



**CERAMIC TILE INSTITUTE OF AMERICA, INC.**

*12061 Jefferson Blvd., Culver City, CA 90230-6219*

## **CTIOA REPORT 2003-4-17**

**SUBJECT: FLASHING DETAILS – EXTERIOR TILE DECK CONSTRUCTION**

**By Mark Marsch**

### **Preface**

Having been in waterproofing for years I have decided to choose as my research topic something I have first hand knowledge of. When a leak is discovered on an exterior deck the first call usually goes to the General contractor who then contacts either the roofer or the waterproofer. Unlike a pedestrian traffic deck membrane, in order to visually inspect the below grade deck membrane one has to remove the tile to inspect it.

The determination of the cause of the leak and the implementation of the repair is much more costly on a tiled deck when compared to the cost of repairing an exposed membrane system. This is why it is so important to understand the complete tile assembly and not just one component. It is my intention to contribute to the tile industry by giving you a macro view of this assembly via my experience in construction defect litigation repair involving the sheet metal, waterproofing and tile installations.

Since the CTIOA has produced substantial information on the tile itself I will confine my research report mainly to the metal, tile elevations, waterproofing and their relationship to a complete tile assembly.

### **Introduction**

Usually it is the General Contractors job to oversee and coordinate the installation of the complete tile deck assembly. After the framing and the sheeting are completed, the General Contractors tile installation coordination begins with the installation of the sheet metal, the waterproofing and finally the tile.

Without *prior* direction the General Contractor will most times make his decisions based on scheduling concerns rather than the best method of installation. However, the General Contractor relies on his subcontractors to advise him of the best method of installation. Advising the General contractor becomes tough for us as *subcontractors* because the waterproofing Contractor generally does not do tile or the metal installation nor does the tile installer usually do the waterproofing. To further complicate matters, the sheet metal contractor usually has no knowledge of either the waterproofing or the tile.

It seems the first concern of the General Contractor is to get the metal in so he can install his doors and pass his framing inspection.

This not only allows him to get the building wrapped or “dried in” but it is common for the General Contractor to obtain a draw after the framing inspection is passed. Once the building is wrapped he can start construction on the interior. For obvious reasons, the motivation for his scheduling decisions may be more focused on time saving techniques and less on the proper installation methodology.

## **1) Sheet metal**

Because sheet metal is installed first, it is critical to the complete tile assembly. Setting up the proper elevations for the full tile assembly should be done prior to any metal installation. Sheet metal should be installed at all deck transitions. Since the sheet metal contractors are not familiar with the waterproofing requirements nor are they responsible for the tile elevations, it is critical that they be given direction. All of these transition details can be prefabricated prior to installation in the field. The architect will usually specify soldered corners on all prefabricated items.

The waterproofing manufacturers, since they do not sell nor do they warrant the metal, require that the installation at least follow SMACNA (California Association of Sheet Metal and Air Condition Contractors, National Association) guidelines. Merkote Products is the only manufacturer that I’m aware of that provides its customers written direction on metal details. You can find these details at [WWW.merkote.com](http://WWW.merkote.com) under Mer-krete systems. For our applications on an exterior deck, the nailing patterns are minimum 3in. on center in a staggered pattern with a minimum 4 in. overlap between metal pieces. All overlap joints must have sealant (a single component urethane is recommended) between the laps.

The metal laps should always follow the same lapping procedure as you would use with sheathing membranes on walls. Since some decks have the slope built into the framing you want to start at the lower end and lap over the lower pieces as you would do with shingles.

When deciding how large the prefabricated items should be, the following rules of thumb should be followed. The horizontal legs on the deck should always be at least 4 inches. Manufactures of waterproofing materials recommend at least 4 inches of metal exposed for an attachment. The vertical leg should be a minimum of 6 inches up the wall. Many of the failures found in new construction are because there was very little overlap at the sheathing

paper to flashing detail.

All too often the stucco contractor, without direction, has set his weep screed too low which causes the tile contractor to compromise his minimum mortar bed thickness or his slope to drain. A two piece deck to wall metal is preferred over a one piece flashing detail because of its flexibility with regard to elevation. A one piece deck to wall has the stucco termination built in at a fixed distance off the deck. Once this one piece is set, the elevation maximum is now set because you cannot float any higher than the stucco termination.

Actually, it can be floated higher and we see this done all too often. If you did float higher than the stucco termination the water would have no way of exiting the stucco and would be forced to exit the stucco and into the wall. If the L flashing or deck to wall flashing, the first component of a two piece flashing system, is used, the tile setter can float his mortar bed or mark his elevation so that the stucco contractor can set his weep screed after the proper elevations have been set. It is also a good idea to let the stucco contractor know not to put the *weep screed* too close to the deck as this will cause you a problem when you are caulking your expansion joint at the perimeter.

The industry has found many leaks occurring where a deck to wall flashing and drip edge termination begins. In figure # 7 you will see a typical *drip edge termination* piece. This piece is designed to eliminate any lapping or corner to stucco interface weaknesses. It allows for plenty of room for not only the drip edge and deck to wall to overlap but for the stucco or siding lapping over as well.

The *post collar* in figure # 8 is designed so the post can be cut to accept a short flange placed into the cut and caulked. This design was created to minimize the chance of water getting between the metal and the post.

Figure # 10 is a *door saddle*. Door openings are the single greatest source of failures. Doors are not designed to be waterproof and they are not warranted as such. This door saddle is designed to prevent water intrusion regardless of the door system.

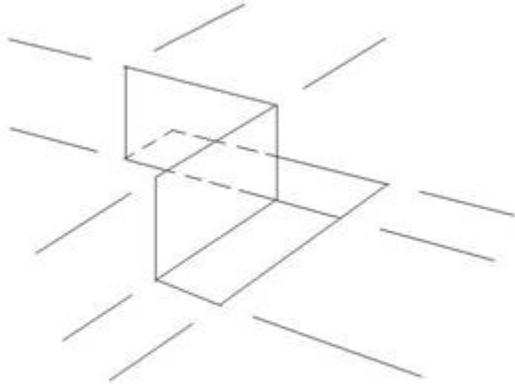
The following are the most common sheet metal details found on exterior deck applications:

1. Outside corner
2. Inside corner
3. Overflow scupper
4. Standard scupper
5. Standard Drip edge
6. Reverse Drip Edge
7. Drip to wall termination

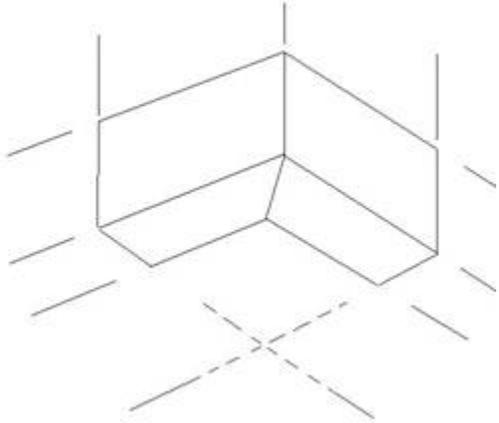
8. Post collars

9. Standard L metal deck to wall flashing

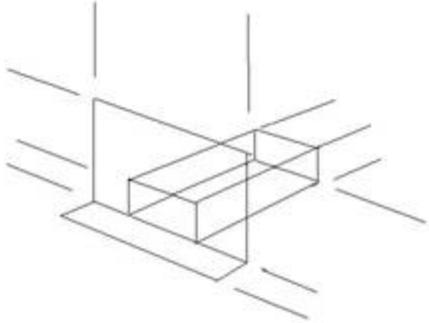
10. 2 Piece Door Saddle



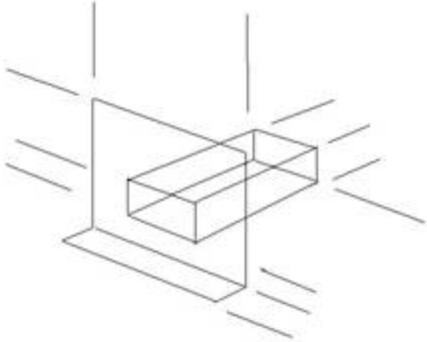
**Figure 1: Outside Corner**



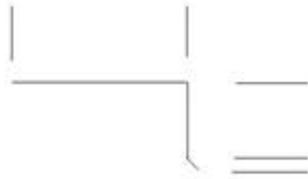
**Figure 2: Inside Corner**



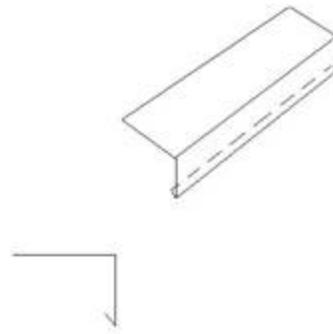
**Figure 3: Overflow Scupper**



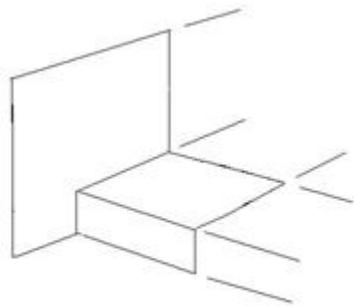
**Figure 4: Scupper**



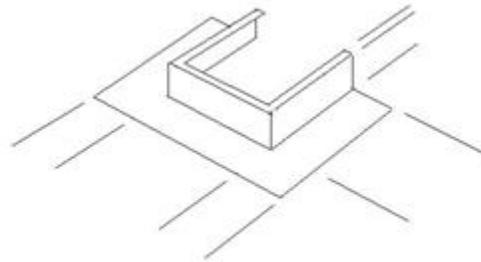
**Figure 5: Drip Edge**



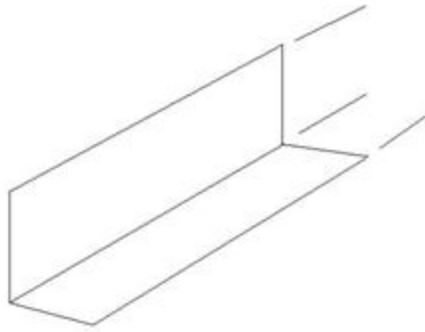
**Figure 6: Reverse Drip**



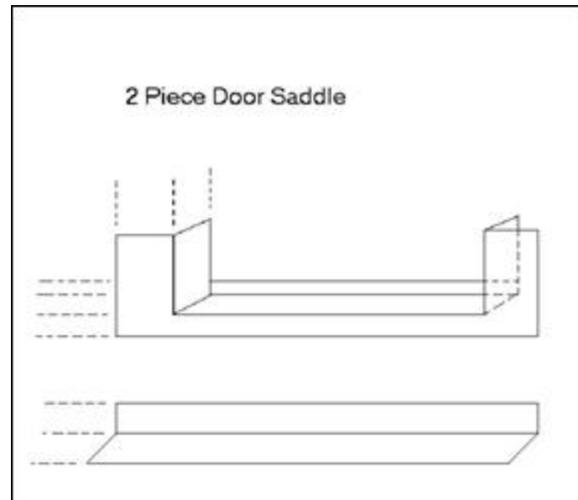
**Figure 7: Drip Termination**



**Figure 8: Post Collars**



**Figure 9: L-Metal**



**Figure 10: 2 Piece Door Saddle**

## 2) Waterproofing

Once the elevations have been set and the sheet metal is installed the waterproofing can be installed. The membrane can be placed at the plywood level if the slope is in the framing. No manufacturer will warrant their membrane with the possibility of standing water for more than 24 hours. Manufacturers also will not warrant their membranes over OSB (oriented strand board) on exterior walking decks because it has not been approved by I.C.B.O. (See attached letter) If you see that the decks have been sheathed with OSB it is important to bring this to the attention of the General Contractor or owner and let them make the decision on how to proceed.

If the plywood is not sloped then the membrane can be placed on the mortar bed. It is extremely important that expansion joints are properly placed during the installation of the mortar bed. Expansion joints are placed at all restraining abutments or changes in plane and every 12 to 16 feet in the field. It is not acceptable to cut them in afterwards as it is very unlikely that the depth could be cut in with any precision.

If the mortar bed is sloped this means the thickness will vary which means the fixed cut depth would either be short of the plywood or cut into and weaken the plywood. Having the cut fall short of the plywood would not work as the expansion joint. An expansion joint, in order to function properly, has to start at the plywood level and continue up through the tile.

There cannot be any rigid material in the joint that would prevent it from expanding. (See TCA handbook for Expansion joint details). Once the mortar bed has been placed with expansion joints the membrane can be installed per the manufacturer's recommendations.

## Conclusion

Most of the failures encountered on exterior decks are a direct result of lack of communication or lack of understanding on a complete tile assembly. Every trade wants to only be responsible for their component of the assembly. Although this may be a tact taken in a court of law, it does very little to prevent the failures of the complete, exterior tile assembly. It is my desire to provide the tile industry with information on the integral parts of the complete assembly so that they can take charge of the process to insure our customers a viable, complete exterior tile assembly.

Footnotes:

1. Merkote details

[www.Merkote.com](http://www.Merkote.com)

2. ICBO Evaluation Service, Inc.

Letter dated May 11, 2000

Brian C. Gerber S.E.

3. TCA 2002 Handbook for Ceramic Tile Installation

40th Edition

P. 40

The preceding article was researched and written by Mark Marsch as a requirement for the Ceramic Tile Consultant Course. We wish to thank Mr. Marsch for his excellent report.