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MATTHEW SUTER
SOL HARRIS/DAY ARCHITECTS I
5677 FRANK AVE NW
NORTH CANTON OH 44720-7259

Images courtesy of Graham Architectural Products



Older, historic buildings that need new windows can find new life by incorporating custom replication windows that can meet historic preservation guidelines and modern energy performance needs as shown here in the Firststone Triangle Building in Akron, Ohio.

Other aspects of the glass used in windows will affect the energy performance. Glass is tested and rated for its solar heat gain coefficient (SHGC), which indicates how much solar heat passes through the glass compared to what is reflected away. In building situations where heating from passive solar gains is desired, a high SHGC is desirable to take advantage of the free solar heat. In other situations where cooling is the primary energy driver in a building, a lower SHGC is needed to prevent unnecessary air-conditioning use because sunlight is heating up a space. Of course, the treatment for some of the energy-efficiency characteristics of the glass can interfere with the ability of people to see clearly through it. Therefore, visible light transmittance is also measured to help identify acceptable levels of clarity for views or the use of natural daylighting in buildings.

Ultimately it is up to a window manufacturer to put all of these things together and the architect or designer to select a product that suits the design and performance needs of a project. Manufacturers offer numerous window and door options with two or three panes of glass, choices in operation types, and a range of glazing options to meet the performance challenges of any climate. Some even use their extensive selection of shapes, sizes, styles, and finishing options to allow virtually unlimited design capabilities and the flexibility to get exactly what a project requires. Kris Hanson, senior manager of Group Product Management at Marvin Windows and Doors, sums it up this way: "We are continuously updating our product offerings to best meet architects' current needs and to help solve the challenges they face on a daily basis. As design trends continue toward more glass and narrow frames, we work to create large window offerings that continue to deliver superior performance."

CUSTOM REPLICATION WINDOWS

It is easy to think of selecting windows creatively in terms of new construction, but existing buildings, and historic buildings in particular, bring some additional considerations. Typically, windows in these cases need to fit some preexisting conditions or incorporate custom features to achieve results that match the design, function, or historic needs of the existing building. Therefore, the design challenge is to work with a window manufacturer who can help maintain the original aesthetics of the building while improving overall efficiency using modern materials and glazing. Often, the exact look or design an architect is trying to achieve does not exist off the shelf as a premanufactured product. Fortunately, there are window companies that will work with the architect and design team to either modify or create new shapes to satisfy the desired look and meet historic requirements.

A specific challenge can be producing windows with designs that faithfully replicate the original steel windows used in many older buildings using alternative, higher-performing materials such as thermally broken aluminum. At least one manufacturer has developed such a steel replication window specifically for use in historic buildings to help meet the requirements of state or national historic preservation agencies. This design includes narrow (less than 2-inch) frames that mimic historic steel profiles and slim-line integral and fixed-stack mullions for minimal sightlines. It is possible to specify historic profile true muntins as well. In addition to meeting these visual needs, applied-muntin grids with 1-inch insulating glass allows for the windows to be upgraded in terms of thermal performance compared to the original, which are most often single-glazed clear glass. That means that retrofitting older buildings can

be done using modern materials and window product designs so the overall building energy performance is also inherently improved.

Putting this in context, those engaged in historic replication projects will usually attest that they are not for the faint of heart. Each job of this nature has its own unique challenges, which means it often requires a combination of architectural attention to detail along with a window manufacturer that can provide a highly engineered solution to deliver the necessary blend of strengths, capabilities, and aesthetic demands. It is important to select a company that has a track record of meeting the demanding scrutiny of historic preservation jurisdictions. It is equally important that the company can demonstrate how it recaptures original aesthetics while providing improved thermal efficiency and structural integrity to the buildings it has been involved in. That might include projects like renovating old factories or enabling the repurposing of an old mill to bringing the highest levels of performance, beauty, and operability to new construction.

The companies involved in successfully producing replication window solutions find it is a particular source of pride for those involved. Their focus is on overcoming the limitations of steel windows with single panes of glass and being able to design and deliver aluminum replications using state-of-the-art thermal technology that meets the often conflicting needs of both the National Park Service and the Department of Energy. Bill Wilder is Graham Architectural Product's director of technical sales and comments, "That's what makes our niche hard to do. That's the fight we face in this industry of architectural windows: how to morph current technology into antiquated design while meeting today's demanding standards for energy efficiency."