EXTECH
EXTERIOR TECHNOLOGIES, INC.

# STRUCTURAL CELLULAR POLYCARBONATE

Benefits and Uses of SCP in Facades and Canopy Systems

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# INTRODUCTION

## Who is EXTECH?

We specialize in designing, engineering, fabricating, and manufacturing custom facade systems and daylighting products across North America.

Since our founding in 1975, EXTECH/Exterior Technologies Inc. has developed and patented over (18) eighteen façade, canopy and skylight systems specifically engineered for structural cellular polycarbonate glazing.

## Why EXTECH?

We believe that a collaborative and creative approach is vital to produce beautiful, functional, durable, and cost-effective solutions within schedule. We partner closely with everyone involved in the architectural process, asking questions, and listening, to foster innovation, cost-savings, and ease of implementation.

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**Our Mission: Deliver solutions that elegantly meet the demands of the project through collaboration, innovation, and exceptional engineering.**

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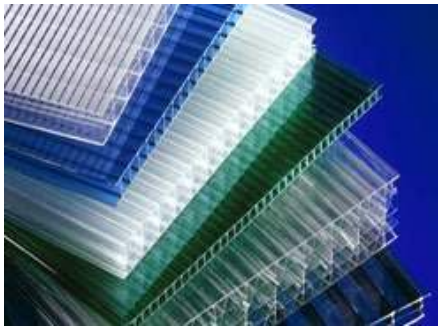
# WHAT IS STRUCTURAL CELLULAR POLYCARBONATE (SCP)?

Structural cellular polycarbonate (SCP) is a lightweight, impact-resistant, extruded thermoplastic glazing material used widely within the construction industry to reduce building operating and upfront material construction costs.

A key feature of polycarbonate is its translucency. SCP enhances daylighting while also ensuring good thermal insulation. It can be tinted to modulate color and light transmission, optimize shading, and provide the desired aesthetic goals of a project.

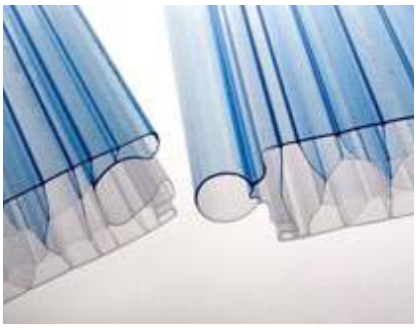
SCP was first developed in the 1950s by a team of researchers at General Electric, looking for a substitute for glass in aircraft canopies. Since its' early development, polycarbonate has become a popular choice for a wide range of architectural applications due to its many unique qualities.

An important innovation was the introduction of UV-resistant co-extruded absorbers, which protect polycarbonate from degradation caused by UV exposure from sunlight. This has extended the lifespan of polycarbonate products and made them more suitable for long term outdoor use. The co-extrusion of UV-resistant coatings can be extruded onto both the interior and exterior of a polycarbonate sheet. This co-extruded UV-resistant layer eliminates the need for future UV protective maintenance coatings and allows for warranties of up to 15 years to be offered.



Flat sheet

Standing seam



Tongue & groove

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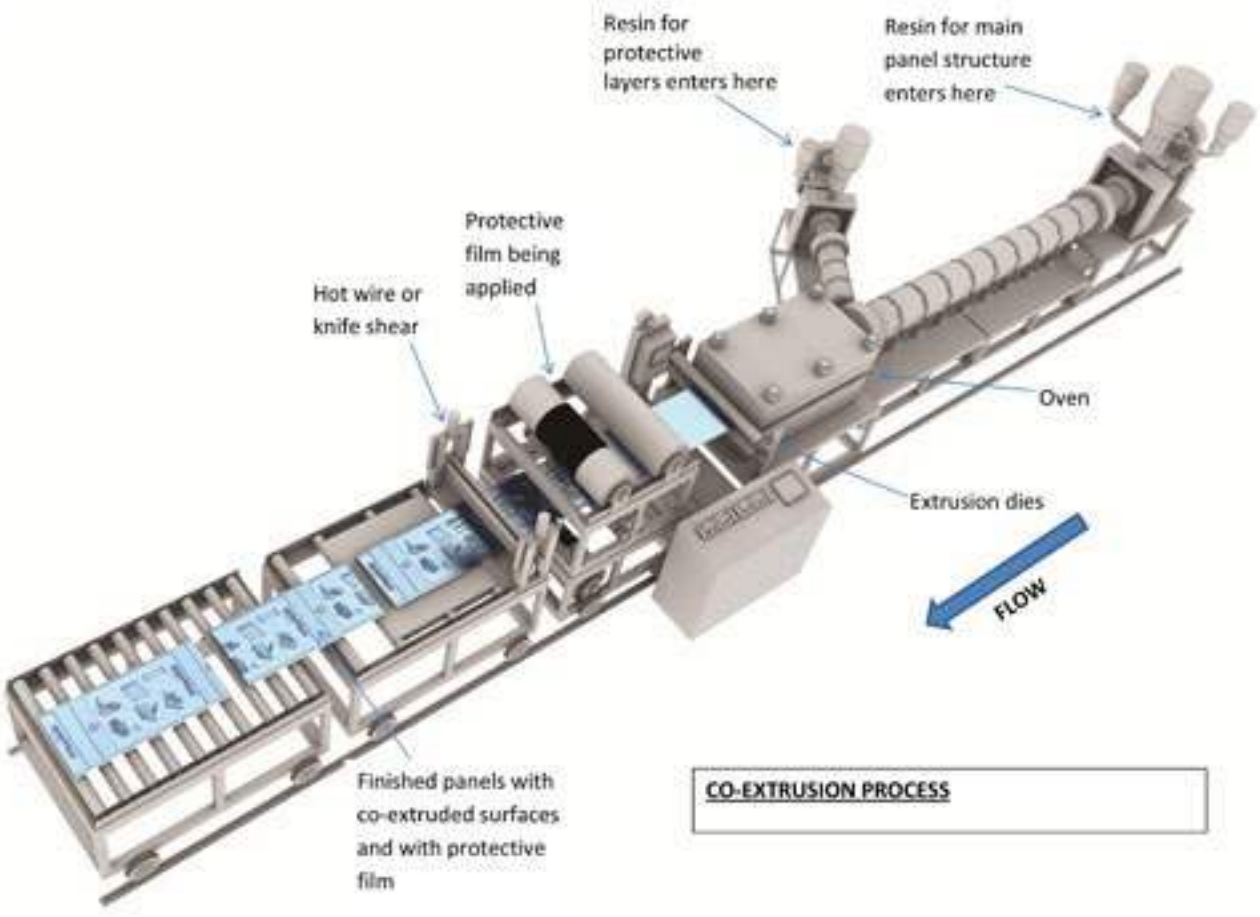
# SCP

While relatively new to the US market, SCP has been used extensively for many decades in European and South American countries from small residential projects to many large stadium coverings. Its recent advance in the US market is a result of the panel resins being formulated to pass US based building code testing. SCP is available in CC1, Class A per ASTM-84 fire core requirements.

Polycarbonate material can be up to 250X more impact resistant than annealed glass. While not as scratch or abrasion resistant as glass, the cell structure and co-extruded treatment reduce the visual effects of such abrasions.

The process of extruding multiwall polycarbonate involves very low energy consumption with reduced environmental impacts. The manufacturing of polycarbonate is a closed-loop process, where scraps and imperfections are recycled for different uses such as discs, flat sheets, and more.  SCP is 100% recyclable at the end of its life. The use of SCP can also qualify for LEED credits.

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# GLAZING DESIGN OPTIONS & VERSATILITY

SCP's durability, sustainability, and performance benefits offer architects and designers a range of aesthetic and performance options including various solar heat gain coefficients (SHGC), thermal U-values, visible light transmission (VLT), span/load capabilities, various sheens, bi-color panels, etc. The resins can also be tinted to achieve different colors, levels of transparency, and improved backlighting.

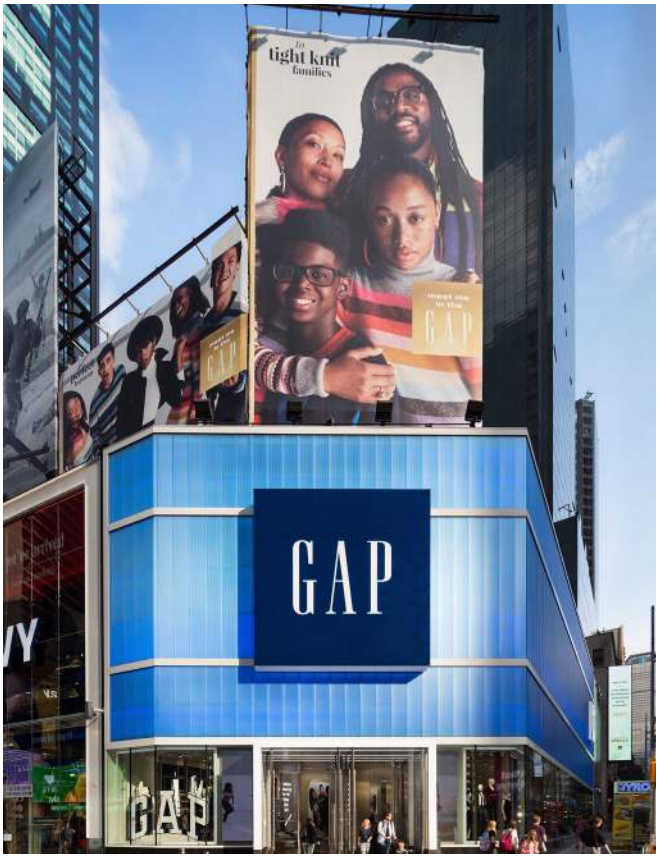
One of the most appealing features of SCP is its ability to let natural light into a space while still providing privacy, insulation, and soft, even illumination. This is especially useful for buildings that require a balance of natural light and privacy.

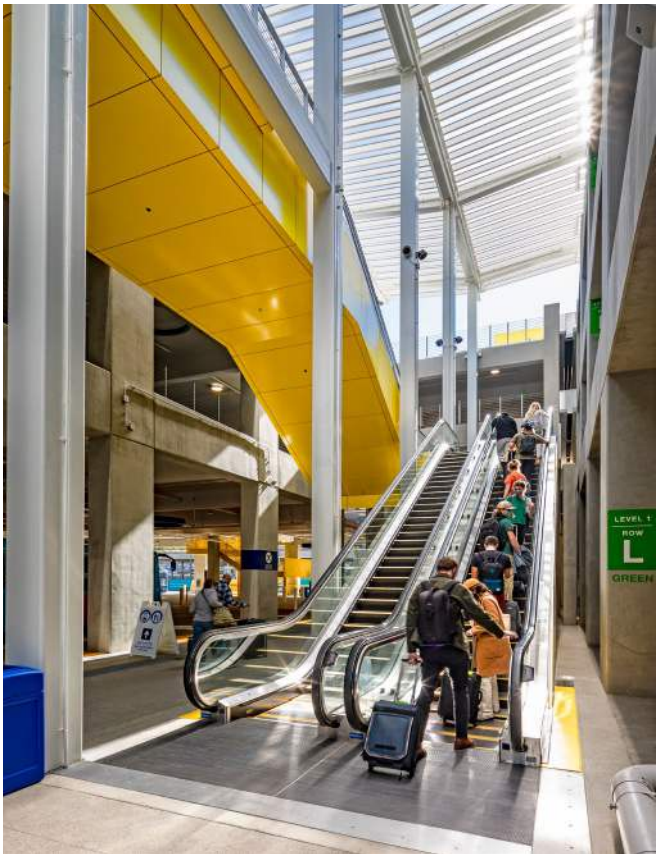
SCP glazing, while not as visually transparent as glass, allows for greater visibility and light transmission as opposed to other translucent glazing materials such as FRP (fiberglass reinforced polymer). This allows a great visual and emotional connection to the outside environment. This also enhances safety and security.

Unlike FRP, SCP cannot delaminate or fiber-bloom over time.

As SCP can be extruded in sheets up to 54' for transport, it allows design flexibility that no other glazing material offers. Long lengths also allow for the elimination of leak prone transverse joints in sloped or vertical applications.

SCP also allows for easy field cold bending applications unlike FRP or glass. Tighter radiuses can be achieved by heat forming.



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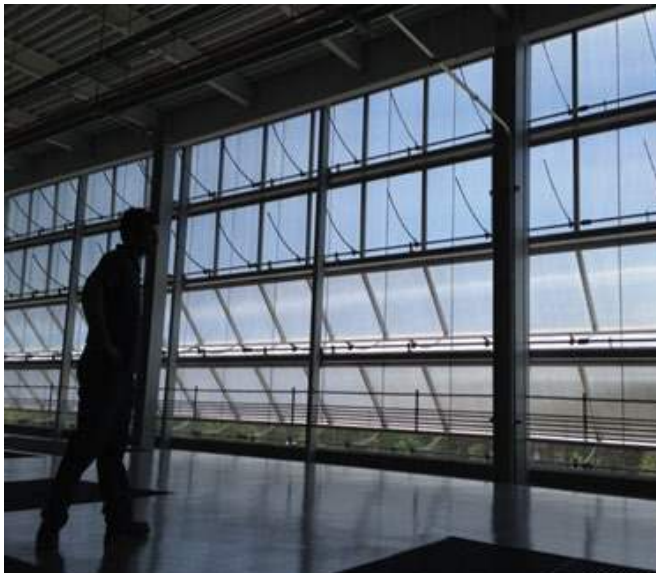

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# WHAT IS UNIQUE ABOUT SCP FRAMING SYSTEMS?

SCP's thermal movement must be carefully considered and engineered into every project. This thermal "respect" must be adhered to during design, engineering, fabrication, and installation. As an example, a 54' long sheet over a material design temperature range of 160 F will expand and contract up to 4".

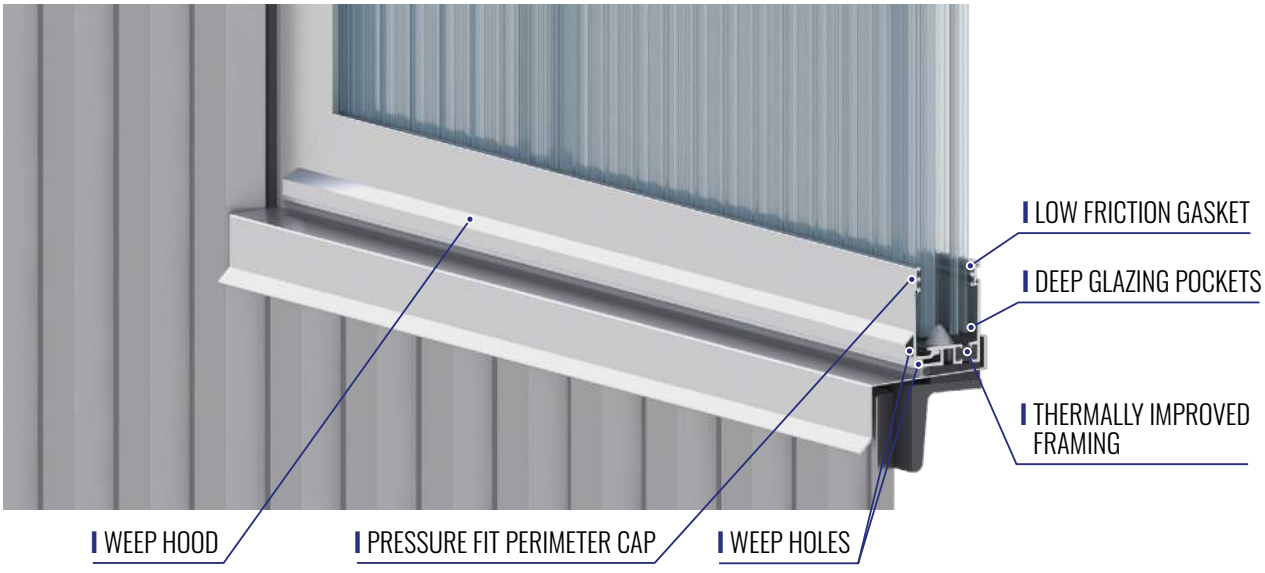
Fiber-bloomed FRP examples

EXTECH's frames are designed to respect this thermal movement, incorporating the following key features necessary for a successful system:

- Adequate rabbet depth
- Controlled pinning, when necessary
- Low friction gaskets
- Unrestricted lateral load clips, when necessary
- Controlled pressure capture
- Temperature considerations during engineering, production, and installation
- Proper weep design for internal water control AND to provide adequate ventilation of the cells.
- Proper cell vent taping

Temporary or occasional condensation may occur within panel cells because of rapidly changing environmental conditions. This is normal for cellular polycarbonate. Proper weep and frame design reduces the degree and frequency of this condition. To further mitigate this condition, EXTECH ventilates both ends of the cells. Vent taping also helps prevent organic material from entering the cells.

An EXTECH framing system for polycarbonate panels

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## HOW ARE EXTECH SCP SYSTEMS SUPPLIED/DELIVERED?

EXTECH delivers its framing and glazing prefabricated under controlled conditions to the greatest extent possible. This eliminates field labor often under adverse weather conditions and dramatically enhances quality control.

EXTECH delivers its systems crated and protected with each component labeled and delivered in the order of installation, as pre-coordinated with the installer. Complete installation instructions are included.

Often, depending on size and application, EXTECH will deliver fully pre-assembled panels, speeding erection.

SCP sheets are delivered with a protective peel coat that should be removed soon after installation to avoid long term exposure to the direct sun.

## HOW MUCH DOES SCP WEIGH?

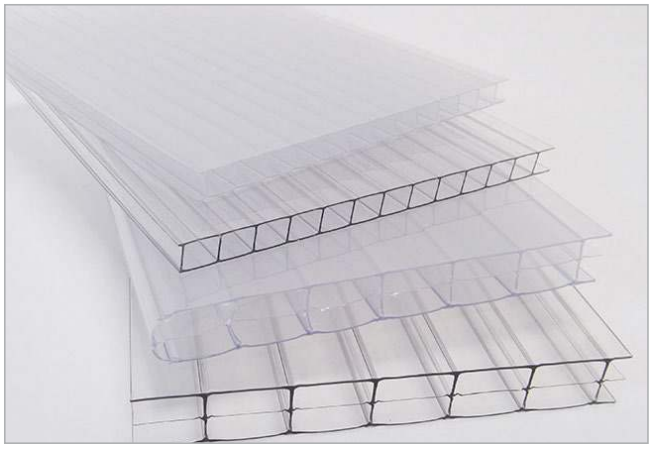
While SCP is available in an endless array of profiles, thicknesses, colors, and cell structures, it is rare for this glazing material to get above one (1) pound per square foot. In comparison, glass can be more than (11) eleven times heavier in the same application. This dramatically reduces fabrication, transportation, installation costs, and building structure costs.

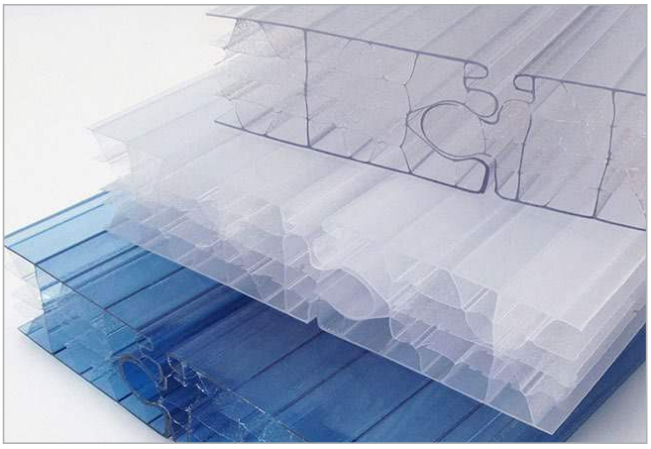
Because of its inherent flexibility, SCP is extremely forgiving when mounted over uneven substructures or where movement and deflection are anticipated. (i.e. large aircraft hangar doors or garage structures with differential floor deflections.)

## BIRD AND INSECT MITIGATION?

The internal cell structures of SCP – in combination with specialty matte/ IR/ AR finishes – reduce visual clarity, creating a broken pattern deterring bird strikes.

Because SCP is comprised of multiple cells, proper vent taping of the cell ends is necessary to deter insects, dirt and debris from entering the cells during transportation, fabrication and installation.





SCP panels do not pose a visual threat to birds

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## VANDALISM MITIGATION

While extremely impact resistant, SCP is not as scratch resistant as glass. Consideration should be given to its use and the environment in which it is installed. The cell structure, along with other available surface embodiments, reduce the visibility of abrasions. Should replacement be necessary, the lightweight nature of the material lessens time spent on replacement, often without heavy equipment as glass replacement may require.

## WARRANTIES

EXTECH can issue overall system warranties of durations as required in each specific contract. These typically range from one (1) to five (5) years. In addition, SCP panel warranties extend from 10 to 15 years. Frame finish warranties, such as anodized finishes, can extend up to ten (10) years while PVDF warranties can extend up to 20 years.

## MAINTENANCE & REPAIRS

SCP is resistant to many common environmental chemicals and ozone. For unique applications, such as certain industrial or manufacturing applications, SCP manufacturers have extensive chemical sensitivity tests that can be consulted.

Should cleaning be desired, a low-pressure wash using mild detergents can be used. Each specific manufacturer should be consulted.

Removal of graffiti will depend on the graffiti material used. Each specific manufacturer should be consulted. Removal typically starts with the most chemically compatible agent moving toward the most aggressive.

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