

Sure-Flex[™] PVC

Roofing Systems

CASE STUDY

PERFECT10
COUNCIL



JOB PROFILE

PROJECT LOCATION:
Clarksville, TN

CARLISLE APPLICATOR:
Modern Heating Cooling
& Roofing

BUILDING OWNER:
Clarksville-Montgomery County
School District

- ROOFING SYSTEM:**
- » Sure-Flex PVC membrane – Slate Gray
 - » Sure-Flex PVC Contour Rib[™] Profile
 - » Sure-Flex PVC Bonding Adhesive
 - » ½" SecurShield[®] HD Polyiso

Freedom Elementary School



To accommodate community growth, the Clarksville-Montgomery County School Board recently initiated a \$44.8 million project to build a new elementary school on a 17.96-acre lot off Fort Campbell Boulevard in Clarksville, TN. The new school, designed by Rufus Johnson Associates of Clarksville, was named Freedom Elementary School to honor the nearby Fort Campbell community. The school is nearly 105,000 square feet and will accommodate Pre-K through fifth-grade students.

The new construction project includes about 112,000 square feet of roofing on 14 different roof areas, at heights ranging from 15 to 30 feet, and several different shapes and slopes, including single slopes, hips and gables, and a barrel roof over the school's main entrance.

Modern Heating Cooling & Roofing of Clarksville was selected as the roofing contractor for this critical project. The company has a long and strong performance history working with Carlisle and has been recognized with the prestigious Perfection Award for excellent installation and warranty performance. Additionally, they have been selected to serve on Carlisle's Perfection Council, reserved for those with the very lowest warranty claim rating, in each of the past three years.

"This is a critically important project for our community in terms of keeping up with population growth and student needs," said William (Bill) Kimbrough Jr., Vice President of Modern Heating Cooling & Roofing. "So, it's important that we deliver a roofing system that will protect the facility for years to come."



Most of the school was constructed with a 22-gauge steel deck; however, a 7,000-square-foot section along the front of the school building was constructed with a structural concrete deck.

“The architects originally specified a standing seam roof for the sloped and visible sections of the roof,” said Kimbrough, “but that turned out to be quite expensive. So, with the help and input from the Carlisle Field Service Rep, we recommended using the Carlisle Contour Rib Profile system, which simulates the look of a standing seam roof with but with the performance of a PVC single-ply membrane.”

Both the architect and the school board accepted the recommendation, and ultimately selected Carlisle’s 60-mil Sure-Flex PVC membrane in Slate Gray for the project.

Carlisle has a long history of outstanding performance with its Sure-Flex PVC membranes. The membrane offers a wide range of performance characteristics that were appealing to the school board for this project. Not only is it easy to install and weld, but it is also highly fire resistant, provides outstanding chemical resistance, and has higher breaking strength, tear resistance, and elongation properties than ASTM D4434 Type IV Specification Standards.

“We like installing Carlisle PVC membrane,” said Kimbrough. “It’s easy to handle on the roof, welds well, and is not as stiff or boardy as some other single-ply membranes. Our guys typically get great productivity with it.”

The Low Roof

The lowest section of the new school’s roof located across the front of the building is a rectangular shape approximately 233’ long. The roof varies in width from 10.6’ to 22.5’, with the short ‘leg’ measuring 65’ deep by 28’ wide. This portion of the roof has a structural concrete deck with a series of seven internal drains. As a result, the entire roof required a fully tapered system to efficiently move water to the drains; this proved to be one of the more challenging parts of the installation.

For this section of roof, the team from Modern Heating Cooling & Roofing (Modern), first adhered two layers of 2” InsulBase® Polyisocyanurate Insulation with Flexible FAST™ Adhesive, followed by a complete tapered insulation to each of the drains.

Each of the drains required four-way sumps, which resulted in a series of ridges and valleys across the long axis of the roof. In addition, the Modern team installed a variety of two-way crickets along the front and rear edges of the roof, as well as between some of the tapered sections.

CASE STUDY

“It’s easy to handle on the roof, welds well, and is not as stiff or boardy as some other single-ply membranes. Our guys typically get great productivity with it.”

“The roof was very narrow, sloped in four different directions, and had multiple HVAC stands that had to be carefully flashed, so the work was slow and the guys had to be extra careful,” said Kimbrough.

On top of the tapered insulation, Modern then installed ½" SecurShield HD Polyiso with Flexible FAST Adhesive. “The Flexible FAST Adhesive is very easy and efficient to use, and we can get some great productivity with it,” commented Kimbrough.

Once the SecurShield HD was installed, the team could move forward with adhering the membrane using Sure-Flex PVC Low-VOC Bonding Adhesive, a high-strength contact adhesive specially formulated for PVC membranes.

The team applied the adhesive to both the polyiso and the bottom of the membrane, allowed it to flash off, and then rolled the membrane in place for maximum contact. Once the membrane was down, they heat-welded the seams and terminated the membrane around the perimeter.

The Contour Rib System

The sloped and visible sections of the roof all had steel decks. For those sections, the Modern team loose laid two 2"-thick layers of 4' x 12' InsulBase Polyiso Insulation, which went down quickly due to the size of the boards. This was followed by a layer of ½" SecurShield HD that was mechanically fastened through the insulation below to the deck using InsulFast™ Fasteners and 3-inch insulation plates.

“The 12' insulation was a real productivity driver for us,” said Kimbrough. “We like using it whenever we can because it goes down fast and really helps to move projects along quickly.”

After installing the membrane, welding the seams, and terminating the membrane with shop-bent drip edge fascia made with matching Slate Gray clad metal, the Modern team started to install the Contour Ribs.

“Getting each of these sections dried in quickly was important so that the internal work could continue on time,” said Kimbrough, “but we still had work to do in terms of installing the ribs.”



Sure-Flex PVC Contour Rib Profiles are 1 ¼" tall and 2 ⅛" wide (including the welding flange) and come in 10' lengths. Each has a ⅛" alignment hole and a fiberglass reinforcing pin that is installed between each section to ensure that they remain in a straight line. Ultimately the ribs are heat-welded in place.

“This was our first job using the Contour Rib system,” said Kimbrough. “There was definitely a bit of a learning curve because it’s immediately apparent that the ribs must be installed perfectly straight and align perfectly with the structure. Any variation would be very noticeable from below and would ruin the look we are going for.”

CASE STUDY



To get the alignment correct, the Modern team first snapped chalk lines but decided that the ribs could ‘walk’ a bit during the alignment.

“To ensure that the ribs remained perfectly straight, we fabricated a wooden ‘guide’ as a straight edge that we used to keep the welder running straight. We had one person running the robot welder, and four people moving the wooden guide to keep up with the welder.”

Modern finished the installation using a variety of custom-fabricated boots and corners to match the Slate Gray membrane. In addition, around the perimeter of the main roof areas, they installed Carlisle SecurEdge™ 200 snap-on canted fascia. The fascia is ANSI/SPRI/FM 4435/ES-1 tested and Factory Mutual approved for wind uplift and offers maximum protection for the new school’s roof.

When complete, Modern will have installed 53,200 square feet of roofing with the Contour Ribs, and another 51,800 square feet of roof without the ribs.

“This is the fourth time that we have installed a roof on a school with this type of footprint,” said Kimbrough. “But in the future, to help with the budget, we’ll be switching from standing seam metal to Carlisle’s Contour Rib Profile instead.”

In the end, the project was highly successful based on Modern’s diligence and craftsmanship, as well as open communications with the GC, architect, and local Carlisle representative.

For this, Modern Heating Cooling & Roofing gets an A+ and goes to the head of the class.