A Clear View

Polycarbonate manufacturers are working hard to develop new products that will not only help temperature control in the greenhouse but also slow yellowing and hail damage.

By Trisha Korioth

Lexan polycarbonate materials will allow this greenhouse in The Netherlands to produce more energy than it uses, enabling approximately a third of the heat generated to be sold as surplus. (Photos: GE Plastics)

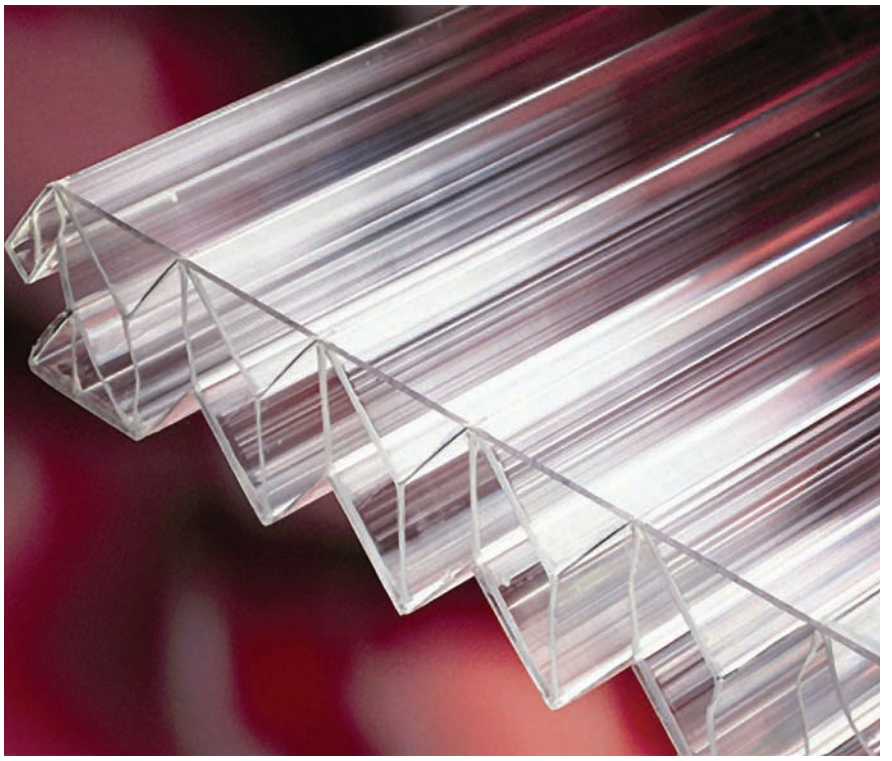
The word "polycarbonate" might conjure up thoughts of industrial-looking buildings with uneven light diffusion. But recent technologies have revolutionized this type of greenhouse covering, resulting in a desirable and customizable option for growers. Triple-layered walls, ultraviolet (UV) filtering coatings, strong corrugated single walls and new technologies that help growers control structure climate have recently emerged in the market. With all the new innovations, polycarbonate has developed into pretty stiff competition for some of the more traditional coverings such as glass, acrylic and polyethylene film.

The Polycarbonate Evolution

The changes to polycarbonate products have been an evolution of sorts throughout the past two decades, argued Stan Schultz, director of marketing for Palram Americas. "As far as polycarbonate in general goes, we're seeing a shift internally where we're finding new materials and new technologies developed to help us fine tune — kind of customize — the quality of light that gets transmitted through panels."

This has become especially important as energy costs continue to soar. "One of the main concerns is how to save energy," said Erin Hugget, Green-Tek's logistics provider to distributors and original equipment manufacturers for the horticultural market. "Greenhouse growers have to make sure they have the proper greenhouse with the proper covering with the proper heating with the proper fans so they are running their heaters and coolers efficiently and not more than they need to."

According to some manufacturers, polycarbonate is becoming an industry standard for rigid glazing ➧



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for a variety of reasons, including ease of handling during installation and cost-effectiveness as a rigid covering. Whereas other rigid glazes such as fiberglass and glass are prone to breakage during installation, polycarbonate products were developed to be picked up, rolled into a tube and carried easily. Polycarbonate is also typically easy to install with basic tools.

Light/Climate Control

New and improved ways to use different resins and additives in polycarbonate are being developed to control light transmission. These new polycarbonate products appeal mostly to retail garden centers that require plenty of light to maintain plant quality but also need to block the sun's heat rays to maintain comfort for customers.

ThermaGlas SLT. ThermaGlas is the name for all Palram's multilayer polycarbonate glazing panels. ThermaGlas triple-wall offers half as many vertical ribs as standard twin-wall products, which Palram says results in more clarity. In Palram's new product, ThermaGlas SLT, products are designed to selectively transmit or screen certain wavelengths of solar radiation to achieve benefits for specific environments or applications. "We achieve this through the use of advanced additives and coating in or on the panel," said Schultz. "Our first SolarSmart product, ThermaGlas SLT, is engineereed to absorb a large percentage of the sun's heat-giving rays while also transmitting a large proportion of the PAR light that the plants would typically use for growth."

Heat-reduction capabilities make ThermaGlas SLT suitable for retail garden centers. (Photo: Palram Americas)

Lexan Thermoclear Solar Control IR. Lexan Thermoclear Solar Control IR polycarbonate heat-management glazing from GE Plastics blocks near infrared heat but lets in high levels of light. According to GE, proprietary resin additives manage heat, and because solar control is inherent to the polymer, these properties are virtually permanent.

The product is designed to minimize near infrared transmission. It can provide 25 percent less infrared transmission than standard Lexan products and is available in a multi-wall sheet that can offer even lower solar transmission. UV protection is on both sides, facilitating installation.

"Controlling the temperature is going to be easier [with Solar Control] because heat from the sun is not going to affect you," said Carina Viola, an industry manager with GE Plastics who covers the building and construction industry sector for specialty film and shade.

DynaGlas SolarSoft. Another product of Palram's is DynaGlas SolarSoft, a single-layer, corrugated polycarbonate glazing panel engineered for commercial greenhouse use. According to Palram, it is the first corrugated panel to offer 100-percent light diffusion while also transmitting 85 percent of the sun's valuable light.

"Really, what that is designed to do is spread the light more evenly throughout the greenhouse," Schultz said. "You end up getting more light spread around and eliminating or reducing the effect of shadows."

Preventing Wear And Tear

GE Plastics has focused recently on yellowing by measuring the delta Y.I. (yellowness index) in its products in comparison to similar products. "In our case, it is going to be two," said Viola. "With two, it is really very, very slight," she said.

Viola said GE Plastics found that growers are using Lexan polycarbonate Thermoclear and Thermoclear Plus for walls or, in some cases, the whole structure. Lexan Thermoclear twin-wall sheet

is one of the heaviest twin-wall sheets in the industry, according to GE Plastics. The surface of the sheet is protected from the degradation effects of UV radiation by a proprietary co-extrusion process.

Thermoclear sheets are available with options such as Easy Clean, which is self cleaning. A unique coating reduces surface tension and increases the contact angle of water. Large droplets form, washing away dirt and allowing surfaces to remain cleaner longer than conventional materials, according to GE Plastics.

Use of polycarbonate products on structures in the United States is growing. Viola said slower uptake might be related to a misconception about polycarbonate's capabilities. Some growers may have used a polycarbonate product in the past without UV protection and experienced yellowing and problems with light transmission. "So because they didn't use the right product, they have the wrong interpretation about the multi-wall product," she said.

Schultz said Palram's corrugated products have been available for more than 20 years and have never had a claim for yellowing or loss of light transmission. The company's multi-wall products have been available for eight years and have not had claims for yellowing or loss of light transmission due to yellowing, according to Palram.

Two different types of technology provide UV protection and, hence, prevent yellowing of polycarbonate products: spray-on lacquer and co-extruded UV protection.

Palram has also had good performance against hail, said Schultz. "Polycarbonate has the very best impact performance out there in terms of protecting against hail," said Schultz. "We feel we are doing very well. I don't know of anything better for impact resistance."

"If you have hail, the material is not going to be broken," added Viola. "If you compare versus glass, you see there is a very good benefit," she said.

A Lasting Solution

It seems that polycarbonate products tend to last as long as or even longer than other greenhouse glazing options. Although polycarbonate's use in commercial greenhouses is strong in Europe and Canada, it has a ways to go in terms of popularity in the United States, said Viola.

Hugget said growers are becoming more aware of the light they are letting into their greenhouses and how that affects the overall environment and growth of plants. "Being aware of the light diffusion and aware of the energy savings of the product…is going to benefit their business."

Manufacturers remain positive that as new technologies evolve, polycarbonate will continue to gain momentum. "The cycle you have for replacing is going to be longer," said Viola. "In that case, the customer is going to have a cost savings, so I believe the market is going to grow with this." GPN

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