



YOUR VISION.

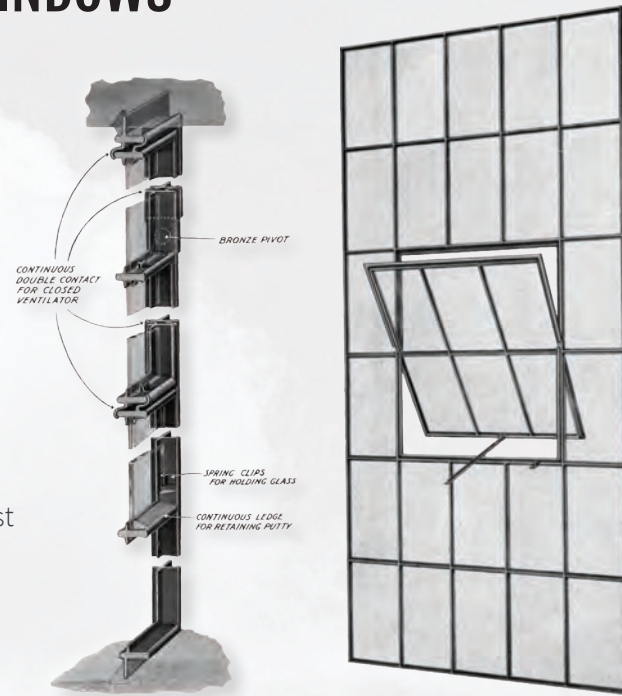
OUR EXPERIENCE.™

Graham has designed an aluminum window system that replicates the steel windows found in so many of our historic buildings throughout the country. Designated SR6700 Series, it has been the answer to many projects requiring modern replacement windows while preserving the original aesthetics of the structure.

THE HISTORICAL LEGACY OF STEEL WINDOWS

Steel windows saw widespread use and popularity through most of the 20th century, from the first American factory established in 1907 through the 1970's. The benefits included:

- **Cost Efficiency**
The price of steel was cheap
- **Narrow Sightlines**
Allowed for maximum daylight
- **The Strength of Steel**
Provided a durable, long lasting product with rigidity against wind pressure and low flammability
- **Large Ventilation Area**
Popular with foundries, machine shops, steel mills, and anywhere heat and toxins were a factor



Traditional Vented Steel Window, 1912



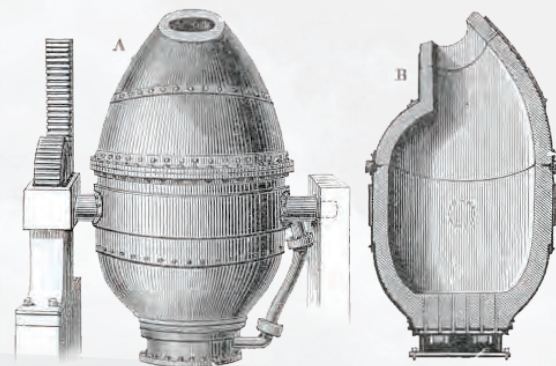
Medieval Era Steel Window

Humble Beginnings

The first metal windows were made of wrought iron by blacksmiths in the middle Ages. The invention of cast iron allowed for more complex shapes.

The Bessemer Process

In 1856, Sir Henry Bessemer developed a system for blowing air through molten pig iron to remove the impurities. This made steel easier, quicker and cheaper to produce, revolutionizing its usefulness and popularity with architects.



Bessemer Converter, Schematic Diagram

STEEL WINDOWS IN THE UNITED STATES

In 1884, Crittall Manufacturing Company Ltd began manufacturing steel windows in the United Kingdom.



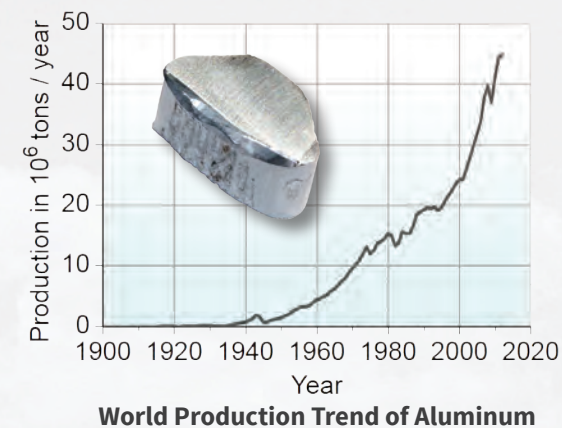
In 1907, Crittall ventured a stake in the Detroit Steel Products Company, establishing the first steel window factory in the United States. Their product was branded "Fenestra".

THE RISE OF ALUMINUM

In the 1880's the Bayer and Hall-Héroult processes introduced more cost-efficient methods of producing aluminum from bauxite and other ores. Charles Hall established the company which would later become the Aluminum Company of America "Alcoa" in 1907.



Bauxite Ore



Aluminum production and use grew exponentially during the World Wars, earning the name "winged metal" for its extensive use in aviation. From there, aluminum began to progress as a favored material for construction. The Empire State Building was the first to make broad use of the metal in the interior and exterior, as well as structurally.

INTRODUCING THE SR6700 STEEL REPLICA WINDOW

The innovative SR6700 aluminum window system is designed to replicate the original steel windows used in many historic and commercial buildings. It features a true "floating vent" and large openings with minimal sight lines. Historic concave true muntins and applied grids add to the authentic steel window look. The SR6700's one-of-a-kind design has been approved for use on several National Park Service (NPS) registered landmark projects. Heres how:

Narrow sightlines matching original steel windows

True floating vent

Overlap of vent to frame for historic replication

Available in dual finish (Two-Tone)

Concave exterior glazing leg

Monumental sizes available

PERFORMANCE

Strong

40 psf design pressure for floating vent configuration
100psf for fixed window configuration

Thermally Efficient

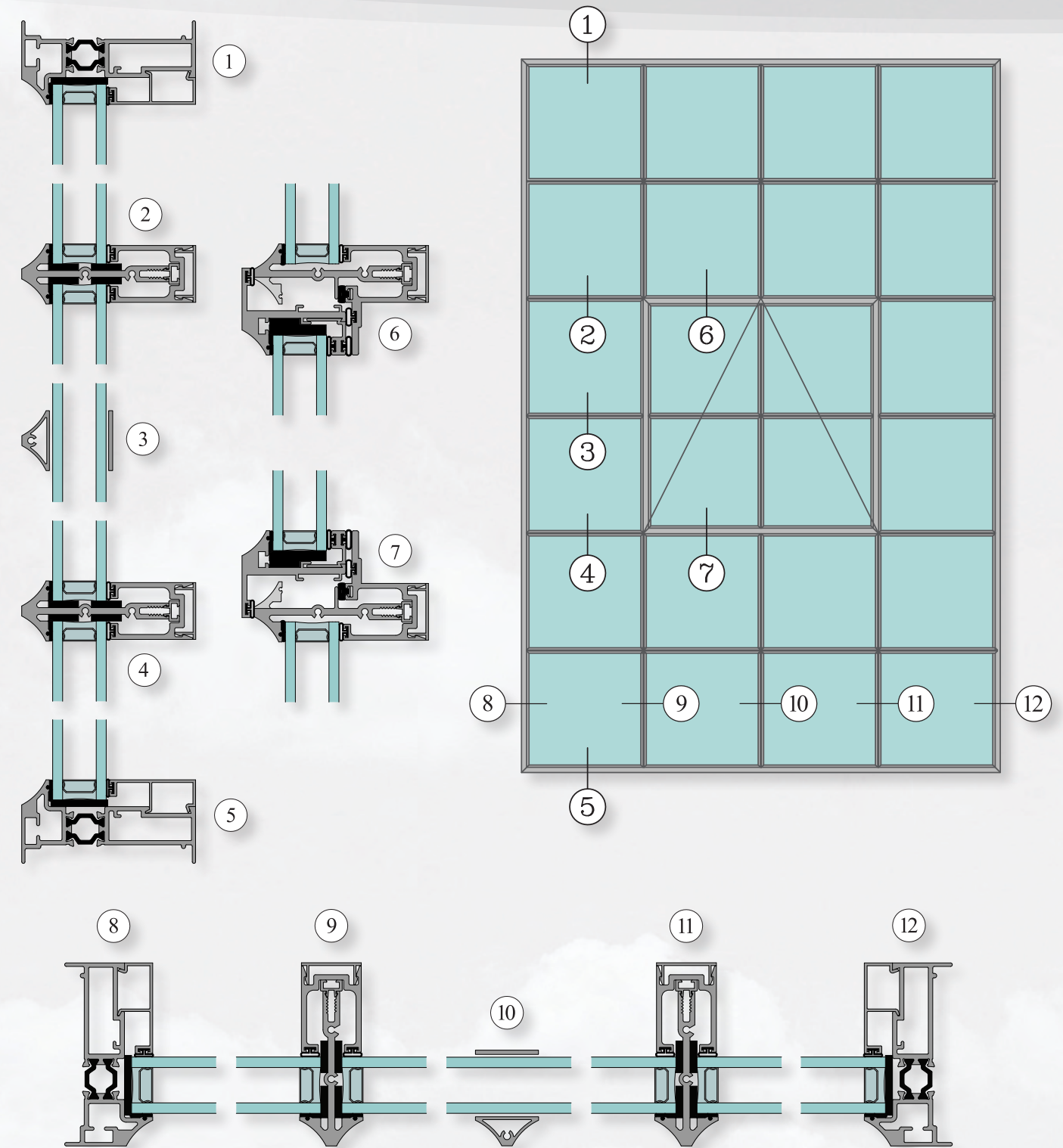
Dramatic improvement in heat loss from original single-pane steel windows.
U-Factors cut in half.

Airtight

Less than 0.04 cfm/ft²

Watertight

12 psf water test pressure



TYPICAL FLOATING VENT DETAIL

STARRETT-LEHIGH

New York, NY

THE CHALLENGE

Exacting replication to satisfy New York State Parks, Recreation and Historic Preservation demanding standards. Very large openings and some unique architecture added to the complexity of this high profile iconic historic building.

PROJECT DESCRIPTION

The Starrett-Lehigh Building encompasses a full Manhattan city block. With 2.3 million square feet, it is larger than the Empire State Building. Not only is it part of the West Chelsea Historic District, it was named a New York City landmark in 1986.

And it is wrapped in eight miles of iconic ribbon windows, consisting of nearly 5,000 separate openings, openings that will be filled over the next two years by windows from Graham Architectural Products (GAP).



Starrett-Lehigh, 1932

When opened in 1931, the Starrett-Lehigh Building was the picture of modernist architecture. Most notable were the strings of multi-pane steel sash windows, as well as the fact that trains could be driven directly into the ground floor of the building. That's because the building was originally a joint venture of the Starrett real estate interests and the Lehigh Valley Railroad, so in addition to being a warehouse and office building, it was also a freight terminal.



Bottom Row: original steel windows
Top Row: SR6700 Steel Replica windows



ARTIST LOFTS

Manitowoc, WI

THE CHALLENGE

Help a Wisconsin redevelopment firm meet historic preservation office demands while converting an abandoned factory building into 40 affordable two and three bedroom apartments, a majority of which are to be income-restricted.



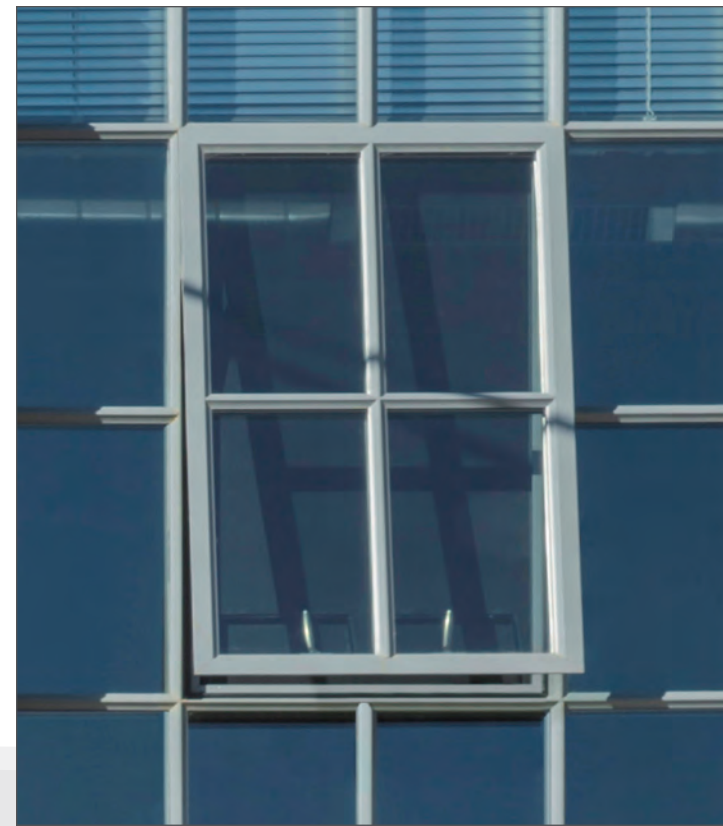
Mirro Plant #3, 1929

PROJECT DESCRIPTION

For years, the Mirro Aluminum Company plant, built in 1929, was a center of Mirro cookware manufacturing in Manitowoc, Wisconsin. According to the Wisconsin Historical Society, it was also where the company's "popular 'Mirro-Craft' line of lightweight and inexpensive family pleasure boats was developed, tested and produced."

Production ceased in the building in the early 60s and the facility eventually became mostly vacant and decrepit. Fast forward to 2016 and the building has been reborn to Artist Lofts, a 40 unit apartment building. Before the renovation could proceed, the owner had to find a viable replacement for the old steel warehouse windows that would allow them to enjoy tax credits they sought.

Graham's SR6700 windows were just the right answer to their needs. With National Park Service approval needed for the credits, the SR6700 window was just the right solution.



CABLE MILLS

Williamstown, MA

THE CHALLENGE

Replicate, while bringing up to date, the historic windows that once graced this 140-plus year old mill, so that a dramatic renovation may comfortably accommodate 61 luxury apartments and receive the National Park Service's approval.



PROJECT DESCRIPTION

It took 14 years, three developers, and the unveiling of a new window design from Graham Architectural Products, but Cable Mills, nestled along the banks of the Green River in Williamstown, MA, is now open and looking marvelous. The project is an adaptive reuse of the one-time Water Street Mill built in 1873.

According to the architects for the project, Graham played a key role in overcoming challenges and obtaining historic tax credits they sought to help fund it. The NPS required the windows to be more representative of the original structures with an operable panel was in the middle of the grid. The SR6700 offered that floating vent, large opening sizes and the minimal sight lines preferred by the NPS.

Beyond the \$4 million in Federal Historic Tax Credits and another \$3.5 million in Massachusetts Historic Tax Credits, Williamstown committed \$1.5 million in Community Preservation Act funds and the state provided \$1.3 million in support of affordable housing. In return, the state and the town received the pristine preservation of a 19th century mill building, a pedestrian walkway and 61 luxury housing units.



KREIDER COMMONS

Lebanon, PA

THE CHALLENGE

Helping to restore an old shoe factory to a modern apartment complex while maintaining the original historic look. Graham's SR6700 windows worked perfectly.



PROJECT DESCRIPTION

At one time the A.S. Kreider Shoes in Lebanon, PA was the world's largest manufacturer of children's and toddlers' shoes. When overseas competition forced the company to close its doors in the 1950s, the building became home to a garment manufacturer and then other tenants before being abandoned to the elements.

Now at nearly 100 years old, the building has once again become something – something new and exciting – and Graham was part of the project.

The building recently reopened as Kreider Commons, an apartment complex featuring 50 one and two-bedroom apartments for seniors with low to moderate incomes. More than 200 of Graham's SR6700 steel replication windows helped restore the project to its original splendor.



Kreider Commons before Renovation

21c MUSEUM HOTEL

Oklahoma City, OK

THE CHALLENGE

Meeting museum quality demands while satisfying national historic replication requirements. The SR6700 fit the bill.



PROJECT DESCRIPTION

Built in 1916 and listed on the National Register of Historic Places, the 21c Museum Hotels' redevelopment of downtown Oklahoma City's historic Fred Jones Building opened in June of 2016.



Originally designed by the famed architect Albert Kahn, it was built for Henry Ford as an assembly plant and was one of 24 regional assembly plants designed and built between 1910 and 1915 to accommodate the expansion of the Ford Motor Co.'s assembly process across the country.

This historic renovation, featuring the SR6700, includes 650 windows in 175 openings. The building is now a 135-room, full-service hotel with 14,000 square feet of contemporary art exhibition space and a mix of permanent and rotating art displays.

