

**Sure-Weld® TPO**  
Roofing Systems

CASE STUDY

**West Park Elementary School**  
**Elevating Expectations with Sure-Weld TPO**



**JOB PROFILE**

**SQUARE FOOTAGE:**  
42,000 sq ft.

**ROOFING CONTRACTOR:**  
B&M Roofing of Colorado, Inc.

**ROOFING SYSTEM:**  
Carlisle SynTec Systems  
60-mil Sure-Weld® TPO

**CONSULTANT:**  
Division 7 Design, Inc.

**COMPLETION DATE:**  
1997

The Lake County School District's motto is "Elevating Expectations," and when choosing the right roofing membrane and material supplier for their new roof in the late 1990's, they made no exceptions.

Lake County School District, located in Leadville, Colorado, sought the services of B&M Roofing, Inc. in 1997 when it became clear that West Park Elementary School needed a new roof. B&M Roofing decided to use Carlisle SynTec Systems' Sure-Weld 60-mil white TPO membrane for the project, even though TPO was relatively new to the roofing industry.

"At the time, there were a number of 'expert' opinions, both pro and con, regarding the long-term performance of TPO," commented John Hesslink, the roofing consultant who worked with West Park Elementary School on this project.

Hesslink also notes, however, that after 17 years, Carlisle's Sure-Weld TPO continues to perform "far beyond any expectation."

West Park Elementary School is situated in a climate and elevation where severe environmental stress presents an extraordinary challenge to the school's exterior building materials. At 10,200 feet above sea level, the damaging solar radiation of UV rays poses a particular threat to the roofing membrane's performance because exposure to UV radiation increases at higher elevations.

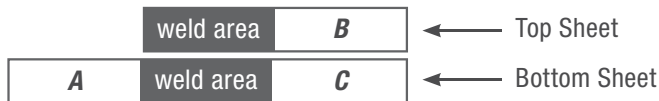
"UV rays are one of the most damaging types of solar radiation," Hesslink observes. "The greatest performance concern for any roofing membrane is its ability to endure UV light, since the damaging effects are both immediate and cumulative."

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Despite these challenges, test results from Carlisle's TPO have proven it is highly resilient. Nearly 20 years after the school's roof was installed, samples extracted from the site demonstrate the material's longevity. Three sections of TPO membrane were removed from the roof and sent to an independent lab for analysis. Careful review of these samples revealed that Carlisle's Sure-Weld TPO was able to withstand Colorado's severe weather and harsh environmental conditions with minimal signs of aging to the membrane.

## Analyzing the Findings

Three 12" x 12" samples of TPO membrane were removed from the roof for analysis. Each sample included the field seam area where two sheets were welded together with one sheet underlying the other by approximately 6", thus remaining unexposed to the elements.

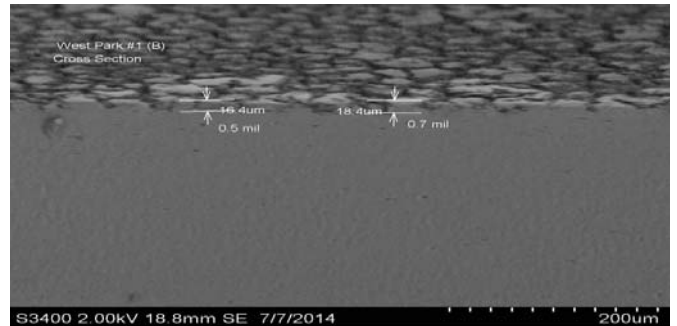


Each sample was examined for surface crazing, depth of surface crazing, thickness of TPO over scrim, and total thickness of the TPO sheet.

Table 1 shows the thickness over scrim and total sheet thickness of the 17-year-old samples, as well as the current ASTM standard for new TPO membranes.

Compare	Average Thickness Over Scrim (mils)		Average Total Sheet Thickness (mils)	
	Exposed Membrane	Unexposed Membrane	Exposed Membrane	Unexposed Membrane
West Park Samples	25.6	25.6	57.8	57.0
ASTM Requirement for New TPO Membranes	15.0	15.0	60±10%	60±10%

In addition to overall thickness, a measurement of the depth of any crazing on the surface of the membrane was taken. As demonstrated in Figure 1, the surface of the TPO held up extremely well to the intense and prolonged UV exposure.



Carlisle's TPO Marketing Manager, David French, was pleased with these results.

"While we are extremely satisfied with the results of the long-term performance study conducted on the membrane installed on the West Park Elementary project 17 years ago, we are not at all surprised by the report," French remarked. "As an innovator of TPO membrane, Carlisle has always prided itself on producing TPO with exceptional long-term performance," he continued.

## Advantages of TPO

TPO is the fastest-growing segment of the commercial roofing industry, but not all TPO membranes are created equally. Carlisle's Sure-Weld TPO offers the performance that building owners have come to expect from the leading manufacturer of this highly reflective roofing material. Sure-Weld TPO membranes are ENERGY STAR®-qualified and Cool Roof Rating Council (CRRC)-certified and have been directly attributed to a reduction in a building's energy consumption by decreasing the amount of air conditioning needed.

Xenon-Arc testing and long-term heat aging show that Carlisle's TPO membrane meets and exceeds the highest standards in the industry. That's because every TPO membrane is enhanced with the OctaGuard XT Weathering Package, a unique eight-component blend of antioxidants, UV absorbers, as well as light and heat stabilizers, providing highly dependable long-term performance.

## Conclusion

Only the strongest roofing membranes can provide long-term performance at 10,000 feet above sea level with constant exposure to UV rays. The samples extracted from the West Park Elementary School roof showed only minor crazing and revealed that the TPO maintained impressive thickness after 17 years of exposure to some of the country's harshest weather conditions. For these reasons, it is clear Carlisle's TPO was the right choice for West Park Elementary School.