

# ROOF



Located on a 272-acre campus in Fairfield, Iowa, the Maharishi University of Management has seen students from dozens of different countries as well as a variety of weather conditions over the years. The 28-year-old Patanjali Golden Dome — one of two on-campus meditation centers — had experienced both of these strains before Thermoseal's SPF crew arrived from Indiana. At a school founded on Transcendental Meditation, keeping the Golden Dome in functioning order was crucial.

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# SEALING: GOLDEN OPPORTUNITY

*By Stephanie Marie Chizik*

**F**or the Maharishi University of Management community in Fairfield, Iowa, the word “dome” may conjure images of tranquility and serenity. It’s in their two Golden Domes where meditation occurs. For the SPF industry, though, the idea of a dome may bring another idea to mind: difficult conditions. For Thermoseal, Inc. — acting as both contractor and installer — words like “challenges,” “conditions,” and “risks” were more the way of the Golden Dome job. However, for a small family business run by President David Cates “with care and concern for the customers and our reputation,” positive outlooks still prevailed for Thermoseal.

The school — founded on the principles of Transcendental Meditation — counts meditation as a primary objective throughout the campus. According to the mission, the school focuses on “the expansion of happiness” and incorporating the consciousness — or full potential of your brain — into education. Meanwhile, with the Maharishi job, Thermoseal focused on the two inches of original SPF covering the 28-year-old wooden dome — a total of 25,000 square feet.

After the initial assessment of the Maharishi Patanjali Golden Dome — the male meditation center — the SPF company realized

they would need to first deal with a few existing conditions. Over nearly three decades, the dome had been damaged. It needed several repairs where problems from lack of attention or maintenance remained. The condition that impacted Thermoseal the most, though, was underneath the surface. There, the crew found small areas of saturated foam. They would need to remove the original one to one-and-a-quarter inches of SPF that was installed at the building’s inception and replace it with something new. The SPF did take care of the expansion and contraction issues that could have caused problems for the wooden dome. Luckily, SPF nearly eliminates all of these problems, so the team was able to focus on the eroded coating instead. With a four-man crew, the installers had a lot to cover.

## **Contemplating a Solution**

The Golden Dome job started in July 2007. SPF was chosen as the insulation material when the building was built in 1979 and again in the renovation job because it’s “lightweight, stable, and provided a seamless system,” said Tom Holsen, Marketing Manager for



The protective tarp allowed the team to scarify the entire 25,000 sq. ft. roof without worry that the debris would endanger anyone underfoot. To scarify, the Thermoseal team used a reel-type roof scarifier with a West Equipment carbide tip. They affixed both the machine and the workers to the rooftop with tie-off attached with 3/8" braided steel wire cable to the collar at the top of the dome. Starting at the bottom and working their way to the top, the crew slightly shortened the wire cable after each pass to ensure a tight hold.



Re-finishing the Golden Dome would require a number of separate steps. First, the Thermoseal crew closed off the building from foot traffic. Not only was no one allowed in or out of the building, but the area around the building was secured with a warning line as well. With the building secure of foot traffic, the team encircled the building with tarps taped to the roofline.



Once the roof was scarified, the team was able to locate and fill areas of deteriorated foam that were a result of lack of attention and maintenance. Though the Patanjali Golden Dome roof had been re-foamed a few times over the years, it hadn't been completely re-finished since being built in 1979. David Cates, Thermoseal's President, explains that the crew "identified, tore out, and replaced areas of deteriorated foam" (see insert).

Volatile Free, Inc. The Thermoseal crew would need to match the look of the new SPF to the existing roof level as well as the other domed building that was renovated in 2004. A matching look was tricky but necessary.

Fortunately, the relationship between the school and the SPF contractor was a positive one lasting more than 15 years. Before working with Thermoseal, the current sales manager, Ed Munoz, had done roofing projects in the past for the university. These jobs helped him gain a reputation with the school before 2002, when he joined the Thermoseal team. Due to the protocol that Munoz had developed with previous on-campus jobs and the re-roofing of the first Golden Dome, Thermoseal was the natural choice for the second dome project.

The renovation on the Patanjali Golden Dome — the most recent Thermoseal job on the campus — was a no-brainer; the same four-step system had been used on the female meditation center, the Bagambhrini Golden Dome, by the same company a few years earlier. Thermoseal had just completed another re-coating job in the summer of 2007 at the university's field house. The final Golden Dome renovation, located in what David Cates calls a "serene countryside setting," was completed in a total of 800 man hours: 350 hours in July and 450 hours in August.

The Thermoseal crew, with David Cates' brother Julian as the foreman, devised a plan to account for the extra insulation and thermal stability needed for the wooden roof. First, they scarified an inch off of the entire foam roof to create a texture on the old roof that would ensure a successful adhesion. The team worked in a circular pattern from the outside of the roof toward the center using a carbide tip, reel-type roof scarifier from West Equipment. The machine was secured to the center column of the dome with a 3/8-inch braided steel wire cable. In addition to securing the scarifying machine to the rooftop, the cable also ensured that the entire roof would be uniform after scarifying by holding it on a steady course as it moved around the roof. As the team finished a row and moved the scarifier up the slope of the dome, they shortened the cable to prepare for the next row.

The dome had been re-coated a few times over the years,

# JOB at a GLANCE

## RE-FINISHING SCHOOL'S MEDITATION DOME

### PROJECT:

Re-roofing the Maharishi Patanjali Golden Dome in Fairfield, IA.

### SPF CONTRACTOR:

Thermoseal, Inc.  
800 East Oregon Street  
Evansville, IN 47711  
(866) 428-3343  
Thermosealroofing.com

### WORKING WITH:

Volatile Free, Inc.  
19500 Janacek Court  
Brookfield, WI 53045  
(800) 307-9218  
www.Volatilefree.com

### SIZE OF CONTRACTOR:

Thermoseal has 20-25 employees at the peak of the season. A four-man crew worked on this project.

### PRIME CLIENT:

Maharishi University of Management  
1000 North 4th Street  
Fairfield, IA 52557  
(641) 472-7000  
www.MIU.edu

### SUBSTRATE:

28-year-old wooden dome roof with original SPF

### SUBSTRATE CONDITION:

The dome had several re-coatings in the past, but hadn't been scarified or re-foamed since 1979. The dome had some problems from lack of attention or maintenance.

### SIZE:

25,000 sq. ft.

### DURATION:

800 man hours between July and August 2007.

### UNUSUAL FACTORS:

- The severe slope of the dome not only gave the crew access problems, but footing challenges as well
- The wind caused delays in spraying the foam to avoid uneven results and dangerous conditions

### MATERIALS/PROCESS:

- Scarify existing roof with West Equipment carbide tip, reel-type roof scarifier and replace areas of deteriorated foam
- Prime the surface using Volatile Free #11 two-part epoxy primer using a Graco 45:1 airless spray pump with a 0.021 tip
- Spray-apply 1½" layer of Volatile Free #730 SPF using a Gusmer H-II pump and Gusmer CX-7 gun with a #90 tip

- Spray-apply basecoat with 24 mil (DFT) of Volatile Free #540 polyurea at 1.5 gallons per 100 sq. ft. using a Gusmer 20/35 pump and GlasCraft Probler gun with a #2 tip
- Mix and spray an aliphatic topcoat of Volatile Free #263 at 20 mil (DFT) at 1.5 gallons per 100 sq. ft. using a conventional Graco King airless pump with a 0.027 reversible tip

- All guns used 250-ft.-long hoses

### SAFETY CONSIDERATIONS:

- Full-body tie-off harnesses used 100% of the time
- 100% tie off of scarifying and spraying equipment with 3/8" braided steel wire cable
- Dome encircled with tarps to catch debris during scarifying process
- Dome closed during renovations to avoid falling debris hazards
- Crew wore 3M organic vapor, dual carbon-filter respirators, Tyvec suits, and wrap-around tinted safety glasses
- "Tool Box" meetings held each week to discuss re-fueling equipment, ladder safety, fall protection, PPE, lifting, weather concerns, and safe methods of using the compressed air

Re-finishing the roof would require a four-step coating technique. First, they primed the surface with a Volatile Free #11 two-part epoxy primer using a Graco 45:1 airless spray pump with a 0.021 tip. The SPF was applied next with a 1½" layer of Volatile Free #730 SPF. They used a Gusmer H-II pump and Gusmer CX-7 gun with a #90 tip. The basecoat — 24 mil (DFT) of Volatile Free #540 polyurea at 1.5 gallons per 100 sq. ft. — was applied next. They used a Gusmer 20/35 pump and GlasCraft Probler gun with a #2 tip to complete this step.





The final coat in the four-step process — the topcoat — was a very important part in making sure that after everything was finished the men's meditation dome matched the women's meditation dome. Re-finished in 2002 by Thermoseal, the crew followed the same four-step process that was used on the women's Bagambhrini Golden Dome. In order to ensure a match, the team mixed the same high-gloss gold metallic urethane. Designed by Volatile Free, Inc. specifically for the university, the top coat was sprayed in Maharishi gold.

cure one day before moving on to the next step: Re-foaming the roof with a one-and-a-half inch layer of Volatile Free #730 SPF, a spray-in-place polyurethane foam. They used a Gusmer H-II pump and Gusmer CX-7 gun with a #90 tip. The team allowed the foam to cure for 12 hours before the cream-colored base coat was applied. If they'd waited another day, the sun's UV rays would have started to harm it, or give it "sunburn" as the team calls it. This base coat — the third step in the finishing process — was sprayed with a Gusmer 20/35 pump and GlasCraft Probler gun with a #2 tip. It covered the whole surface with 24 mil (DFT) of Volatile Free #540R polyurea at one and a half gallons per 100 square feet. The fourth and final layer was applied after one to two days to allow the base coat to cure. The Thermoseal crew mixed and sprayed the topcoat using a conventional Graco King airless pump with a 0.027 reversible tip. They used an aliphatic coating of Volatile Free #263 at 20 mil (DFT) in Maharishi gold, a high-gloss gold metallic urethane designed by VFI specifically for the university. This final layer was also sprayed at one-and-a-half gallons per 100 square feet.

The four layers — primer, SPF, basecoat, and topcoat — were all sprayed with 250-foot-long hoses. The four layers combined gave a highly attractive appearance to this popular meditation building.

Throughout the process of spraying, the team paid strict attention to using proper safety precautions. Each week, the crew held "tool box" meetings to discuss re-fueling equipment, ladder safety, fall protection, PPE, lifting, weather concerns, and safe methods of using the compressed air. They wore 3M organic vapor, dual carbon-filter respirators, Tyvec suits, and wrap-around tinted safety glasses. With a roofline 12' to 14' off the ground and a steep slope, the crew used full-body tie-off harnesses worn 100% of the time.

but this was the first time it was renovated with scarifying and re-foaming. David Cates explains that they "identified, tore out, and replaced areas of deteriorated foam." Once the dome was prepped, the spraying could begin.

The dome was finished in a four-step process. First, the Thermoseal crew primed the surface using Volatile Free #11 two-part epoxy primer. It was mixed at a 9:1 ratio with an air-operated power mixer. The primer was sprayed at 2.5 mils using a Graco 45:1 airless spray pump with a 0.021 tip. They let the primer



David Cates explains that “the weather was not cooperative” during the project. Along with the many steps involved — scarifying, coating, cleanup — and the safety precautions necessary for this type of job, the Thermoseal crew managed to meet their challenge. Maharishi University of Management’s Patanjali Golden Dome now has a new roof to match its meditation “sister.”

## Reflections

Over the course of the two-month job, the Thermoseal crew ran into a few challenges. To prepare for the large amount of scarified debris coming off the roof, Thermoseal encircled the walkway around the dome with tarps. All falling foam was collected in plastic trash bags and discarded at a landfill. And although the campus was required to adhere to the tobacco-, alcohol-, and drug-free guidelines, the SPF crew did not have to adhere to the students’ all-vegetarian organic diet.

In addition to their work habits, Thermoseal also had to make accommodations and adjustments throughout the two months on the job. The crew members were forced to work with the unusually shaped structure, weather, and students simultaneously. The slope of the dome not only gave the crew access problems, but mobility challenges as well. They were required to use additional safeguarding equipment to accommodate the angle of the roof. All equipment was attached to the center column of the dome in the same manner

The Volatile Free #263 aliphatic topcoat was sprayed at 20 mil (DFT). Using a conventional Graco King airless pump with a 0.027 reversible tip, the Maharishi gold coat was spray-applied at 1.5 gallons per 100 sq. ft. This topcoat, as well as the previous three coats, was applied using 250-ft.-long hoses.

as the scarifying machine. The scarifying equipment was tied off 100 percent of the time, while full-body tie-off harnesses were used by the crew. “Each crew member wore a body harness with a two-foot shock-absorbing lanyard attached to a synthetic rope with snap hooks,” said David Cates. “To ensure proper fall protection, the rope was then attached to the collar around the top of the dome. Walking on the slope was not difficult, but we would never do it without fall protection.”





Once the spraying was complete, the team had to clean up the jobsite, located on what David Cates called a “serene countryside setting.” This cleanup included taking off the tarps used to collect the debris from scarifying as well as any overspray from the four-step coating process. They collected all loose material in plastic trash bags and discarded it at a landfill.

The crew — (from left to right) Ralph Cox, Julian Cates, Samuel Feury, and Randall Austin — worked around the requirements of the campus. The school is tobacco-, alcohol-, and drug-free. Regardless of the added confinements, the Thermoseal crew managed to have a positive experience on the Maharishi job.



To protect themselves from the chemicals, the crew wore 3M organic vapor, dual carbon-filter respirators, Tyvec suits, and wrap-around tinted safety glasses. At the beginning of each week, Julian Cates held a “tool box” meeting to discuss re-fueling equipment, ladder safety, fall protection, PPE, lifting, weather concerns, and safe methods of using the compressed air. With a job like the Golden Dome, safety was imperative.

In addition to the slope of the roof, the weather was a disruptive issue. The wind that whipped around the Iowa campus changed direction frequently, causing several delays during installation. “The weather was not cooperative during the project,” David Cates said. To have the smoothest possible roof on such a steep slope, the Thermoseal crew had to wait until the wind almost died down completely. The crew had to stop work and wait for the wind to slow to ensure safe working conditions, too.

While the slope and wind caused safety and aesthetic issues, the Thermoseal crew members worried about the students and faculty walking near the dome. Since the bottom edge of the roof rests a mere 12 to 14 feet off the ground, the fear was that someone walking in or out of the building might be in harm’s way. To avoid any chances for mishap, the Patanjali Dome was closed to all faculty, students, and staff for the entire project. They set up a warning line on the sidewalk that wrapped around the perimeter of the dome. They even went as far as keeping watch on the ground for overspray. The Thermoseal crew member who was operating the spray equipment on ground would also keep an eye out to make sure that no one from the university walked too closely to the work on the roof. Eliminating the public foot traffic allowed the Thermoseal installers to pay attention to what was happening on top of the roof rather than below it.

Even though the Maharishi Patanjali Golden Dome job was frustrating at times due to the challenges from the slope of the structure and high winds, the project was a positive one for the Thermoseal crew. The success of the job helped to further the relationship between the university and the SPF crew as well as help encourage the “expansion of happiness” of the meditating community. It was an important job — in size and stature — for both the SPF crew and Maharishi University. **SF**