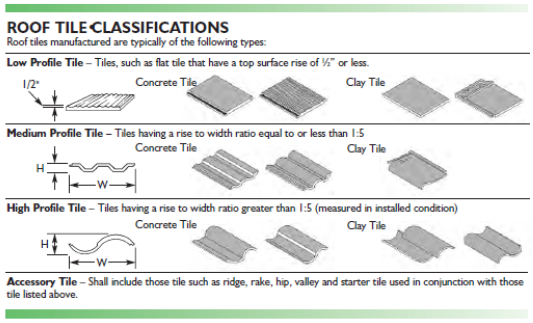
Roof Tile Classifications

Page 3

Low (Flat)- Less than ½" surface rise

Medium- Rise to width ratio of equal to or less than 1:5

High – Rise to width ratio greater than 1:5 in installed position

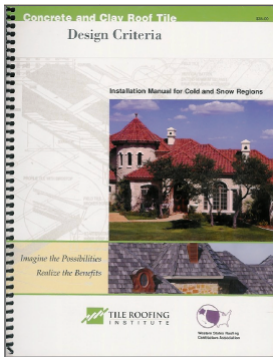


Low/Flat Medium High



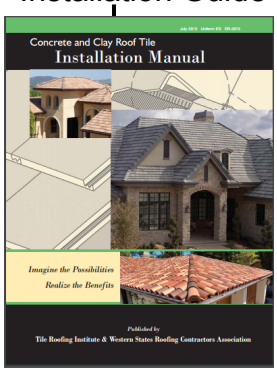
TILE ROOFING INSTITUTE 16

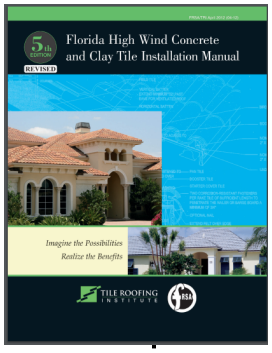
Installation Manuals



Cold & Snow

Installation Guide





Florida / Hurricane Regions

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Tile Roofing Inspection

Installation Guide Basics

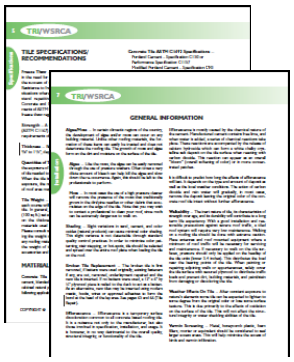


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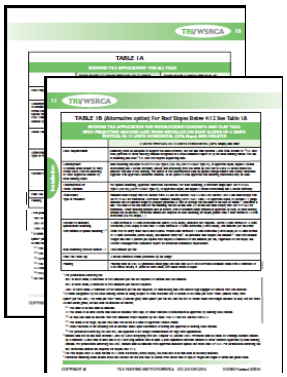
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Using the TRI Installation Manual

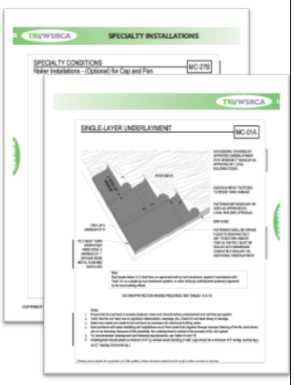
Words 1-9



Tables 10-14



Drawings 15-75



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Table 1B
Tile with Projecting Anchor Lugs (page 11)

TABLE 1B (Alternative option) For Roof Slopes Below 4:12 See Table 1A

ROOFING TILE APPLICATION FOR INTERLOCKING CONCRETE AND CLAY TILES WITH PROJECTING ANCHOR LUGS WHEN INSTALLED ON ROOF SLOPES OF 4 UNITS VERTICAL IN 12 UNITS HORIZONTAL (33% Slope) AND GREATER

Installation

	4 UNITS VERTICAL IN 12 UNITS HORIZONTAL (33% Slope) and over
Deck Requirements	Sheathing must be adequate to support the loads involved, but not less than nominal 1-inch thick lumber or 15/32- inch thick plywood or other decking material recognized in a code evaluation report or by the local building official. The use of sheathing less than 15/32- inch will require supporting data.
Underlayment In climate areas subject to wind driven snow, roof ice damming or wind regions as defined by local building codes	Solid sheathing one layer of ASTM D226 Type II (No. 30) (ASTM D4869 Type IV), or approved equal, lapped 2 inches horizontally and 6 inches vertically, except that extending from the eaves up the roof to a line 24 inches inside the exterior wall line of the building, two layers of the underlayment shall be applied shingle fashion and solidly cemented together with approved cemented material. As an option a code approved self adhering membrane may be used.
Underlayment for Other Climates	For spaced sheathing, approved reinforced membrane. For solid sheathing, a minimum single layer ASTM D226 Type II (No 30) (ASTM D4869 Type IV), or approved equal, felt lapped 2 inches horizontally and 6 inches vertically.
Attachment[1] Type of Fasteners	Fasteners shall comply with IRC section R905.3.6 and IBC section 1507.3.6 and UBC Section 1507.3 and shall comply with ASTM F1667 for tolerances. Corrosion resistant meeting ASTM A641 Class 1 or approved equal, or number 11 gauge diameter and of sufficient length to properly penetrate ¾" into or through the thickness of the deck or batten [3], whichever is less. The head of the nail used for tile fastening will not be less than 5/16 inches and shall comply with ASTM F1667 for tolerances. Other fastening systems such as screws, wire or adhesive based systems as approved by code, or local building officials will be allowed. Horizontal battens are required on solid sheathing for slopes greater than 7 units vertical in 12 units horizontal (58.3% Slope).[1, 2]
Number of fasteners Spaced/Solid sheathing With Battens or spaced sheathing [1, 2] Fastening requirements change without battens Solid sheathing without battens [1, 2]	5 units vertical in 12 units horizontal and below (42% slope), fasteners not required. Above 5 units vertical in 12 units horizontal (42% slope) to less than 12 units vertical in 12 units horizontal (100% slope), one fastener per tile every other row or every other tile in each course. Twelve units vertical in 12 units horizontal (100% Slope) to 24 units vertical in 12 units horizontal (200% slope), one fastener every tile[4]. All perimeter tiles require one fastener[5]. Tiles with installed weight less than 9 pounds per square foot require a minimum of one fastener per tile, regardless of roof slope. See current codeapproved evaluation report for additional installation requirement. One fastener per tile
Field Tile Head Lap	3 inches minimum unless precluded by tile design
Flashing	Flashing shall be (No. 26 galvanized sheet gage) not less than 0.019 inch corrosion-resistant metal with a minimum of 0.90 ounce zinc/sq. ft. (total for both sides) G90 sheet metal or equal.

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J T E

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Batten Guidelines

Page 13

New requirement for cool, humid climate areas:

•Std. 4' battens fastened direct to the deck are not allowed

Installation

TABLE 3
GUIDELINES FOR BATTENS & COUNTER BATTENS

ROOF SLOPE	STANDARD REQUIREMENTS	OPTIONAL UPGRADE(S)
2 1/2 / 12 (21%) TO LESS THAN 3/12 (25%)	**Counter Batten System** Refer to Counter Batten Systems (Page 6) & MC-05 / MC-06A	**Alternates:** Corrosive resistant metal, or other man-made material that meets the allowable loads (see Table 2), ICC-ES recognized, and/or approval of the local building official.
3/12 (25%) TO 7/12 (58.3%)	**Not Required** See below for special climatic conditions	**Nominal* 1" x 2" x 4' or less** (min 1/2" separation between battens)
		Nominal* 1" x 2" x greater than 4' (Provision for drainage beneath batten with min 1/4" thick decay-resistant riser at each fastener)
		Counter Batten Refer to Counter Batten Systems (Page 6) & MC-05 / MC-06A
		Alternates: Corrosive resistant metal, or other man-made material that meets the approval of the local building official and/or ICC-ES recognized batten system.
GREATER THAN 7/12 (58.3%)	**Nominal* 1" x 2" x 4'** (min 1/2" separation between battens)	**Counter Batten** Refer to Counter Batten Systems (Page 6) & MC-05 / MC-06A
	Nominal* 1" x 2" x 8' (Provision for drainage beneath batten with min 1/4" thick decay-resistant riser at each fastener)	**Alternates:** Corrosive resistant metal, or other man-made material that meets the approval of the local building official and/or ICC-ES recognized batten system.

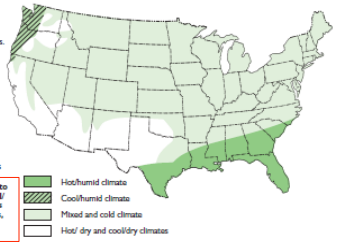
Nominal:* Refer to IBC, Chapter 23 (WOOD), SECTION 2202 (DEFINITIONS).

Allowable Loads: When using counter battens, refer to Table 2 for additional load considerations.

Batten Fastening: 24" OC to the deck with 8d corrosive resistant nails.
12" OC to the deck with No 16 gauge by 7/16-inch crown by 1 1/2-inch long corrosive-resistant staples.
Once the batten is installed, it becomes part of the deck for fastening purposes.

Climactic Conditions: In dry/low humidity climates, moisture resistant battens are not required. Consideration should be given to lower slope roofs that are susceptible to wind driven snow and rain. Optional upgrades should be considered.

Standard 4' battens fastened direct to the deck are not allowed in the Cool/Humid climate zone. Batten systems that provide drainage/air-flow (shims, counter battens or other approved systems) are required.



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Options, Upgrades & Adaptation







Counter Batten Installation for Cold Weather

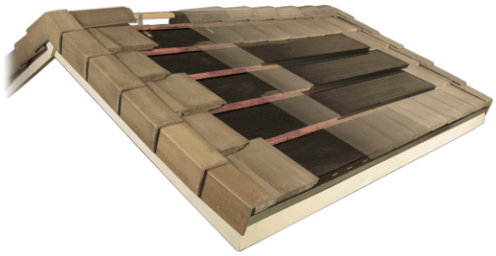


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Energy Saving Batten Installation

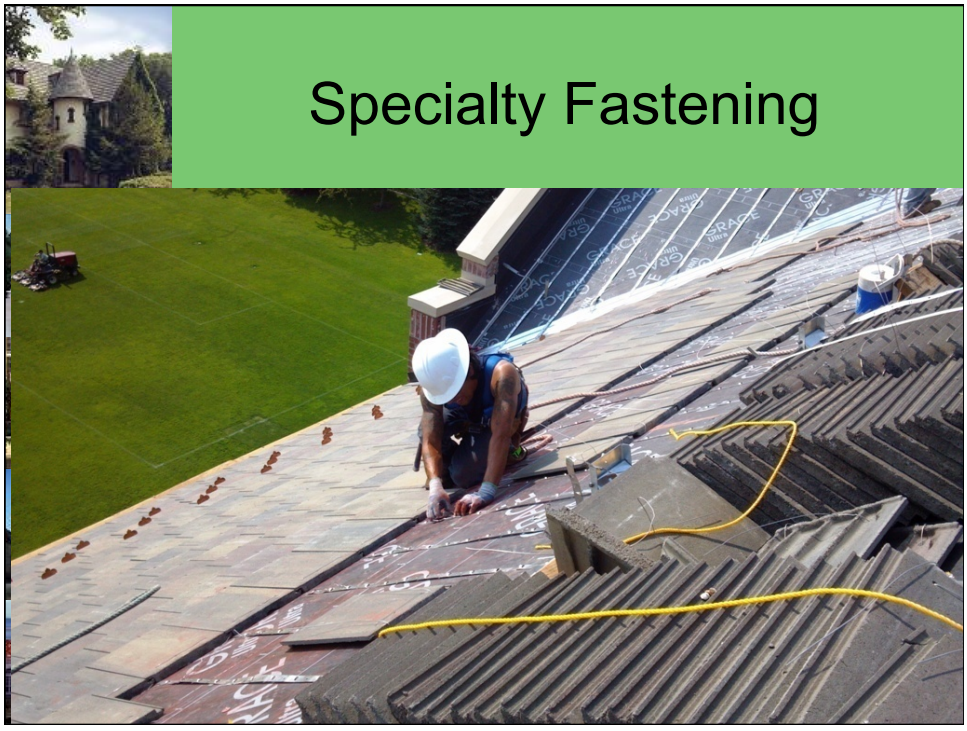
The Energy Saving Tile Roof Systems are specifically engineered to allow greater airflow between the tile and the roof deck – creating an energy efficient roof system





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Specialty Fastening


Specialty Fastening


Adhesive Foam Installation


Inspecting the Roof
What you can see
and
what you can't.
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Inspecting a Tile Roof



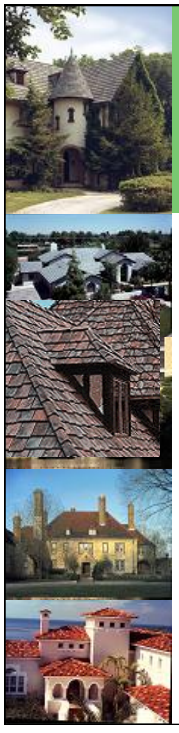
The Home Inspector
"Oh no, it's tile!"

Concerned Buyers Agent
"Are you going to ruin my sale?"

Concerned Buyer
It's tile!
"It'll never leak right?
Do you have insurance?"

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Inspecting the Roof



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A Peek Behind the Curtain



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Walking on Tile

Position feet at the bottom edge of the tile.

Walk softly and stay well balanced.

Do not walk on wet tiles.

Do not walk on cut tiles.

Pay attention to where you step.



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Some things are obvious from a distance





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And from your attic inspection



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Inspecting the Roof

What you can't see

Leak or ???



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Mechanical Venting



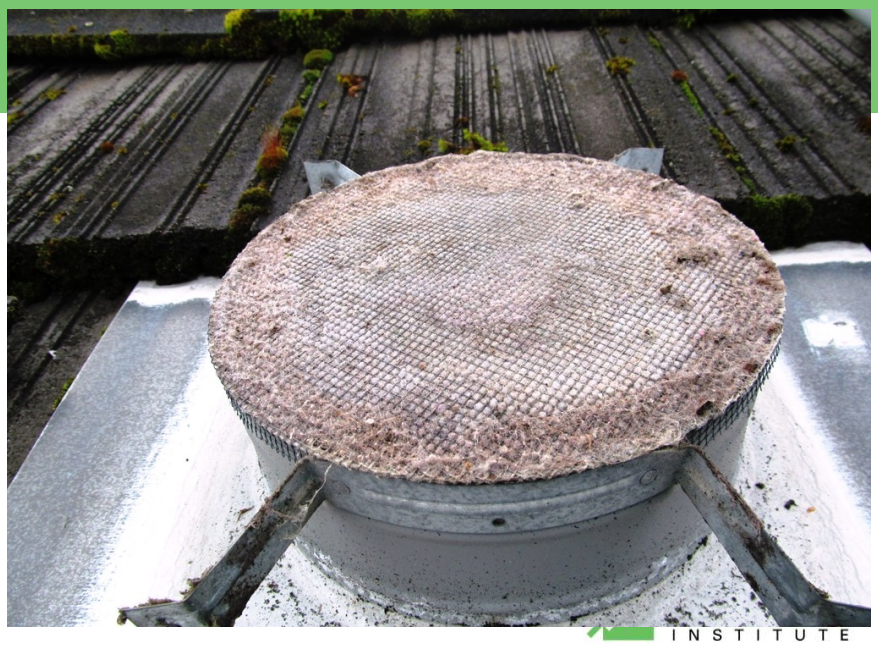
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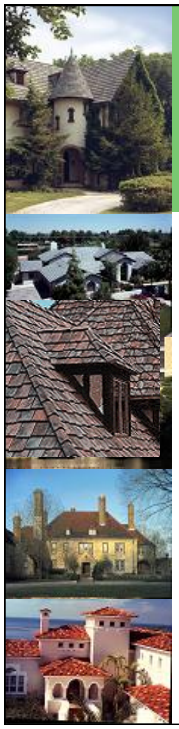
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INSTITUTE 41



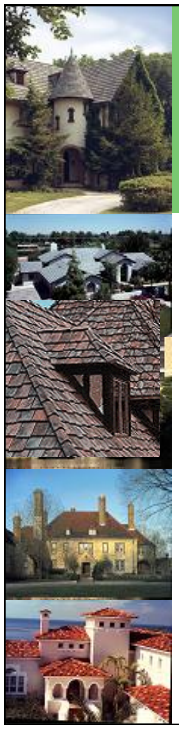
INSTITUTE 42



Things to Remember (most you can see)

- Weather Blocking required all profiles
- Eave drip flashing required all profiles
- Eave Bird Stop required on high profile
- 3” min. headlap
- You should not see fastener holes in the field

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Clues, Trouble Spots and Solutions



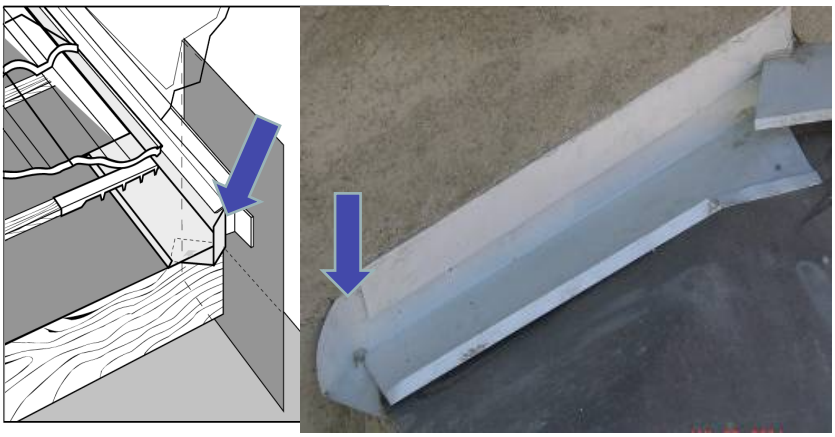
44

Leaks and staining at fascia



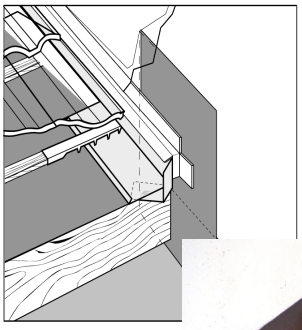
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Sidewall Pan Flashing page 36



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Slipped “half tile”



Most common when “Pan” flashings are used

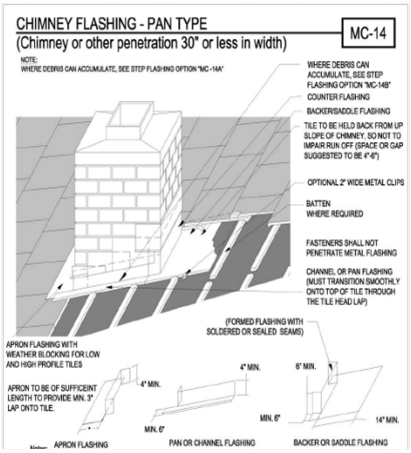




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Pan Flashing Transition



Transition points and valleys are the most common locations for tile roof leaks.

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Transition Flashing

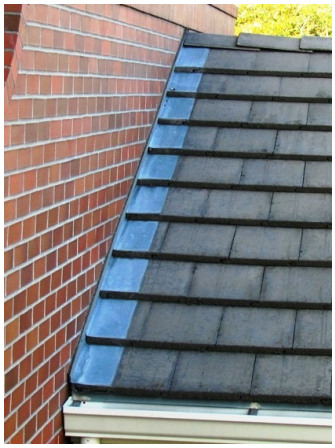


Lugs removed at Transition



Step Flashing





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Step Flashing



Contractors with craftsmanship quality and tile experience exist, but they are rare

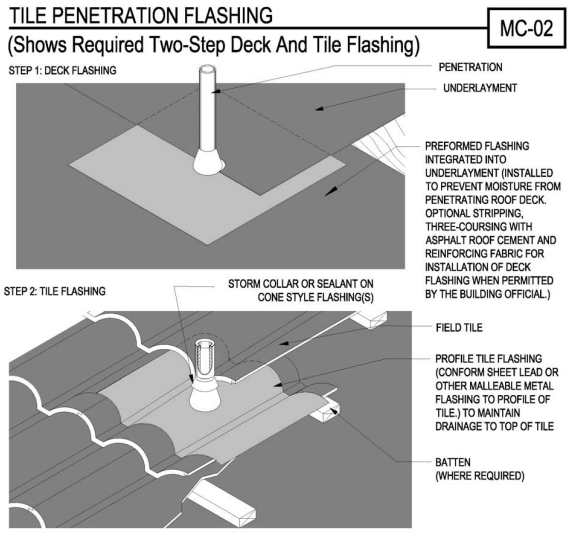
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Tile Penetration Flashing

Page 19

- Two flashings are required per penetration.
- First flashing is installed with the underlayment and is considered the secondary or base flashing.
- Second flashing is integrated with the tile and is considered the primary or tile flashing.
- Rigid flashings may be used for flat tiles and all base flashings.
- Malleable flashings are required as the primary flashing for profile tiles.



Tile Flashing



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Secondary Deck Flashing on all penetrations



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What's Wrong?

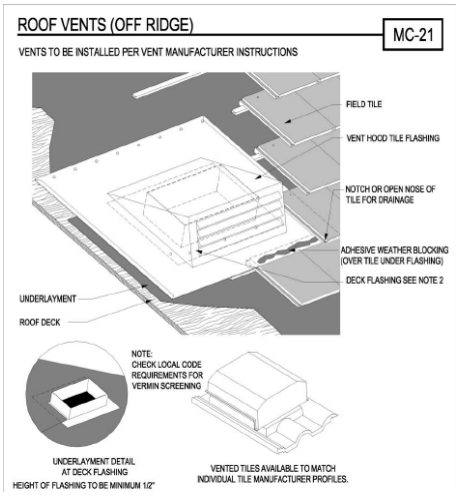


Roof Vents



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Attic and Mechanical Vents







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Deck Flashing for Vent Penetration



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Valley Flashing





Tile in valleys can be installed "open" or "closed"

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Should valley rows line up?



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Typical valley repair



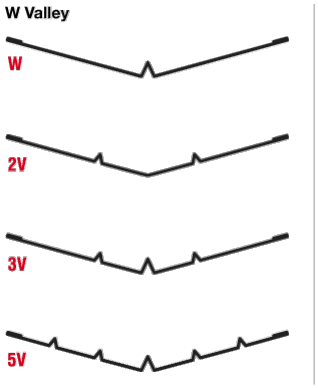
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Batten Extension or Ribbed valley required when flat tile installed as a closed valley



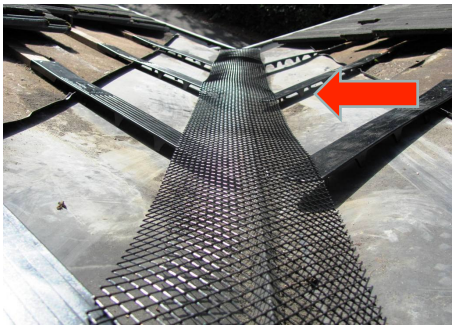
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Valley Flashing Profiles

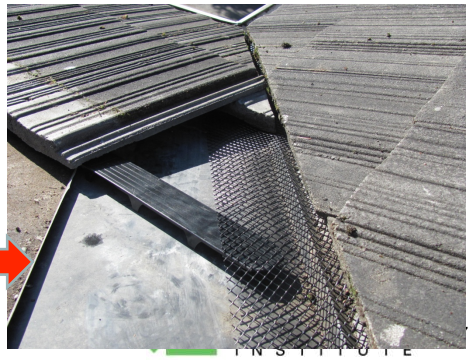


TILE ROOFING INSTITUTE 66

Batten Extension or Ribbed valley required when flat tile installed as a closed valley

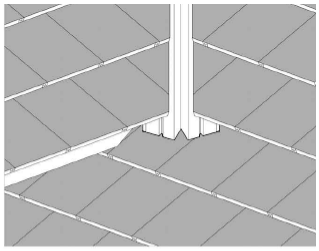


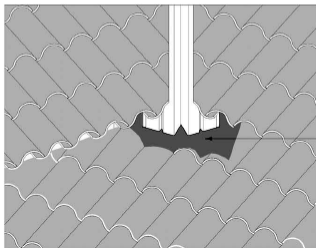
Batten extensions keep tile raised up and out of the water flow channel



Metal return can remain vertical

Valley Termination on Roof







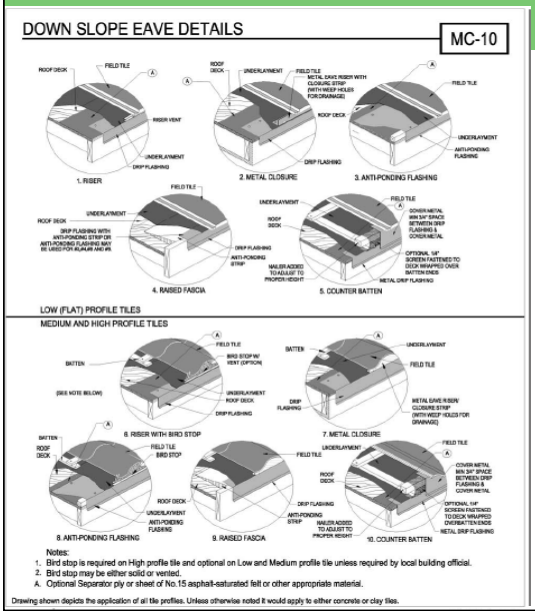
A profile tile requires a malleable flashing transition

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Eave Options

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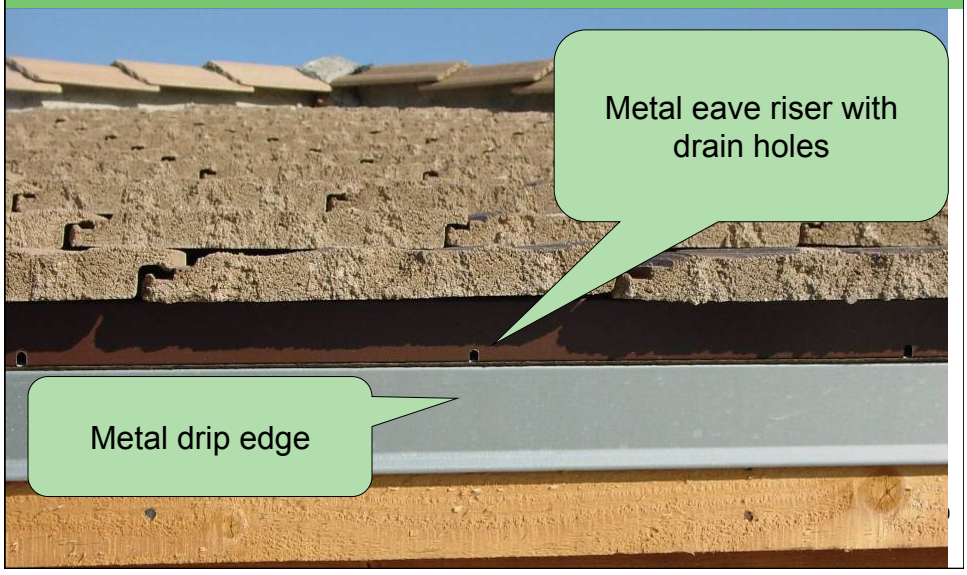


- Drawings on this page portray additional options for eave treatments using various tile profiles.
- Metal eave riser and closure strips with weep holes for drainage and other possibilities for improved ventilation at the eave.
- Drip edge flashing required in all cases.

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Flat Tile Installed with Metal Eave Riser



Clay Bird-stop at Eave



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Cut Away of Installed Raised Fascia



Raised fascia and starter strips can create the same type of water dam and both require that an anti-ponding mechanism be installed.

Anti-ponding mechanism must be of sufficient size to promote positive water flow.

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Raised Fascia - before



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Some clues



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Raised Fascia - after



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Overburdened by Design



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Overburdened by Design



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Overburdened “J” Flashing, by Gutter/Downspouts





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Putting the Mississippi in a culvert pipe



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Broken Tile



"Replace broken tiles."



"System Repair"







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Surface conditions Efflorescence



Reaction between lime in cement and carbon dioxide and water in the air forming calcium carbonate crystals on surface of the tile.

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Efflorescence Solutions

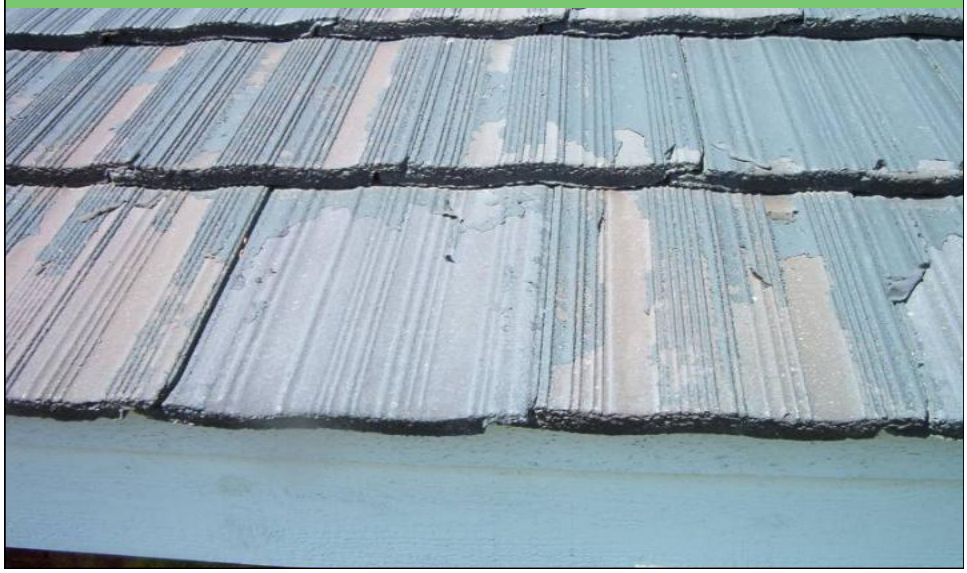
- Power washing
- Acid wash (Acid Magic)
- Reseal
- Wait for nature to run it's course.

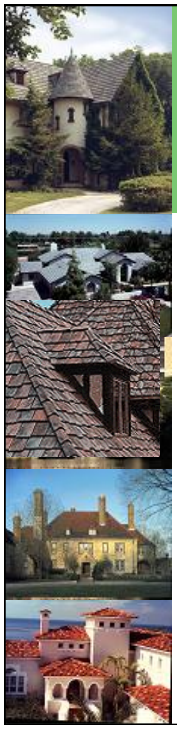
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What's this?



Repainted tile losing coating





Tile Roofing Inspection

Questions?



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Walking on Tile

Position feet at the bottom edge of the tile.

Walk softly and stay well balanced.

Do not walk on wet tiles.

Do not walk on cut tiles.

Pay attention to where you step.

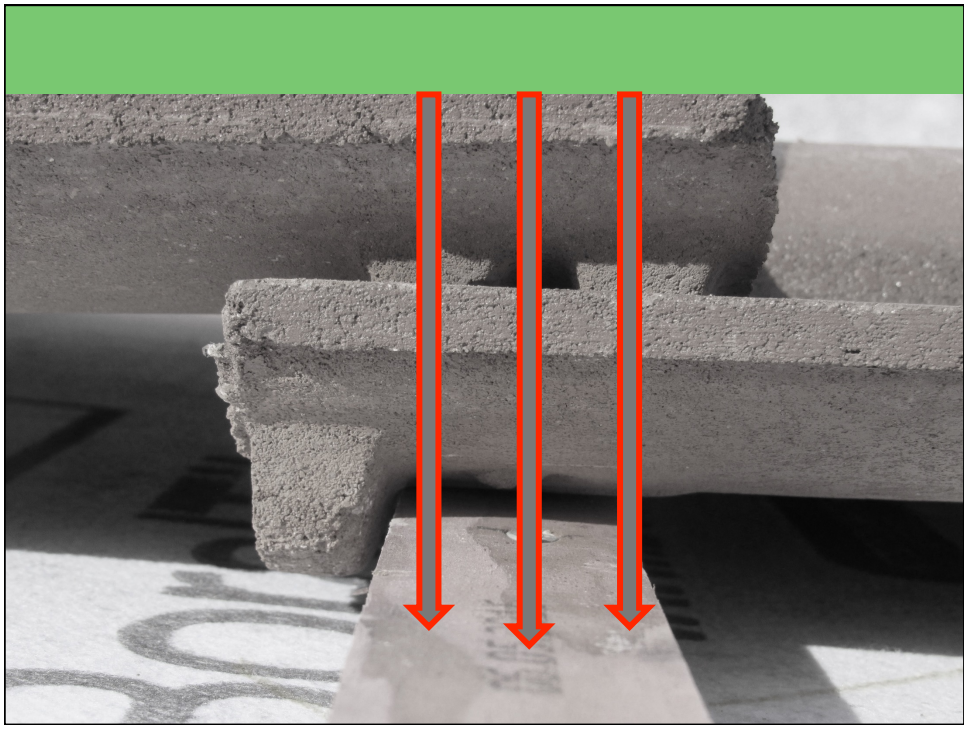


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Low Profile Tile





Rules for myself when inspecting a tile roof I am not repairing.

- If I don't need to, I don't get on the roof.
- Follow All Required Safety precautions.
- Never get on a wet tile roof (includes morning dew).
- Never get on a tile fastened directly to the deck. This include most clay tile, and many concrete in SoCal.
- Walk on full, uncut tile only.
- Avoid walking within 3' of valleys, hips, skylights or anywhere there are cut tiles.
- Stay on the crown part of the tile.
- I always have a piece of "Walkaflex", just in case.

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