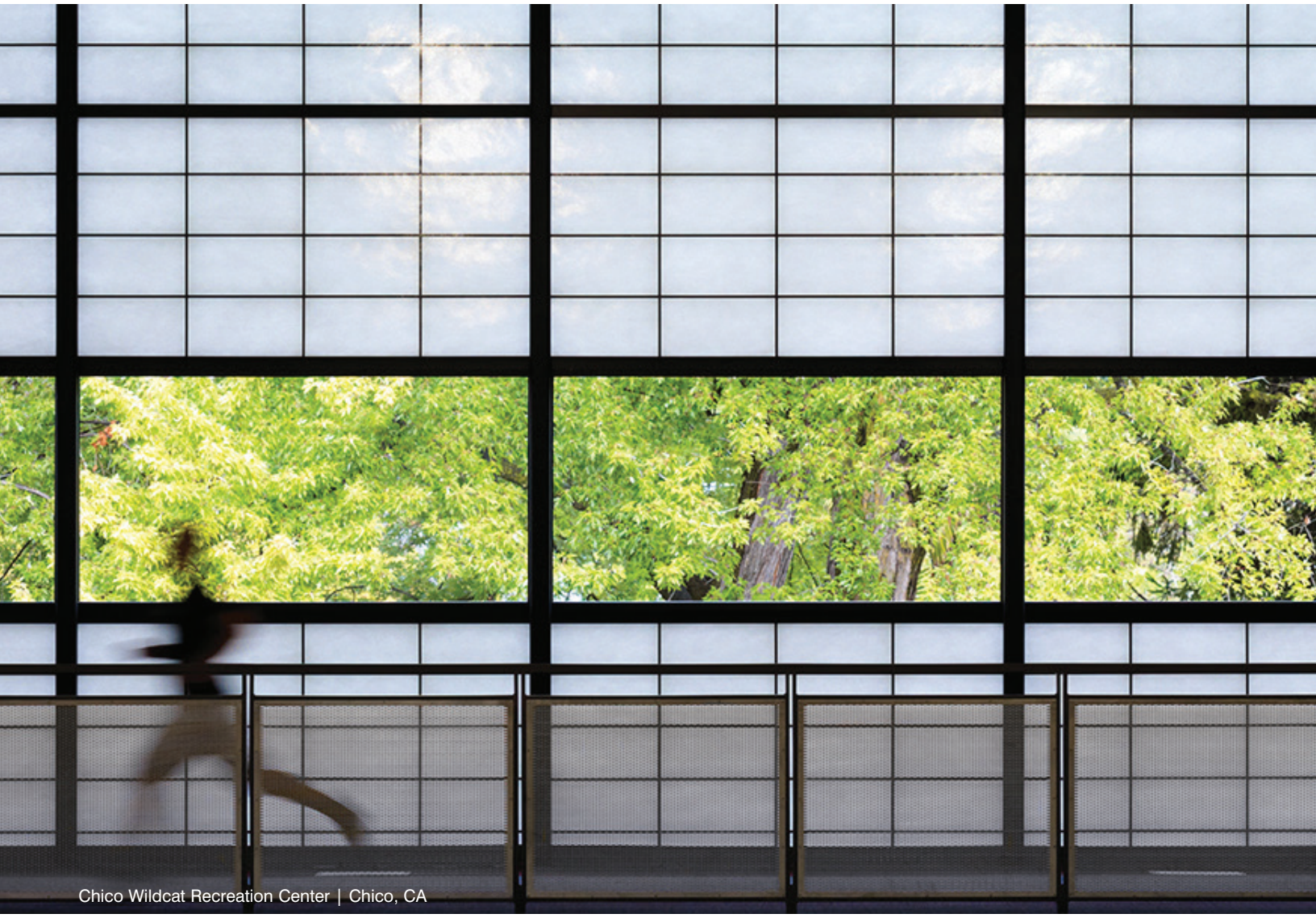
KALWALL®

high performance translucent building systems



Chico Wildcat Recreation Center | Chico, CA

Redefining the Basics:

The Translucent Sandwich Panel

KALWALL®

high performance translucent building systems

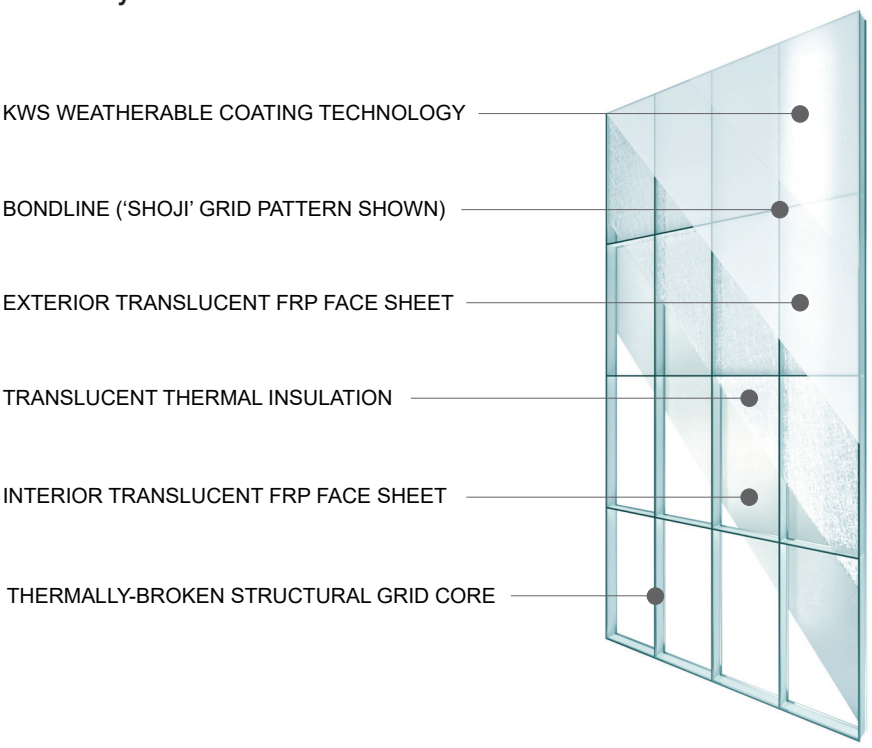
DID YOU KNOW

Kalwall founder Robert R. Keller invented the original translucent sandwich panel in 1955.

People need a few fundamentals to survive: oxygen, water, food, sleep and shelter. They also have secondary requirements, one of which is daylight.

Is your building keeping people healthy? While it's good to try new and exciting things, to meet the fundamental needs of people we need to remember that daylighting is essential to wellness. See how the translucent sandwich panel can help you keep daylighting and other healthy building concepts top of mind.

Anatomy of a Translucent Sandwich Panel



BUILDING FOR PEOPLE = **Daylighting**

Manhattan Fire Station | Manhattan, KS


Northwest Missouri State University | Maryville, MO


Elgin Artspace Lofts | Elgin, IL

People have been harvesting daylight for thousands of years. The ancient Egyptians were using windows covered by reed mats in 1500BC. While the principle remains, technology has developed, first by using shutters, then glass and, now, translucent panels, sunpipes and smart glass.

What is Daylighting?
Daylighting is the art of placing apertures into buildings to control either direct or indirect sunlight that penetrates the space to provide interior lighting.

In architecture, daylighting has gone through a complete 360°. Originally it was one most important aspects of a building design with buildings being planned around movements of the sun to capture the most lighting. This meant that houses in the northern hemisphere had fewer windows on the polar side wall than facing south. The opposite was true in the southern hemisphere. Then, with the advent of electrical lighting, daylighting became less important and purely aesthetic or utilitarian. Now, architects and designers are placing more and more emphasis back on daylighting and the benefits it brings.

In science, computers can now run daylight modelling exercises as well as generating lux levels, daylight autonomy reports, levels of radiance illuminance and glare pattern analyses. This technology can find that ‘sweet spot’ between lighting, climate, warmth and health benefits.

In art, daylighting is managed to maximize visual and thermal comfort and/or to reduce energy use from artificial lighting – not just throwing uncontrolled sunlight into a space. It can be used to highlight architectural features and to bring accents to different spaces. By allowing full-spectrum color rendering, daylighting provides an ideal space for showcasing artwork.

DID YOU KNOW

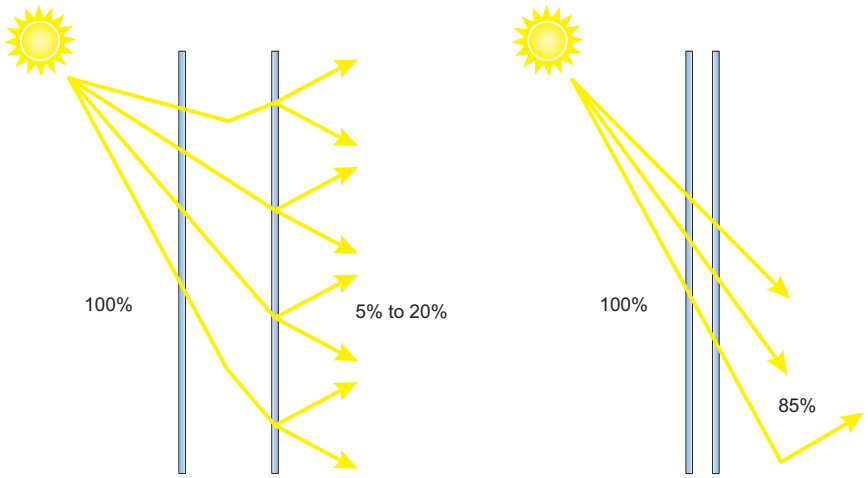
In the late 17th Century a window tax was introduced in England, Scotland, Wales and France that levied extra taxes on houses which had more than 10 windows. This tax resulted in many owners bricking up window spaces, which in turn caused a surge in disease and ill-health and was viewed as a tax on light and air. It was repealed 156 years later. Many period houses still have outlines where windows used to be.

Translucent vs. Transparent

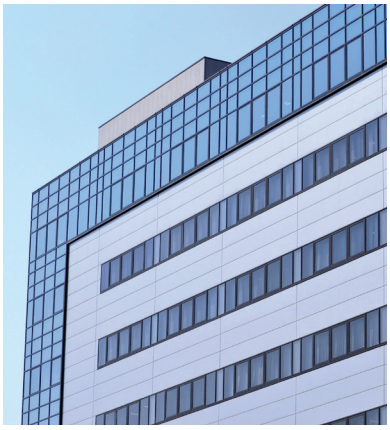
Since the first use of windows, the amount of light entering a building has needed to be controlled. Whether it be preventing excessive solar gain or stopping glare and hotspots, daylight has always been constrained using sunshades, brise-soleil, curtains, blinds, louvres or shutters.

Transparent mediums have no built-in filter, which is why translucent solutions that diffuse daylighting are popular. The broad diffusion of light over a large area means more usable light penetrates deep into the interior space, allowing excellent visual clarity.

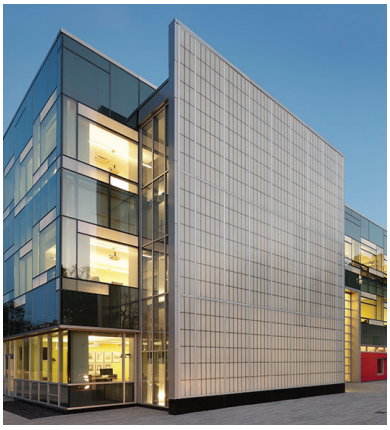
Furthermore, it has been shown that diffused daylight offers other benefits over transparent options. This goes from the calming and attractive ambience to enhanced concentration and better responsivity compared to traditional glazing.



Translucent Transparent


Glass


Polycarbonate


Kalwall Fiber-Reinforced Composite Panels

Common Daylighting Products

There are three traditional methods for allowing daylighting into buildings: Glass, Polycarbonate and Fiber-Reinforced Composite Panels. Each have distinct advantages and disadvantages.

I. **Glass** is the oldest way of allowing natural light into a building. Since Roman times, it has been used to allow light into a space while blocking out dust, dirt and wind. Its transparency offers unparalleled visual freedom with those inherent biophilic advantages of linking people to nature. However, glass also has several disadvantages. It is heavy, inflexible and fragile, which causes installation challenges. It also provides relatively poor thermal properties and it needs a secondary solution to control solar gain and glare. That's why we don't all live in glasshouses.

II. **Polycarbonate** sheeting offers a stronger, more durable and lighter alternative to glass and helps block harmful UV rays, but it also has several disadvantages. It can be easily scratched and become discolored and brittle over time. In addition to poor impact resistance, it has very low levels of thermal efficiency and is sensitive to heat.

III. **FRP** panels offer distinct advantages over both glass and polycarbonate in terms of thermal insulation (which can be the same as an insulated cavity wall). In addition, these translucent sandwich panels offer the highest protection and resistance to wind-borne debris, impact, fire, abrasion and point loads. Although these panels can be more expensive than their counterparts, with a long life cycle and low maintenance, this additional cost is somewhat mitigated. Lastly, while the translucency will not provide a view to the outside, it is perfect if you want line-of-sight protection.

Sometimes, incorporating more than one product offers the best solution. For example, you can achieve the performance benefits of an FRP panel, while incorporating vision glazing for a connection with nature.

BUILDING FOR BENEFITS = **The Sandwich Panel**

DID YOU KNOW

A report by the New York Times in 2008 reported that the bomb which exploded at LaGuardia "shattered plate glass windows 30 feet high, spraying glass shards like shrapnel, and hurled metal from shattered baggage carousels and coin-operated lockers." This simply wouldn't happen with the use of a structural sandwich panel.

The unique composition of FRP sandwich panels offer superior benefits compared to the alternatives across pretty much every aspect; from safety and security to weatherability and energy efficiency.

- The aluminum or thermally-broken grid core with interlocking I-beams gives sandwich panels incredible strength in a light-weight system, making them substantially lighter when compared to the glass equivalent.
- Sandwich panels are structurally very sound, with an outstanding load capacity that makes them safe to walk on.
- The strength of the panels themselves facilitate larger spans with less supporting substrates. It is possible to obtain spans up to 80 feet (25 meters) – unheard of with polycarbonate or glazing.
- An important aspect of using FRP is its innate shatter/impact proof nature, making it suitable for use in areas of high security or those at risk from blasts. It is increasingly used in airport design and in areas deemed as high-risk, high-value or target-rich. These include man-made risks such as terrorism or explosion venting to extreme weather events such as hurricanes.
- When filled with insulation or an aerogel, sandwich panels offer unparalleled thermal performance. The most insulating sandwich panel can achieve a 'U' value of .05 (0.28W/m^{2}K), the equivalent of a cavity filled solid wall.
- In addition to superior thermal performance, a translucent sandwich panel offers the energy efficiency of optimal daylighting design. Utilizing diffusion, the sandwich panel can transmit up to 20% visible light that is scattered deeper into spaces without glare or hotspots, reducing the need for artificial lighting and controlling solar heat gain.

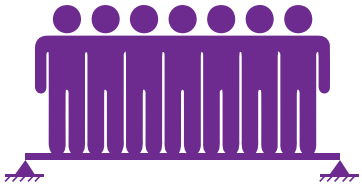
BENEFITS OF THE TRANSLUCENT STRUCTURAL SANDWICH PANEL

museum-quality daylight™

energy savings

comfort + wellness

productivity



structural performance

lightweight materials

low maintenance

safety + security

blast protection

BUILDING FOR EVERYONE = **Sustainability**

DID YOU KNOW

A survey by World Business Council for Sustainable Development, found that people believed green building features would increase the cost of a building by 17%. Researchers have actually found average marginal costs of less than 2%. That is easily offset by the life-cycle value of sustainable building.

FRP sandwich panels are increasingly being specified as the material of choice as the demand for sustainable, high-performance products increases.

The self-supporting nature of sandwich panels coupled with their light weight reduces the need for supporting structures. Not only is this aesthetically more pleasing, but it reduces a project's carbon footprint (as well as saving time and money).

The exterior face of the sandwich panel is color stable and includes a permanent glass erosion barrier with UV resistant, self-cleaning surface. This means that normal rainfall helps to keep the surface free of dust and dirt while at the same time retaining its original color during the weathering process. Furthermore, the inclusion of an erosion-prevention barrier protects the interior from weather exposure and the risk of fiber-bloom, cracking and crazing.

Aspen Music School | Aspen, CO

Kalwall + Sustainability

0 Landfill
Manufacturing Process

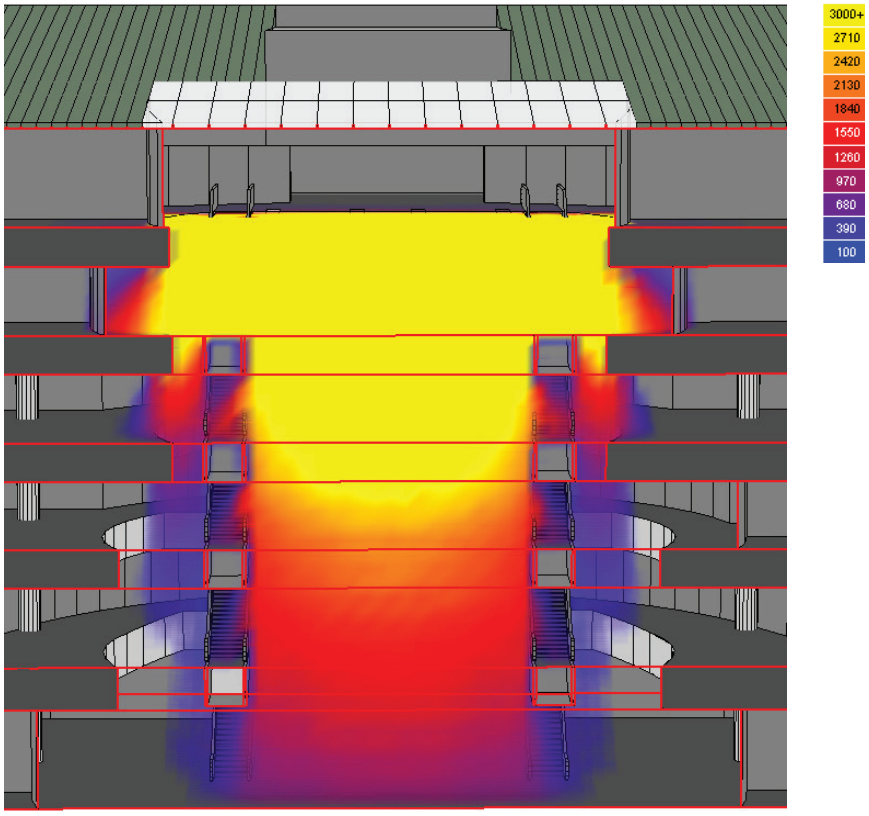
Earn 25+
LEED v4 Credits

Achieve up to R-20 or
.05 U (0.28W/m²K)

Achieve SHGC as low as
.04

1000+ LEED
Certified Projects Completed

Maximizing daylight is an integral part of sustainable design. Translucent panels have the ability to diffuse large amounts of usable light with a relatively low level of light transmission. Less radiant energy is transmitted and this, coupled with diffusion, does away with the hot spots that are so common to other light transmitting sources. It also throws evenly-distributed light further into an interior space, reducing the need for artificial lighting and the loads on mechanical systems.



Sometimes true innovation means going back to the basics and remembering the “why” of your design. Building for people, building for benefits – building for everyone.

KALWALL®

high performance translucent building systems

FACADES	wall systems unitized curtain walls window replacements
SKYROOFS®	standard s-lines standard pyramids standard geo-roofs®
SKYLIGHTS	pre-engineered skyroofs custom skyroofs clearspan™ systems
CANOPIES+ WALKWAYS	canopies walkways pre-engineered structures

Want to know more about using Kalwall in your project? We'd love to talk to you.

Please call us at +1 603 627 3861

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