

FleeceBACK® PVC

Roofing Systems

CASE STUDY

Crewe Center for the Arts at USM



JOB PROFILE

PROJECT LOCATIONS:
Portland, Maine

CARLISLE APPLICATOR:
Tecta America New England, LLC

BUILDING OWNERS:
University of Southern Maine

ROOFING SYSTEM:

- » 115-mil white FleeceBACK PVC adhered with Carlisle's Flexible FAST™ Adhesive
- » 60-mil Sure-Flex™ PVC attached via RhinoBond® induction welding system

'Can't Take My Eyes Off of You,' was a hit in 1967 sung by Franki Valli and the Four Seasons. The song, written by Bob Crewe and Bob Gaudio, earned a gold record and was at the time the band's biggest hit.

It is not a coincidence that the University of Southern Maine's new Crewe Center for the Arts (CFA) is named for the man who wrote the song. The visually stunning state-of-the-art facility, designed by Pfeiffer Partners Architects of Los Angeles, is the university's new home for music, visual arts, book arts, and theatre and is designed to meet the highest standards of innovation and sustainability, including LEED® Silver certification. The 40,000-square-foot facility houses a 200-seat performance hall, a rehearsal hall, arts lab, sound-proof studio spaces, and interactive classroom spaces.

Bob Crewe co-wrote and produced a string of top 10 singles for the Four Seasons including 'Big Girls Don't Cry,' 'Walk Like a Man,' 'Can't Take My Eyes Off of You,' and 'Bye, Bye, Baby' as well as 'My Eyes Adored You,' and 'Lady Marmalade.' He also had hit recordings with many other performers including Michael Jackson, Bobby Darin, Roberta Flack, Patti LaBelle, and Barry Manilow, among others.

Before his death in 2014, Bob and brother Dan established the Crewe Foundation dedicated to advancing opportunities in music and the arts. The Crewe Foundation donated more than \$6 million to support the construction of the new Center for the Arts, the largest gift in the Foundation's history.



Many Roofs with Lots of Slope

Tecta America New England, LLC, was hired to install the complex roofing system on the Crewe Center. In total, the building has over 42,500 square feet of roof on six different levels. The tallest of which is the 42-foot-tall center 'Gallery' that traverses the building and serves as a conduit between USM's campus and the city of Portland and features large glass facades at both ends of the facility.

"This was a highly complex project," said Darren Metayer, Director of Operations for Tecta America New England. "The roof consists of several levels, with both steel and structural concrete substrates, low and steep slopes, and very tall vertical surfaces. It had a little bit of everything!"

Pfeiffer originally specified a PVC roof from another company. However, after reviewing the project details and discussions with Tecta, the material was switched to Carlisle's 115-mil FleeceBACK PVC membrane.

"It was important for this project that the materials were easily available locally," said Metayer. "Carlisle has a great local distribution network here in Southern Maine, which was a critical difference for this project."

In addition, the roof was specified for a 100-mph wind warranty. One of the benefits of the Carlisle FleeceBACK system is its ability to achieve very high wind uplift performance due to the strong bond between the fleece and adhesive, which was another critical reason for the change.

Top-Down Application

The Tecta team of 8 to 10, started the project at the highest point of the facility, on the Gallery roof. From the steel deck up, the Tecta team first installed a ½-inch DensDeck® cover board followed by Carlisle's VapAir Seal™ 725TR Air and Vapor Barrier/Temporary Roof membrane, a 40-mil composite consisting of 35-mils of self-adhering rubberized asphalt laminated to a 5-mil woven polypropylene film.

The roof over the Gallery is approximately 8,300 square feet and includes three internal drains. To ensure that the roof drained properly, Tecta installed a complete tapered insulation system with an average R-30 rating. The 1.5-inch-thick InsulBase® Polyisocyanurate Insulation was secured with Carlisle HP Fasteners and 3-inch insulation plates.

"On that section, the tapered insulation slopes to the center of the roof where the drains are located, and then we installed crickets between the drains as well as at the ends of the structure to promote the positive drainage," said Metayer.

Once the crickets were installed, the Tecta team installed a ½-inch DensDeck Prime cover board over the top using beads of Carlisle Flexible FAST Adhesive, 12 inches on center (OC) in the field and 6 inches OC in the perimeter and corners.

The last step for the Gallery roof was installing the 115-mil FleeceBACK PVC membrane.

"We installed the FleeceBACK membrane with the Flexible FAST Adhesive," said Metayer. "We really like the adhesive for how easy it is to install, and we also like the fact that it offers great wind uplift strength, which was very important for this project."

Tecta applied the Flexible FAST Adhesive using the splatter method in the field, perimeter, and corners. The adhesive was applied directly to the cover board, and then the membrane was carefully rolled in using a weighted roller. They then terminated the membrane around the perimeter of the Gallery with Carlisle SecurEdge™ 2000 Fascia.

The next section of the roof that Tecta tackled was over the 200-seat Performance Hall.

"This section of the roof, and the one over the South Arts Lab, were really tricky," said Metayer. "Both had structural concrete decks with a

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3:12 inch slope, and both have an 18-inch-wide sump trough at the bottom of the slope for drainage.”

The assembly started with Carlisle’s VapAir Seal 725TR Air and Vapor Barrier installed directly to the deck using CAV-GRIP® III Low-VOC Adhesive/Primer. Once in place, the Tecta team installed two layers of 2.6-inch InsulBase Polyiso using beads of Flexible FAST Adhesive spaced 12 inches OC in the field and 6 inches OC at the perimeter and in the corners. They also lined the inside of the sump trough with InsulFoam EPS.

“Normally we would install the polyiso from the high side of the slope down,” said Metayer, “however, given the 3:12 slope, we were concerned about the insulation in adhesive remaining in place, so we installed the insulation from the bottom of the slope up. Which worked out well.”

Given the sloped decks, neither of these two sections required tapered insulation, except for the area behind the sump trough, where Tecta installed tapered InsulFoam EPS to achieve a proper 4:12 backslope to the sump trough. After installing a cover board, Tecta secured the FleeceBACK PVC membrane using the Flexible FAST Adhesive and terminated those sections with shop-bent coping.

Tall Walls and Mechanical Wells

Adjacent to the Performance Hall section, the Crewe Center has a deep mechanical well. The 25-foot-tall walls of the well are open-frame construction covered with a Gypsum coverboard followed by Carlisle VapAir Seal 725TR Air and Vapor Barrier. The bottoms of the walls are about two feet above the roof deck for air flow, and the entire structure was fully encapsulated with Carlisle’s white 60-mil Sure-Flex PVC membrane.

“Fully encapsulating the mechanical well was a big challenge,” said Metayer. “Besides flashing all of the curbs for the mechanicals inside the structure, we had to flash each of the support legs, then wrap the entire wall with membrane that we installed using the Carlisle RhinoBond induction system and hand-held induction welders.”



Carlisle RhinoBond is an alternative attachment system for thermoplastic membranes. This all-in-one system uses the same fastener and plate to secure the membrane and the insulation to the deck or substrate without penetrating the membrane.

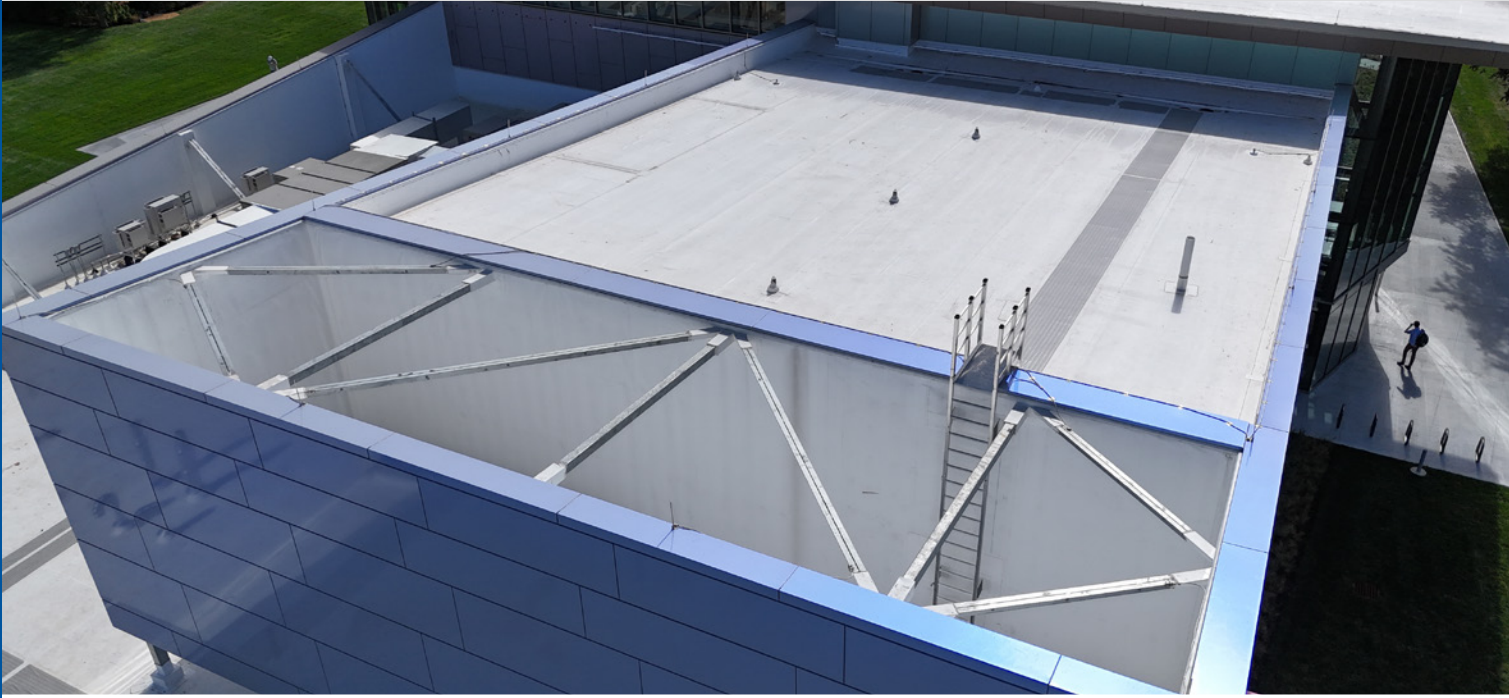
By eliminating in-seam mechanical fastening, the RhinoBond system decreases the number of screws and plates required for some assemblies by as much as 50%. Additionally, RhinoBond plates are installed in a grid pattern to more evenly distribute the wind load.

Tecta installed the PVC RhinoBond plates to the studs in the wall every 16 inches OC, and every two feet up the wall, working carefully around the supporting steel braces and terminating the membrane at the top with shop-bent coping. The process required Tecta to ‘hang’ the membrane down the wall, hot-air weld the seams with a hand welder, and then fuse each plate to the membrane with the handheld induction welders.

“This was very time-consuming and meticulous work,” said Metayer. “Certainly, it was faster and easier than using bonding adhesives, but it took our team quite a bit of time to fully line the mechanical well and encapsulate all four sides of the 25-foot wall.”

The remaining sections of the roof on both ends of the building each have a combination of concrete and steel decks. There

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are three sections with concrete decks that house a variety of mechanical equipment, which all had to be carefully flashed. In addition, each required tapered insulation and crickets for drainage around the mechanical curbs.

To separate the concrete deck sections from the steel deck sections, Tecta recommended building low curbs that would make it easier for installing the different roof assemblies, and to help make the tapered insulation design more efficient.

"The GC and architect were very open to our suggestions for dividing the roof into smaller sections," said Metayer. "We had a very good partnership, and the result is a better overall roof and installation."

The assembly over those sections was essentially the same as in the other areas, including a vapor barrier, full tapered system, crickets for drainage, cover board, and FleeceBACK membrane. At the perimeter parapet wall, Tecta terminated the membrane with HP fasteners and 2-inch seam plates installed at 6 inches OC. Next, the bare-back PVC was welded to the FleeceBACK sheet and installed up the wall using either induction technology or Carlisle CAV-GRIP Adhesive.

Crisscross Parapet Walls

"One of the biggest challenges was the sloped steel-framed parapet walls that crisscross one another," said Metayer. "The walls slope from about six to 18 feet tall, and cross along the South side of the building."

In that area, one of the parapet walls was essentially constructed just inside of the other, leaving about a two-foot-wide gap between the two walls that had to be completely encapsulated with PVC.

For this, Tecta installed the bareback PVC up the parapet walls using Carlisle CAV-GRIP PVC Adhesive, a one-part aerosol contact adhesive.

"Our guys really like the contact adhesive," said Metayer. "They simply sprayed the adhesive on the wall and rolled in the membrane. It's fast and easy and much quicker than using bonding adhesive, which was important when working in that tight two-foot-wide space!"

At the top of the parapet walls, Tecta terminated the membrane with term bar and a two-piece counter flashing and then installed a coping cap over the top.

In the end Tecta delivered a highly complex roof for the new Crewe Center for the Arts.

"The roof is one of the more complex new construction projects we've ever undertaken," said Metayer. "There are tons of wall supports that all required flashing, crisscrossing parapet walls, concrete decks, steel decks, and very tall mechanical areas. I'm proud of our team and the work we've done and confident that this will be the university's most visited and most visible buildings."

Given its unique design and beautiful construction, the community of Portland, Maine, won't be able to take their eyes off the new Crewe Center for the Arts for many years to come.