



POLYFOAM BEING APPLIED TO DECK DURING INSTALLATION OF US TILE.



## Energy Efficient Tile Roof Offers Energy Efficiency for Houston Texas Home

by Tony Matter, freelance writer for the construction industry

**R**apidly rising energy costs have put the spotlight on energy efficiency. Nowhere is this more evident than in the construction industry, where codes like California's Title 24 have mandated the use of energy-efficient building materials. Because roofs play such a major role in a building's overall energy performance, they have become a major focal point for improving energy efficiency.

Title 24 has required commercial roofs to be energy efficient for a few years, but in 2008, California plans to

add residential roofing standards to Title 24 as well. While California is leading the way toward energy efficiency, the trend is beginning to move eastward. States such as Arizona and Florida have already implemented energy-efficient roofing regulations for residential buildings and Nevada and Texas are right behind them.

For Texas homeowner Pam Herring, energy efficiency was a major consideration when she needed to reroof her house earlier this year. Herring's home featured asphalt shingles installed directly over the

original wood shake roof, a system known within the industry as comp-over-wood. Herring's was in bad shape and in desperate need of repair.

Aside from energy efficiency, Herring said she was also looking for a roofing product that offered long-term durability but resembled the house's original cedar shake. To help her find the perfect system, Herring called Adam Stanford, owner of Graziano Roofing in Houston, Texas.

After considering a number of options, Stanford recommended installing a clay-shake tile in conjunction with an Ecoset® Professional Tile Roofing System from Polyfoam Products, Inc., a Texas-based company. Stanford is familiar with Polyfoam's full line of tile attachment systems, having been a Polyfoam factory-approved installer since 1999. "The Ecoset system was a perfect match for what the homeowner was looking for," said Stanford. "It provided her with an energy-efficient system and allowed her to select a quality clay tile that looks like shake."

Ecoset is a three-part tile attachment system that features a water-

(Continued on Page 66)



# Energy Efficient

(Continued from Page 64)

proofing underlayment, a layer of expanded polystyrene (EPS) insulation and Polyfoam's unique, two-component polyurethane free-rise adhesive. According to Dave Faulkner, originator of the Ecoset system and Ecoset product manager for Polyfoam, the combination of a waterproofing membrane, insulation, and the polyurethane adhesive make the Ecoset system incredibly energy efficient.

"We developed Ecoset specifically for Title 24 and other building codes that are beginning to implement energy-efficient guidelines for residential roofing," said Faulkner. "Ecoset exceeds all of the energy requirements that have been proposed in California and other states."

According to the ASTM C-1363 test, the R-value of an Ecoset system is 10.68, while a traditional, mechanically attached system offers an R-value of only 2.59. Heat flow testing at the Oak Ridge National Laboratory in Oak Ridge, Tenn., confirmed the energy efficiency of Ecoset. According to Dr. William Miller, research engineer working for the Building Envelope Program at Oak Ridge, the Ecoset system reduced peak heat flows through the deck by approximately 80% versus a dark, heat-absorbing shingle in the summer. It also limited nighttime heat loss in the winter by nearly 70% compared to the direct-nailed shingle roof. "Ecoset is an excellent performing roof system for residential applications," said Miller. "There are similar systems out there, but Ecoset is the only one I'm aware of that features a strong, spray foam adhesive."

Polyfoam's spray foam adhesive, Polypro AH-160, is another reason Stanford suggested the Ecoset system. Polypro AH-160 provides two to three times more holding power than traditional tile attachment meth-

ods, making it ideal for regions that experience a significant amount of high-speed winds. "I like to use Polyfoam products in Florida, Louisiana, and Texas because of the hurricane winds that those areas experience," said Stanford. "Even though Spring, Texas isn't located directly on the coast, it can experience a lot of hurricane-like winds. The Ecoset system will keep the tiles on the roof no matter what winds come at them."

Before Stanford and his crew could install the new energy-efficient Ecoset system they had to tear off the damaged asphalt shingles and cedar shake. After the old roofing was torn off, Graziano re-decked the roof with  $\frac{1}{2}$ " plywood and then covered it with Polystick™ TU P, a self-adhesive waterproofing underlayment manufactured by Polyglass® USA.

Next, Graziano began applying the  $\frac{1}{4}$ ", scalloped EPS insulation using the Polypro AH-160 adhesive. The insulation is a major reason that the Ecoset system is so energy efficient. Besides the excellent R-value of the insulation itself, the  $\frac{3}{8}$ " scallops on the underside of the EPS create an air gap that allows air to flow through the system. The air gap also adds additional R-value, which further helps reduce the amount of heat flow in and out of the house.

To apply the AH-160 adhesive, Graziano used Polyfoam's ProPack® 30 field application kit. The ProPack 30 is a portable, self-contained kit that comes with everything a contractor needs to install the Ecoset system, including the AH-160 adhesive, hoses, and foam dispenser.


Besides offering increased R-value, the EPS insulation serves additional roles in the Ecoset system. It also provides extra protection to the waterproofing underlayment by shielding it from inclement weather and diverting any water seepage off of the roof through its scalloped underside. "In traditional tile appli-

cations, the first thing to fail is usually the underlayment because it becomes brittle from exposure to extreme heat and severe weather," said Stanford. "The insulation in the Ecoset system shields the waterproofing membrane from harsh weather conditions, which leads to a longer service life."

Next, Graziano began adhering the new tiles directly to the insulation. For her roof, Herring selected Pro Shake Plus®, authentic clay tiles manufactured by US Tile®, Corona, Calif. Because of the size of the tiles, which measured  $8\frac{1}{2}$ " by 14", and the tiles' low profile, Graziano used a medium paddy to adhere the Pro Shake Plus tiles to the insulation. Paddy is the term given to the adhesive after it is sprayed onto the roof. According to Polyfoam's specifications, a medium paddy should measure 2" x 7" before expansion.

An additional benefit of the Ecoset system and the Polypro AH-160 adhesive is the durability it provides to the rooftop and tiles. After the tile is set in place, the adhesive expands and creates a support underneath the tile. "The Ecoset system creates a solid base underneath the tiles and makes them a lot easier to walk on during installation," said Stanford.

After the field tiles were securely adhered in place, Graziano installed Flexim®, a flexible roof mortar to the hip and ridge. Flexim will remain flexible for the entire life of the roof and will not dry out like traditional concrete.

Because of the ease and simplicity of the Ecoset system, Graziano was able to complete the tear-off and reroof of Herring's 3,000-square-foot roof in a few short weeks. According to Stanford, everything went well and he is pleased with the way the roof turned out. "The Ecoset system was perfect for this project. It gave the homeowner everything she wanted - energy efficiency, durability and beauty," said Stanford. 



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