



TECHNICAL BULLETIN #127

Regarding: Exterior Decks Using Merkrete's Waterproof Membranes. .

Exterior tile decks are beautiful and easy to maintain when properly detailed and installed. When done incorrectly and with little attention to detail, they will fail. The purpose of this Technical Bulletin is to provide a better understanding of proper detailing and use of Merkrete waterproof membranes on exterior tile decks.

Exterior decks; decks, balconies, lanais and walkways have been successfully completed using Merkrete waterproof membranes for many years. Most of the same components from Merkrete are successfully used daily in waterproofing of Parex USA's Mer-Ko exterior pedestrian and auto decking systems. That said, exterior decks are the most demanding installation of ceramic or stone tile, due to a lack of understanding of proper detailing, large temperature changes and environmental conditions.

Industry experience has shown us there are three critical requirements to any exterior installation of ceramic or stone tile. Slope to drain; the installation must slope a minimum of 1/4" per foot. This will assist gravity in removing most of the moisture that can be absorbed into the installation. Coverage of the thinset; when a tile is lifted, coverage must be no less than 95%. That is, 95% of the tile and substrate making contact with the bonding thinset. Anything less than 95% will result in a failure, eventually. Expansion joints are extremely important on exterior installations. The TCNA (Tile Council of North America) Handbook recently increased the frequency of expansion joints exterior to every 8'-12' in each direction. Follow the current version TCNA Method EJ171 for additional details on placement of the joints, how wide the joints should be, and the type of sealant to be used.

The TCNA (Tile Council of North America) Method

F103; Roof Deck, Membrane is based on an exterior deck for concrete, steel or wood construction. It only shows a mortar bed as a recommended substrate. The F103 Method requires the waterproof membrane be placed on top of a properly pre-sloped substrate. The substrate should be sloped to drain the deck to a drain, scupper or off the deck. Then the mortar bed is placed over crushed gravel for a drainage material. The mortar bed is tiled using a premium latex modified thinset like Merkrete's: 735 Premiumflex, 720 Marblepro, 820 Merlite, 200 and 211 Krete thinsets. It is required by industry standards like ANSI A108.5 and critical to any exterior installation of tile that the coverage of the thin set be no less than 95%. If voids of thinset are larger than the industry requirement, they will often accumulate moisture or water. In freeze thaw climates, this water can freeze and expand, causing degradation and bond failure of the thinset. The TCNA F 104 method for Balcony Deck requires a concrete presloped substrate over an unoccupied space. It includes the coving of waterproofing up the wall into a reglet type flashing under the wall finish materials. This way rain draining down the wall will run onto the top surface of the tile, instead of behind it. Neither common TCNA Methods for exterior tile reference to cement board over a plywood substrate. While cement board over a plywood substrate is an exterior substrate we are often asked about, there is a lot of potential for failure. The cement board attached to the plywood substrate, experiences excessive expansion and contraction due to environmental conditions like moisture and thermal, often causing failure resulting in leaking and loss of bond of tile. Industry Standards, Parex USA and Merkrete do not recommend this type of installation on exterior decks, this method does not meet any industry standards from ANSI or TCNA. An exterior wooden

deck must have a properly placed mortar bed as in TCNA Method F103. This requires a properly sloped wire reinforced mortar bed installed over a drainage bed. Even with these precautions, TCNA notes these exterior installations like methods F103 & F104, may not perform in freeze thaw climates.

When installing an exterior deck or balcony there are many great products from Merkrete that will successfully perform as waterproof membranes like BFP, Hydroguard 2000 and SP1 waterproof membranes. We have found the best exterior waterproof membrane and highly recommended over occupied spaces to be BFP. It is our oldest and most proven waterproof membrane. BFP includes a primer coat in addition to the liquid membrane, and creates an incredibly well bonded and very water tight installation. Over unoccupied spaces, the Hydroguard 2000 and SP1 membranes have performed extremely well. Merkrete recommends ANSI 118.4 polymer modified thinsets for bonding tile to our waterproof membranes. We also have a large selection of details on exterior decks, balconies, stairs and walkways on the Merkrete website at www.merkrete.com

These decks must also be constructed to comply with the local building code. We recommend the area to be tiled; be walked with the designer, flashing applicator and builder. Once the substrate is agreed upon, the tiling system can begin. Successful installations require an excellent waterproof membrane coved and tied into the wall behind finishes, columns, and door sills. In addition the membrane should be sloped no less than ¼" per foot and drain to a scupper, drain, gutter or off the deck. After waterproofing, seriously consider water testing or flooding the area, to be confident the waterproofing is properly flashed, sloped and drains quickly before expensive finishes are applied. Consider any penetrations through the deck or membrane like grills, pipes, columns and railings. Eliminate them or minimize them, if possible. If not, after placing, waterproof them again and test. Sealants can help but require frequent maintenance and replacement.

Exterior decks can perform if careful consideration is taken. It starts with a good substrate presloped

like a mortar bed or concrete. The waterproof membrane must be installed following the directions and drain well. The tile needs to be installed with a premium latex modified thinset like Merkrete's: 735 Premiumflex, 720 Marblepro, 820 Merlite, 200 and 211 Krete thinsets. The thinset can have coverage of no less than 95% coverage. The tile has to be suitable for exterior installations. Expansion joints need to be installed, carefully, following the TCNA EJ171 method. If these steps are followed, you will experience a beautiful exterior tile installation with excellent durability.

The installation of tile must be done following installation standards published in the current (TCA) Tile Council of America handbook, ANSI (American National Standards) A108 specifications, any local building codes and our data sheets. For additional information, see our product data sheets and details on exterior decks at the Merkrete website www.merkrete.com For additional technical assistance please call our Technical Department at 800-266-2424 or email us at www.technical@parexusa.com