

## P R O J E C T

*Long-lasting, preformed silicone seal from Dow Corning was used to stop leaks in the barrel vault skylights at the Denver Performing Arts Complex in Denver, Colorado.*

## P R O D U C T S

Dow Corning® 123 Silicone Seal  
Dow Corning® 795 Silicone Building Sealant

## Silicones stop leaks at block-long barrel vault skylight system

Skylight technology has advanced considerably since the first two barrel vault skylights were erected in the 1970s at the Denver Performing Arts Complex in downtown Denver, Colorado. Beautiful and functional, a third skylight was added in the '90s to cover a block-long pedestrian walkway of nine theaters, concert halls and performance spaces that make up the complex, the second largest in the United States.

But time and the elements took their toll on the 80-foot-high glass archway. Leaking water became more than just a nuisance at the complex, causing damage in some areas. Occasionally it even became a problem for pedestrians, when ice formed in shaded ground-level areas.

### Organizing the renovation team

According to Rodney Smith, facility manager for the Theatres and Arenas Division of the City and County of Denver, which owns the Performing Arts Complex, by the spring of 1999, it was clearly time to thoroughly renovate the two oldest skylight vaults. Theatres and Arenas hired Semple Brown Roberts, PC, a Denver architectural firm, to come up with solutions.

Semple Brown Roberts hired Heitmann & Associates, a building enclosure consulting firm with offices in St. Louis, New York and Hong Kong, to identify the causes of the problems being experienced and recommend long-term solutions for repairing the leaking skylights. A repair specification was developed by Heitmann & Associates that called for all exterior gaskets, metal joinery and penetrations to be sealed using silicone sealants installed as fillet, bridge and cap seals. The project was bid, and the Denver-based J.A. Walker Company, Inc., was the successful bidder to be general contractor on the project. J.R. Butler, Inc., a Denver glazing contractor with experience in monumental skylights, was hired to undertake the skylight renovation work.

### The silicone seal solution

J.R. Butler proposed using a category of weatherproofing products generally known as "silicone seals" instead of the specified silicone bridge seals and bond breaker tape at the metal joinery and splice joints. This change was accepted after review of the aesthetic and technical factors involved. All other seals were installed as specified.

Silicone seals are preformed silicone strips, extruded into a variety of widths, colors and textures. They can be bonded to a wide range of substrates with silicone sealant to form a long-lasting, uniform weather-seal. Silicone seal can often be applied over failed sealants, spanning the joint and virtually eliminating costly removal of old caulks. Installation is generally easier and faster than other wet sealant options.



*The Denver Performing Arts Complex in Denver, Colorado, is a block-long complex of theaters, concert halls and other performance spaces protected from the elements by three 80-foot-high glass archways.*

**DOW CORNING**

“We had used silicone seals successfully in the past,” said Glenn Heitmann, president and CEO of Heitmann & Associates. “It became clear that they were the best, long-term match for the Performing Arts Complex project.”

The decision soon brought the team together with Dow Corning Corporation.

### Working with Dow Corning

“Our firm has had a long relationship with Dow Corning,” Glenn Heitmann explained. “They have a great deal of technical expertise and a very hands-on approach. They provide samples and do batch runs, so you know exactly what you’re getting. Dow Corning wants to do the job right the first time.”

Dow Corning manufactures and markets *Dow Corning*<sup>®</sup> 123 Silicone Seal, a product with a long track record as a problem-solver in both new construction and renovation applications. This ultra-low modulus, extruded silicone seal has an extension/compression capability up to +200/-75 percent of the original joint and is typically bonded to substrates using *Dow Corning*<sup>®</sup> 795 Silicone Building Sealant.

The two barrel vault skylights at the Denver Performing Arts Complex earmarked for renovation are made up of 1,100 panes of glass, most of them measuring three-and-a-half feet by eight-and-a-half feet, in an aluminum framing system. Where the framing components intersect – typically a problem area in leaking skylights – extrusions of *Dow Corning* 123 Silicone Seal were cut to span the joint intersections.

### Restoration begins

In October 1999, a J.R. Butler crew began restoration work on the Denver Performing Arts Complex skylights.

According to Dick Butler, president of J.R. Butler, the renovation work on the two skylights was extensive. “We re-torqued 30,000 screws in the framing and installed completely new expansion joints in each vault and in between. We had to clean years of dirt and grime off 1,100 pieces of glass and the aluminum framing before we could apply any sealants or the 123 Silicone Seal to address the leaking joints.”

Throughout the fall, winter and spring, J.R. Butler workers renovated the two leaking skylight vaults. The existing sealants were removed, and all glass and aluminum surfaces were carefully cleaned, before new sealants were installed. Custom scaffolding was built for the project and special ladders were designed to allow workers to safely negotiate their way across the top of the structure.

While *Dow Corning* 123 Silicone Seal can be applied in virtually any weather, the temperature and thermal expansion-contraction of the skylight components dictated the process. So a system of thermometers was deployed to signal when the skylights’ glass lites and framing were essentially at rest and could be worked on.

Over the course of the winter and spring, David Thiemet, project manager with Heitmann & Associates on this project, periodically inspected the renovation project, performing pull tests of the applied silicone seal and extensive AAMA field water leakage tests.

### A successful completion

In May 2000, the Performing Arts Complex skylight restoration project was completed. Thirty thousand lineal feet of *Dow Corning*<sup>®</sup> brand silicone sealants had been used in the project.

“The [*Dow Corning*] 123 Silicone Seal was an excellent product to work with,” Dick Butler said. “We even used it on about a half-dozen acrylic bubble skylights on the Buell Theatre roof. Bubble skylights are very prone to leaks, and we sealed them securely with the silicone seal.”

### Satisfied customers

According to Kay Krebs, senior engineer and project manager for the City and County of Denver on the Performing Arts Complex project, the newly renovated barrel vault skylights are performing as promised. “We’re experiencing no leaks in the system, and we’re very pleased with the work of the renovation team under some pretty trying conditions.”

Today, sunlight reaches the pedestrian walkway at the Denver Performing Arts Complex. Rainwater and snowmelt do not.

FOR MORE INFORMATION

For more information about these and other Dow Corning materials for the construction industry, or for the name of the Dow Corning representative in your area, call toll-free 1-877-SEALANT (1-877-732-5268). Or visit our construction web site at [www.dowcorning.com](http://www.dowcorning.com).

### LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer’s tests to ensure that Dow Corning’s products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

Dow Corning’s sole warranty is that the product will meet the Dow Corning sales specifications in effect at the time of shipment.

Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

**DOW CORNING SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.**

**DOW CORNING DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

*Dow Corning* is a registered trademark of Dow Corning Corporation.

*We help you invent the future.* is a trademark of Dow Corning Corporation.

©2002, 2006 Dow Corning Corporation. All rights reserved.

Printed in USA

AGP8209

Form No. 62-1122A-01

**DOW CORNING**

*We help you  
invent the future.*<sup>™</sup>

[www.dowcorning.com](http://www.dowcorning.com)