



25: CHANNEL GLASS: PUSHING DESIGN LIMITS

A look at basic and advanced channel glass options

by David Vermeulen, Technical Glass Products



DEVIL'S DETAIL

INTRODUCTION

Channel glass first made headlines with its ability to spread out the sun's rays as they pass through its translucent surface, creating soft, even, and glare-free light for building interiors. In more recent years, the material's one-of-a-kind depth and profile have generated a second wave of interest. Building and design teams are now using the self-supporting, U-shaped, linear cast-glass channels to create distinctive configurations, pushing the form of buildings without taking away from energy performance or daylighting goals.

Consider a four-story warehouse-turned-office space in the revitalized shipping district of San Francisco. Lundberg Design & MacCracken Architects was tasked with transforming the 1000 Sansome building into a modern office with increased daylighting. Before the renovation, the space was dimly lit, with low-ceilings. The firm chose to place large pieces of interlocking channel glass into the lobby to form expansive glass walls, allowing light to diffuse throughout the space.



A translucent channel glass system helped give a face lift to the lobby of San Francisco's 1000 Sansome building. (image courtesy of Lundberg Design & MacCracken Architects)

"Not only does the channel glass act as a beautiful divider between rooms, it also offers the durability we needed in place of solid walls," said Daniel Robinson, Principal at MacCracken Architects.

For building professionals interested in using channel glass to create high-performance façades, walls, and partitions like the one in 1000 Sansome, the following sections will provide an overview of key design considerations, from basic to advanced. As with any specialty glazing material, one should consult the manufacturer's and/or supplier's documentation for specific product recommendations.

CHANNEL GLASS BASICS

Channel glass segments are cast in up to 23-foot lengths (7 meters) and are available in various face widths. Standard face widths range from 9.13 inches (232 mm) to 13 inches (331 mm) with consistent flange depths. These versatile, linear segments fall into two different categories: single and dual-glazed systems.

Single-glazed channel glass segments are often used in exterior and interior feature walls. Common examples include rain screens, decorative cladding, and other applications where high wind or energy efficiency are not concerns. Single-glazed configurations provide great design freedom, as the channels can be set in customized arrangements to meet specific project needs or to obtain a one-of-a-kind aesthetic.





Left: Variably spaced channel glass diffuses light while creating visual interest. (image courtesy of Technical Glass Products)

SURFACE TEXTURING

Channel glass' optical qualities are due largely to its surface texturing, which helps to influence lighting and color effects in a space. The segments are available with no surface patterning for a clear look or in a range of textures, the most dramatic of which is a wave-shaped texture with well-defined ridges.

To add depth to a glazed area, building teams can intermix surface textures. By contrast, using the same texturing throughout the glazing system will create a more unified look.

In either scenario, these large, glazed areas can let in a significant amount of daylight to create a design that holds visual interest and contributes toward a building's daylighting and energy goals.

COLOR PLAY

Channel glass systems also allow building teams to make statements with light and color. Specifically, changing the texture and composition of the glass alters the plank's color, allowing for dramatic light effects. The standard channel glass cast is a light seafoam green, which adds a hint of color while allowing for strong passage of natural light. Pyrolytic coatings, like amethyst and bronze, shift the green hue for improved performance and varied color. Low-iron oxide cast-glass channels allow for greater light transmission and reduce the standard green hint. Their nearly colorless surface creates understated beauty. To meet specific project needs, clear channel glass segments are also available.

Where rich, true colors are desired, building professionals can select from a variety of standard polycarbonate laminate options and more than 1,500 tempered ceramic frit colors within the RAL Design System. When these colors are melded to the interior surface of the glazing during manufacturing, the colored ceramic frits are opaque. This bold coloring makes them ideal for object architecture and high-profile storefronts.

Custom blends, images, and graphics can also be printed directly on the glass to create one-of-a-kind installations. Another option for design professionals seeking a dramatic, colorfast appearance is non-pyrolytic coatings, which are bonded to the glass with high adhesion strength to resist chipping and fading. The coating is available in an array of opaque and metallic colors with varying translucency.

Dual-glazed configurations are typically necessary when the channels function as part of the building envelope. In these instances, glaziers mount the nesting channels in an overlapping fashion to provide extra strength against heavy winds. This allows the assembly to be used in place of traditional storefronts and curtain walls. The dual-glazed configuration also helps manage heat transfer—a key benefit for light-transmitting walls where heat gain or loss is a concern.

In both single- and dual-glazed configurations, there are a number of proven ways building professionals can use the material to advance design.

DAYLIGHTING

Due to its translucent nature, channel glass has the ability to diffuse large amounts of balanced daylight deep into interior spaces. Since channel glass is available in a variety of textures and translucencies, building teams can use tailored light effects to achieve a specific look while preserving daylighting goals.

Right top: Backlit channel glass creates a vibrant arrivals and greeting center for LAX guests. (image courtesy of Technical Glass Products); Right bottom: A curved channel glass corridor creates a stunning passageway. (image courtesy of Technical Glass Products and NBBJ)

Another popular coloring option is to set lights between the channel glass and the primary thermal wall. This effectively creates backlit screens that display one or many colors. An example is seen in the LAX Tom Bradley International Terminal in Los Angeles, California (pictured at right). As travelers walk through the arrivals and greeting center, they will notice cast-glass panels that alternate between neon colors like the city's nightlights.

CONTINUOUS INSTALLATIONS

As noted earlier, channel glass is available in long lengths—up to 23 feet. In vertical applications, the channels can span the entire 23 feet uninterrupted, creating tall, sweeping spans of glazing. It is important to note a building's design-imposed wind loads will determine the channel's maximum length. Where it is necessary to limit the channel glass length, it is possible to split the elevation. Alternatively, it is possible to use wind-load anchors.

Another method for creating expansive curtain walls and façades is to use horizontally glazed cast-glass channels. When using this method, it is important to note a special set of guidelines applies. The linear glass segments are usually dual-glazed and limited to 13-foot (4-meter) lengths, or the length specified in the manufacturer's wind load charts. This precaution helps ensure horizontal channel glass segments have adequate structural support.

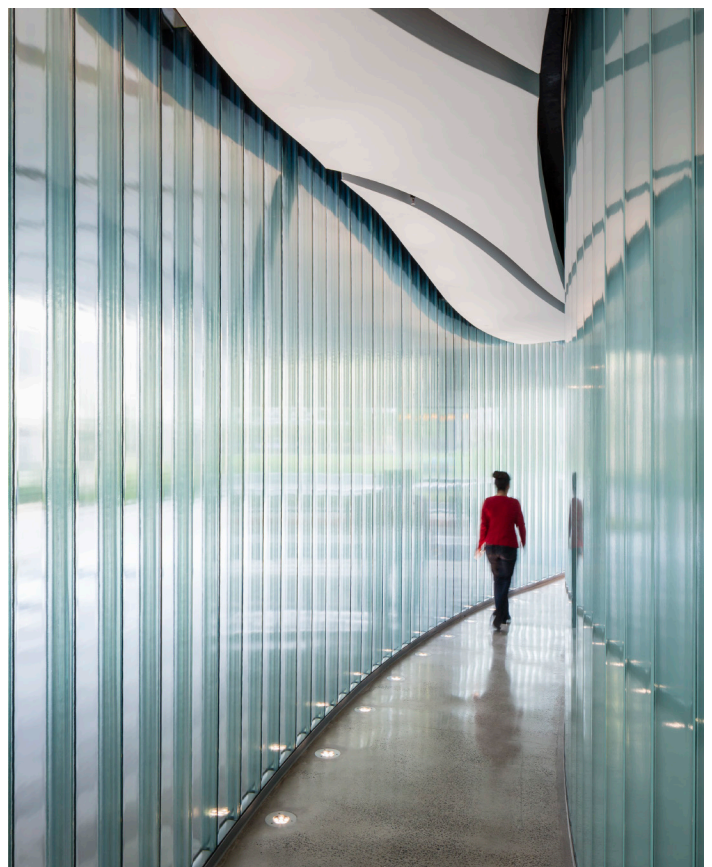
ADVANCED DESIGNS

As channel glass continues to evolve, so too does use. The following advanced methods push the material to new limits:

CURVED OR SERPENTINE

Channel glass' slender frames and narrow segments allow for tight radii – as low as 6.5 feet (1980 mm). These compact arcs make it possible for building teams to add 'curve appeal' to façades, partitions, and walls.

In application, the aluminum framing is stretch-formed into a radius. Then channels segment around the framing to create the desired curve or serpentine configuration. For example, in the University of San Francisco's John Lo Schiavo Center for Science and Innovation, cast-glass channels animate and follow the curve of the building's adjacent walkway (pictured at right). A second layer of channel glass mirrors the curve, creating an ethereal corridor.



To meet custom design needs, manufacturers and suppliers are available to assist in cutting glass segments at an angle, accommodating changes in dimension. They can also help ensure planks fit with the frame profile. However, in each instance, early involvement is necessary.

STEPPED TRANSITIONS

Building teams may also opt to arrange channel glass segments in horizontal or vertical patterns separated by windows, doors, or frames to create a unique sense of movement. In other instances, it may be necessary for the planks to move around fixed building mechanical systems. Either scenario results in a stepped transition, where the channels step around fixed objects.

While channel glass is versatile enough to create stepped transitions, it is important to note that it is rare for the planks to lie around an object without any interference. Cutting the channel glass around the object may seem like the obvious solution; however, this can place high stress on the corners and increase its chance of failure. As such, a best practice is to work with the supplier to ensure adjacent structures are adjusted where possible, allowing for standard full-plank spacing. Alternatively, use flange-cut pieces (i.e. L-shaped pieces of channel glass) and a configuration of different standardly available widths to achieve the right configuration.

RAKED TRANSITIONS

Channel glass can also be raked at the head or sill, allowing for a gradual change in elevation. In this scenario, the channel glass segments are cut on an angle to fit the opening. To ensure structural integrity, the entire plank is cut, rather than just the inside corner.

VERTICAL FINNS

Another emerging trend is to orient channel glass as vertical fins. In such instances, the planks, often called fins, protrude perpendicularly from the flat face of the building to create visual interest or privacy. This was the case in Parc on Powell, a mixed-use development in Emeryville, California, where the fins extend up, often continuously, between sunshades at the fourth story of the building. "They provide a rhythm to the building and tie the main corner entry to the entire project," explained J. Connor, Principal, Kava Massih Architects.

CONCLUSION

From curved installations to soaring partitions, building teams continue to use channel glass to advance modern designs. For design support and resources, contact a channel glass supplier.

About the Author

David Vermeulen is the North America Sales Director for Technical Glass Products (TGP), a supplier of fire-rated glass and framing systems, and other specialty architectural glazing. TGP works closely with architects, designers, and other building professionals, providing them with the state-of-the-art products, service, and support to maximize design aesthetics and safety in commercial and institutional buildings around the world. Contact him at (800) 426-0279.



For more information about TGP's channel glass products, visit <https://www.tgpamerica.com>.

About the Devil's Details

The AGI educational series illustrates and describes common glazing challenges as a means to communicate best practices for the design and construction industry, not as a sole source for design guidance. AGI recommends design professionals consult with an AGI contractor regarding specific project challenges. AGI contractor profiles may be accessed at www.theagi.org. To share a devilish detail of your own, contact info@theagi.org.