

Sure-Flex™ PVC
Roofing Systems

CASE STUDY

**Roofing Innovation in Retail Spaces:
A PVC-Infused Transformation for
Wayfair's Flagship Store**



JOB PROFILE

PROJECT LOCATIONS:
Wilmette, IL

CARLISLE APPLICATOR:
Preservation Roofing Services,
Romeoville, IL

BUILDING OWNERS:
Wayfair

ROOFING SYSTEM:
Carlisle 80-mil Sure-Flex PVC
membrane installed using
CAV-GRIP™ PVC Aerosol
Contact Adhesive

Wayfair, the e-commerce home decor giant, will soon have another option for furniture and decor shopping. The online retailer's first true attempt to break into physical retail will open in the Spring of 2024 with more than 152,000 square feet of retail space located on Lake Avenue in Wilmette, Illinois, about 14 miles outside of Chicago. The store plans to provide interactive experiences from 19 different departments, ranging from furniture and décor, to outdoor, home improvement, and more.

Before it can open, however, the vacant two-story building, originally built in the 1950s as home to Carson's department store, is undergoing a major facelift, including a full interior gut renovation and new façade.

As part of the massive renovation project, the facility's old 82,000-square-foot ballasted EPDM roof must be removed down to the concrete deck and replaced.

Preservation Roofing Services of Romeoville, Illinois, was hired to remove and replace the aging roof. Preservation Services is a third-generation roofing company that specializes in installing and maintaining a variety of commercial roofing systems including PVC, TPO, EPDM, and modified bitumen. The company is a member of the National Roofing Contractors Association (NRCA), and the Chicago Roofing Contractors Association (CRCA).



“The roof is not your typical wide-open 820-square job,” said Brennan Quinn, project manager for Preservation Services. “The roof is divided into three sections, the largest of which includes a highly complex tapered system. In addition, the roof has two knee wall dividers and a parapet wall that ranges from 4- to 14-feet tall, several large concrete curbs for the old mechanical systems, a new clerestory atrium in the center of the building, a large new skylight, and large penthouse structure. So, there are plenty of things to deal with on this project.”

And all the roofing work had to be coordinated through the general contractor and the various subs working on the project.

The first step was removing the old roofing system and nearly 50 original drains set in the concrete deck. The 10-person tear-off crew from Preservation Services first vacuumed the roof and removed the old loose-laid EPDM and tapered EPS. When approximately 85% of the old roof was removed, they started the re-roofing work by installing a vapor barrier and temporary roof using Carlisle’s VapAir Seal™ 725TR Air and Vapor Barrier, a 40-mil composite sheet with 35 mils of self-adhering rubberized asphalt laminated to a 5-mil woven polypropylene film. The VapAir Seal 725TR was secured to the deck using 15-gallon drums of Carlisle’s Flexible FAST™ Adhesive, a two-component, low-rise, VOC-free, polyurethane adhesive, and applied using a Patriot Jr.™ cart.

“As part of the tear-off process, we had to remove and replace the old drains installed across the roof. We upgraded them with new construction drains which will meet the service and performance expectations of the new roofing system,” said Quinn.

Once the new drains were installed, Preservation Services covered them all with the temporary roof membrane until the plumbing crew could connect them to the existing plumbing system beneath the roof deck.

In addition to the air and vapor barrier, the new roof assembly would eventually include two layers of 2.6-inch polyisocyanurate insulation, $\frac{1}{8}$ " of tapered polyiso insulation to provide slope to the drains, a layer of $\frac{5}{8}$ " DensDeck® Prime, and a fully adhered white 80-mil Carlisle Sure-Flex PVC membrane, installed using CAV-GRIP® PVC Aerosol Contact Adhesive.

“Since this is an active construction project, we could only load the roof with about $\frac{1}{3}$ of the materials we needed at a time,” said Quinn. “Each load craned to the roof consisted of about 12 truckloads of materials including 4 x 4 sheets of polyisocyanurate insulation, tapered insulation, cover board, as well as the membrane and adhesives.”

Once the air and vapor barrier/temporary roof was installed, Preservation Services started with the smallest section of the roof and installed the two layers of 4 x 4 sheets of 2.6-inch polyiso, staggered to eliminate air leakage, as well as the tapered insulation, all with the Flexible FAST Adhesive.

“Flexible FAST is a great product and really easy to use,” said Quinn. “It’s perfect for installing polyiso on concrete. Our plan called for a relatively tight pattern of 4-inch OC bead spacing in the corners, and 6-inch OC bead spacing around the perimeter and in the field of the roof.”

“Flexible FAST is a great product and really easy to use, it’s perfect for installing polyiso on concrete.”

The roof is divided into three sections by a low parapet or knee wall. The largest section, which is approximately 62,000 square feet, includes the new clerestory atrium which has a standing seam metal roof, a penthouse for the elevator shafts and new mechanical units, a new skylight, and most of the drains.

“This was the most challenging part of the roof,” said Quinn. “We had to install tapered insulation everywhere, plus there are about 20 crickets on that section of the roof, including on the mechanical penthouse, to properly slope the roof to the new drains.”

For this part of the project, the Preservation Services crew used Flexible FAST Adhesive to install two layers of 2.6-inch polyiso as fill insulation, with the 1/8" tapered insulation over the top. In addition, due to the various drain locations and penetrations on the deck, the tapered design called for more than 30 separate sloped planes on that section of roof with the mechanical penthouse, not including the crickets.

“Not only was the overall tapered design highly complex,” said Quinn, “but the field team also had to match four-way tapered layouts with two-way layouts in several locations, particularly around the new clerestory atrium, and the mechanical penthouse, which was really tricky.”

Preservation Services worked closely with Hunter Panels to design a tapered layout that would effectively allow water to flow freely around the numerous penetrations and the original concrete mechanical supports on the roof and to the internal drains.

“We had to taper almost the entire roof for drainage,” said Quinn. “But on one of the smaller sections, where the deck was already sloped, we were able to install just the flat stock and then add a few crickets to the drains, rather than sloping the entire section.”

Once the insulation was completely installed, the entire roof was then covered with 5/8" DensDeck Prime, a reinforced gypsum cover board, as a solid substrate for the new PVC membrane.

“We used the same Flexible FAST Adhesive to install the polyiso, the tapered ISO, and DensDeck cover board,” said Quinn, “and we find that the large canisters are really good for helping productivity in the field. Our guys averaged about 3,000 square feet a day installing the tapered system.”

Another challenge was dealing with the existing concrete curbs installed on the roof deck in various locations that originally supported the building’s mechanical and air-handling equipment. Each of the 10 concrete curbs is about 30 feet long, 20 inches high and spaced about 25 feet apart, in two different areas on the roof.

While not part of the roofing work by Preservation Services, the concrete curbs had new steel decking installed across each section to create large flat ‘roof’ surfaces, spanning about 80 x 55 feet in total, which would be covered with the new PVC membrane rather than leaving each support to be individually flashed and covered with membrane.

The Preservation Services team filled the voids between each of the concrete supports with insulation, and installed DensDeck Prime on the new metal decking between the concrete curbs. They then terminated the PVC membrane at the deck with fasteners and plates on all four sides, and welded new membrane that was bonded to the concrete curbs and run up and over the top.

All the 80-mil PVC membrane on the project was installed using Carlisle’s CAV-GRIP PVC Adhesive. CAV-GRIP is a one-part sprayed contact adhesive with fast flash-off time for better productivity than traditional bonding adhesive application methods. The adhesive is supplied in a pressurized canister and applied to both the roof deck or substrate as well as to the back of the membrane using a three-foot-long spray gun or wand to ensure 100% coverage. Once the adhesive flashes off, the membrane is rolled onto the deck, brushed in place, and then rolled with a weighted roller for maximum contact.

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“This was the first time we used the CAV-GRIP Adhesive,” said Quinn, “and we loved it. It was easy to set up and spray, provided great coverage on both the substrate and membrane, and it looks really great. More important, we didn’t have to mess with open buckets or rollers, and it was a much cleaner and faster process for our crew.”

The entire roof has a parapet wall that ranges from about 4-feet to about 14-feet tall. The tall sections are new portions of the façade that will eventually be the background for the Wayfair signage on the facility. For the parapet walls, Preservation Services installed membrane from the deck up the side about 6-inches and secured it with fasteners and plates. They then welded new membrane below the fasteners and places, and up and over the parapet using the CAV-GRIP PVC Adhesive, which was sprayed onto the wall and onto the membrane and then rolled in.

The internal knee walls between the various sections of roof also had membrane installed up and over the top, and were covered with a shop-fabricated coping cap.

“The last bit of the project included installing the roofing membrane on the six canopy roofs around the building,” said Quinn.

The canopies are all about five or six feet wide, and about 20 feet long. The membrane was fully adhered, and the canopies were terminated with a shop bent fascia system.

“All in all the project turned out really well,” said Quinn. “The owners and the GC are very happy with the results, and the new Carlisle PVC roof installed with CAV-GRIP looks great. There was no shortage of challenges, but we are all very proud of our work to help make this first Wayfair store a big success.”