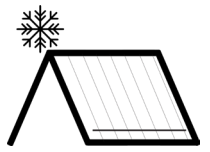




Case Study — Red Rocks Amphitheatre

DualGard™ | S-5-U™ Mini Clamp



At-A-Glance

Project Name

Red Rocks Amphitheatre

Location

Morrison, CO

Architect for Roof Replacement

Short Elliott Hendrickson

Structural Engineer

Martin & Martin

Electrical Engineer

CMO Consulting Engineer, LLC

General Contractor

GH Phipps

Roofing Contractor

Superior Roofing, Inc.

S-5! Supplier

Schafer and Company

Roof Profile

Aurubis Nordic Brown Copper standing seam metal roof

Industry

Municipal

The Situation

Red Rocks Amphitheatre is a spectacular, world-renowned entertainment venue. Its mountainous location makes it prone to extreme shifts in weather conditions from heavy snow to intense hot sun. Due to the area's historical architectural guidelines and the particulars of the new metal roof, the contractor needed a penetration-free, fully engineered, aesthetically pleasing snow retention solution that would both match the roof and last the life of the roof.

The Result

DualGard was custom-designed and engineered for this project to mitigate potential rooftop avalanches, which could pose a serious threat to performers, concertgoers and equipment below.

Project Stats

- **Roof Measured:** 8500 square feet
- **Roof Pitch:** Center, 1/12; Sides, 1/2 /12
- **Building Height** (stage level to top of roof): 51' (lowest edge); 75'+ (highest edge)
- **Products supplied:**
 - DualGard (200 feet)
 - DualBracket (150)
 - S-5-U Mini clamp (300)



The Project

Just west of Denver, nestled among huge red sandstone monoliths in the foothills of the Rocky Mountains at an elevation of 6,450 feet, is the state's most celebrated piece of architecture.

In 1928, the City of Denver acquired land in the Red Rocks area, formerly promoted as a community park and performance venue with a simple stage and existing rough slope used for seating. Through the joint efforts of many federal agencies and Denver area organizations, an amphitheater was constructed between 1935 and 1941 to provide a more functional concert setting.

The project initially required the removal of 25,000 cubic yards of rock and dirt and used 90,000 square feet of flagstone, 10 carloads of cement, 800 tons of quarried stone and 30,000 pounds of reinforced steel. Known as the only naturally occurring, acoustically perfect amphitheater in the world, Red Rocks has attracted some of the world's most notable performers, from the legendary "C/W Outlaws," Sting and The Beatles to opera stars and U2.

Many improvements to the venue have been made over the years. In 2021, the City was looking to expand and upgrade the venue with a larger roofing structure over the main performance stage. An 8,500 square foot Nordic Brown Copper standing seam metal roof was installed to replace the original one. The roof's high-end copper was shipped from German supplier, Aurubis in coils and fabricated on site. Mounted to the venue's stunning new roof is the complete **DualGard™** snow retention system by S-5!

The Challenge

The new roof sits between 75 and 100 feet above the stage floor. Without a snow retention system, snowpack and ice could easily escape endangering performers, concertgoers and expensive equipment.

Due to the high elevation of the site, extreme weather conditions ranged from freezing rain and snow to warm, dry, and sunny, then back to winter-like conditions throughout the duration of the project. Such weather conditions would also be a concern for the venue once construction was complete and business as usual resumed, therefore a high-quality, long-lasting snow retention system was necessary to prevent melting snow and ice from sliding off the sloped metal roof.

The terrain and mountainous setting of the venue, with long lines of stairs and curvy rocks, presented its own set of challenges. Construction staging areas were limited, and it was difficult to maneuver equipment and material. A crane was required to hoist roofing materials over a wall and around the mountain.

Furthermore, the venue is a designated historical site, requiring a tested, trusted and engineered solution that was aesthetically pleasing and would meet the architectural requirements and specifications for the project.

Long-Term Outlook

Red Rocks Amphitheatre was able to achieve the quality look it wanted with a snow retention system that maintains the roof integrity, mitigates potential rooftop avalanches and complements the look of the roof, providing a clean appearance and perfect finish-matching, designed and engineered to last the life of the roof.



The Solution

Because the roof is subject to both downward and upward forces of snow and wind, it required a snow retention system designed to resist stresses in two directions. The DualGard snow retention system by S-5! was custom-engineered for the standing seam roof profile.

Custom powder-coated to match the roof, DualGard is a complete, two-pipe aluminum, snow guard system with strength, testing and quality for almost any standing seam profile so the team was able to accomplish perfect color matching to the copper roof—meeting the architectural requirements for this historical site.

Additionally, the DualGard was easy to transport to such a challenging setting. It is compact and comes in packaging lengths and weights that are 100% UPS-able and easy to handle on site.

How Did the S-5! Products Help?

- Provided the aesthetic solution the architect desired
- Provided safety measures to performers, staff and concertgoers below
- Eliminated the risk of a voided roof manufacturer warranty—no holes/no damage
- Reduced the amount of product and total cost required due to S-5! documented holding strength and engineered system capacity

“Superior Roofing chose S-5! for this highly visible project because we know they offer a superior product that mechanically fastens, matches our metals with perfect color matching, is easy to install, lasts the life of the roof and provides the safety needed on our projects. We have been using it for 15+ years. For us, it is a necessity in the industry.”

—Mark Lopez, Safety Director, Superior Roofing



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