



PINK Insulation Shows True Color is Green

FOAMULAR® Extruded Insulation Recycled
After 17 Years on the Job at DFW Airport



Dallas/Fort Worth Airport, Texas.

Case Study



Most of the time you can't find insulation under a rock but that's exactly what happened at DFW Airport in Texas.

When the time came to replace membranes in insulated and ballasted roofing assemblies on the terminal buildings, the DFW Airport Board's Roof Manager Neal Morris looked for insulation under the rock ballast already on the roofs. What he found was perfectly re-usable extruded FOAMULAR® insulation made more than 17 years ago.

Conley Group, Inc., a roof consultant for the DFW Airport Board, was asked to develop a design for re-roofing all four terminals. After sending insulation samples to an Owens Corning laboratory to verify R-value and compressive strength, the consultant designed the re-roofing projects to re-use as much of the existing insulation as possible.

The roofing contractor was able to pick up and reuse nearly 90 percent of the old material, saving the airport thousands of dollars that would have been spent taking the old material to a landfill and replacing it with all new insulation. Labor for getting the old insulation off the roof and new material up there would have added thousands of dollars to the project.

And then there are the environmental benefits to consider – less material to the landfill and less fossil fuel consumed in raw materials and manufacturing the new insulation.

During the past 17+ years, the insulation has saved countless amounts of coal, oil, gas and electricity from being consumed, and it also helped avoid the creation of greenhouse gas emissions in making and consuming the energy to heat and cool the terminals. The insulation is now back in place to go on saving energy for another 17 or more years. FOAMULAR insulation may be PINK throughout but it looks pretty green when its environmental performance is considered.

Like a charm

One eyewitness who can testify about the savings is Gary Bilpuch, president of Weatherguard Industries Inc., the Dallas contractor who did the first job and several more after that.

"It went down like a charm," says Bilpuch. "To date we have re-roofed 3,036 squares and purchased and used 370 squares of new board. That's 12.2 percent of the total, so we've recycled almost 88 percent of the material in place. In many cases, the insulation we couldn't use was already damaged from foot traffic or previous roof repairs.

"I witnessed my people taking one end of the board and pulling it up – and if it was stuck to the roof the board would actually bow but it wouldn't break," he continues. "Eventually, more often than not, the board would just pop loose and straighten right up. When we broke a piece, it was usually because it got stuck to the membrane and it wouldn't come up clean."

Bilpuch says he was surprised to see how good the insulation looked after so many years of service on the roof.

"It looked like new," he says, "other than being dirty and having a little cratering from the weight of the heavy rock over the years. As for the density and feel of it, if you closed your eyes and held a new board in one hand and the 17-year-old board in the other, you couldn't tell the difference."



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Gary Bilpuch, President, Weatherguard Industries, Dallas

Project Highlights

- 3,036 squares re-roofed
- 88 percent of the existing extruded foam insulation reused
- \$15,000 saved in hauling and landfill fees
- \$100,000 saved in labor costs

Environmental Benefits

- Usable insulation recycled
- Reused material kept out of landfill
- New product resource consumption minimized
- Fossil fuel saved in not making new insulation
- Greenhouse gas emissions avoided by minimizing resource processing
- Insulation continues to save energy

Lab confirms properties

Barb Fabian, manager of testing and materials research at the Owens Corning Technology Center for FOAMULAR insulation in Tallmadge, Ohio, could tell the difference between the old and new material but she didn't find any difference that would keep it from being used again. She was not surprised.

"We do aging curves with all of our materials, and we have hundreds of samples that we have tested and projected out for 20 to 25 years," explains Fabian. "Results for the material from DFW fell right in line with our data. It's within the range of our expectations."

Fabian said the tests were a rare opportunity to confirm data gathered in the laboratory.

"It was unusual for us to get aged material from a roof or an actual application," she says. "Normally, we test aged material or very old material that has been stored in the laboratory."

Fabian said the samples her lab tested had retained about 90 percent of their R-value, had no moisture in them and their compressive strength was very good.

FOAMULAR 404 insulation has a minimum compressive strength requirement of 40 pounds per square inch. The aged product from the DFW airport had a compressive strength of 49 psi. The material maintained its compressive strength after 17 years in service.

"The insulation did not lose any of its physical properties over time," says Fabian.

Two other people involved with the project say they weren't surprised either, but they were impressed – Saverio Marzella, Owens Corning field sales manager for foam roofing, and Luke Legrand of Conner & Legrand, FOAMULAR insulation sales agent for Texas.

"The climate in Texas has lots of heat, high winds and wide temperature swings from day to night and back again," says Marzella. "That makes a lot of hot and cold cycles for the roofing system to withstand."

"The insulation is almost 20 years old and they are able to re-use it for another 15 or 20 years," adds Legrand. Most of the new insulation was bought because the airport needed to increase the R-value, not because the extruded insulation couldn't be used."

Legrand notes that extruded foam is the only type of insulation recommended for use in Protected Roof Membrane Assemblies.

Weatherguard's Bilpuch says insulated and ballasted roof assemblies are tough on insulation. "The extruded insulation board was actually exposed to the elements – the rain and heat – for more than 15 years. It was remarkable how much we were able to re-use."

Replacing the membrane

The roofing consultant on the project was Steve Drennan of the Conley Design Group. He says the project was started because it was time to replace the membrane.

"We were on a 10-year schedule to replace all the terminal roofing," says Drennan. "We were required to cut that timing in half based on the other work going on at DFW with the new terminal and new people mover systems.

"DFW was originally built with rock ballast on all the roofs but the airport has since changed the specification to 'no rock ballast.' All of the ballast has to be pavers. They are concerned that rock might be a blow-off hazard and it's not worth the risk of it causing damage.

"DFW Airport put pavers in their design criteria and we are in the process of specifying them as we upgrade the roof systems. The schedule was accelerated so all the work around the new terminal and people mover can be done at the same time. When the people mover comes online and people are transported around the terminals, if they can see the roof it will all be covered with nice paver ballast."

Bilpuch says his crews started each job by removing rock with a roof vacuum. Then they took up all the insulation, stacked it and secured it. They put new rubber down over the old rubber, which was right against the deck.

Features and Benefits

Extruded polystyrene is the only type of insulation recommended for Protected Roof Membrane Assemblies.

FOAMULAR 404 and 604 insulation products protect the roof membrane from damage, thermal stress and UV exposure.

Designed for use with pavers, FOAMULAR 404 RB and 604 RB insulation products support pavers without the need for pedestals and provide excellent drainage.

Extruded foam insulation has outstanding moisture resistance for long-term thermal performance.

FOAMULAR insulation has a superior R-value of 5 per inch of product thickness.

"The Airport Roof Manager required the old membrane be left in place as extra insurance and a second vapor retarder," explains Bilpuch. "We cleaned the old rubber to get all the debris off and we put new rubber over it – loose laid. Then we put the extruded board insulation back and put a layer of polyester over it to protect the board from physical damage.

"Then over that we put the pavers in lieu of gravel ballast. In addition to blow-off protection and a better appearance, the pavers provide a much better walking surface for maintenance people who have to get up there."

Bilpuch says the benefits of recycling insulation went way beyond the initial cost savings and made life easier for everyone involved.

"For one thing, we didn't have to load new insulation onto the roof," he explains. "The challenges of working at a major airport are many, but one challenge is the fact that you can only load certain areas from the aircraft operations side, which means the work has to be done at night when air traffic is at a minimum. Being able to just take the board up and leave it on the roof and reuse it was a tremendous help. It saved the airport money because they didn't have to buy new insulation from the contractor, and we didn't have to spend a lot of labor getting the new insulation up there.

"You are probably not going to believe this, but there's a savings of about \$100,000 in labor alone," continues Bilpuch. "You have to understand that because the job is at the airport, the material has to be stored out of sight, away from the terminal. It has to be loaded each night, trucked into the aircraft operation area between the airplanes, it has to be loaded on the roof with a Skytrack-type high reach forklift, and the material has to be positioned on the roof and secured. That takes a lot of time and time is money."

Fewer trips to the landfill

Disposal of the old insulation would be an equally challenging exercise.

"The problem with insulation is that it's more volume-producing than a weight problem," explains Bilpuch. "You can't get very many squares into a dumpster so you will need to stack it carefully if you're going to maximize the amount of insulation you can get into a container.

"Let's say you can get about 60 squares in a 30-yard roll-off dumpster; that means you would need more than 50 trips to the landfill to get rid of all that material. At about \$280 a trip, \$15,000 would be a pretty close figure. The savings were almost 90 percent of that."

Bilpuch says bidding the job was tough at first. "To be honest with you, we figured worse-case scenario," he says. "We figured having to replace every single bit of it and that's all we could do to cover ourselves. After our first experience, we had a better feel for how much was going to be reusable on subsequent jobs, which gave us a little bit of an edge on our competition.

"We have done a total of seven separate contracts out there," continues Bilpuch. "On subsequent bids, the airport also upgraded their specification to add 1-1/2 to 2 inches of new board on top of the old insulation to beef up the thermal value of their assembly. The extra board wasn't added to compensate for lost thermal properties, it was added to enhance the thermal properties of the entire assembly," he says.

PINK FOAMULAR extruded insulation seems to have a lot of fans in Texas these days. They like both the money savings and the environmental benefits. In other words, they like the product because it looks very green.

Project: Seven separate projects re-roofing more than 3,000 squares of insulated and ballasted membrane on four airport terminals.

Product Used: FOAMULAR 404 extruded insulation

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Aerial photo on cover by Sky Cam Aerial Photography, Inc.



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