

EASTMAN

Eastman Spectar™ copolyester

Imagine the possibilities.



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Eastman Spectar™ copolyester is a plastic resin specifically designed for sheet applications. Its durability and clarity prove Spectar to be the ideal material solution for the retail and architecture markets.



*Spectar
copolyester application*

Sheet extruded from Eastman Spectar™ copolyester offers a combination of features and benefits you won't find with other materials.

- Outstanding toughness
- Impact resistance
- Flexibility for innovative designs
- Chemical resistance
- Sparkling clarity

- Best-in-class thermoforming characteristics
- Ease of fabrication
- Easy to print and decorate
- Odor free
- GREENGUARD Indoor Air Quality Certified®
- *Cradle to Cradle Certified™* Bronze
- FDA approved for food contact applications

Materials comparison chart

Criteria	Eastman Spectar™ copolyester	IMA	Acrylic	PC	PS	PVC
GREENGUARD certification	✓	✘	✘	✘	✘	✘
Impact strength	●	○	○	●	○	○
Edge clarity	○	○	●	○	○	○
See-through clarity	●	●	●	●	●	○
Heat bending	●	○	○	○	○	●
Flexibility	●	●	○	●	○	○
Thermoforming	●	○	○	○	○	○
Chemical resistance	●	○	○	○	○	●
Minor scratch removal	●	○	○	○	○	○
Downgauging possibilities	●	○	○	●	○	●
Die cutting	●	○	○	●	○	○
Machining	●	○	○	●	○	○
Ease of bonding	○	●	●	○	●	○
Flammability	○	○	○	●	○	○
Surface hardness	○	○	●	○	○	○
Low odor during fabrication	●	○	○	●	○	●

✓ = Yes ✘ = No ● = Best ○ = Good ○ = Average ○ = Fair

Facts about Eastman Spectar™ copolyester

The advantages of Spectar enable effortless fabrication and inspired design. Spectar is the material of choice for distinctive applications at lower overall cost.

Durability

Spectar copolyester is a tough, brilliantly clear material that exceeds performance expectations.

- Up to 18 times tougher than acrylic and 2 to 5 times tougher than impact-modified acrylic sheet
- Easier to fabricate than polycarbonate
- Incredible impact strength minimizes safety and liability concerns.
- Reduced shipping and installation breakage and reduced packaging required
- Perfect in heavy-traffic areas and ideally suited for high-turnover products

Flexibility

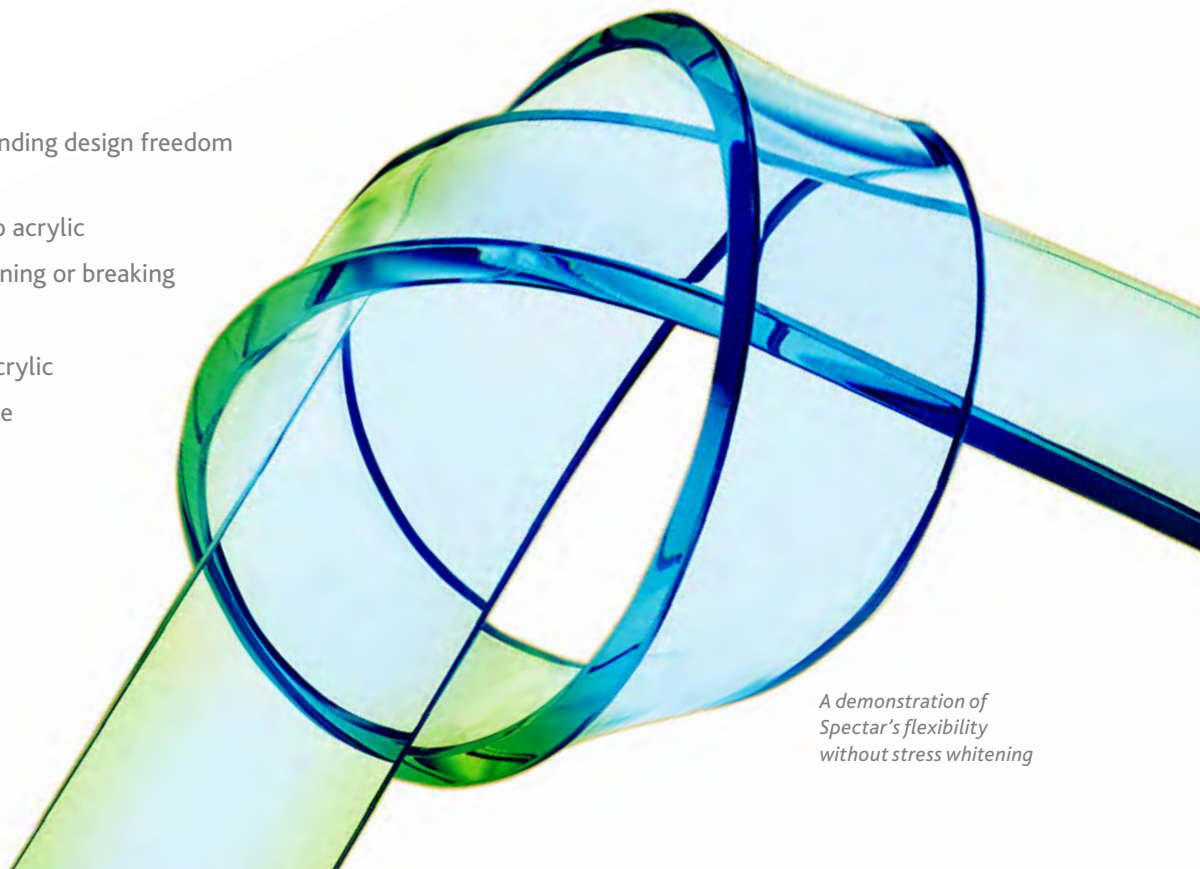
The flexibility of Spectar enables outstanding design freedom and intricate design options.

- 30% faster hot-line bends compared to acrylic
- Easy to cold bend without stress whitening or breaking
- Deep draw capabilities
- Thermoforms 30%–50% faster than acrylic
- Can produce unique shapes not possible with glass or acrylic

Sustainability

Specifying applications made with Spectar allows you to push the envelopes of creativity and sustainability. Manufactured without bisphenol A (BPA), halogens, lead, and mercury, Spectar is GREENGUARD Indoor Air Quality Certified® and is also *Cradle to Cradle Certified™* Bronze by the Cradle to Cradle Products Innovation Institute.

- Cradle-to-pellet carbon footprint is 50% less than acrylic and polycarbonate.
- Allows roughly 20% downgauging
- Toughness translates to longer life, less replacement costs, and less plastic waste.
- Cleared for use in food contact applications by the United States Food and Drug Administration (FDA)
- Regrind is reusable in virgin stream, resulting in material savings without sacrificing quality.



A demonstration of Spectar's flexibility without stress whitening

Working with Eastman Spectar™ copolyester

Fabricating and forming

Spectar sheet is uniquely suited to a variety of fabricating and forming operations. It can be formed at low temperatures without predrying, heats and cools rapidly, and processes with impressive consistency. This all translates into major labor, energy, and capital savings. Using the following methods, you can create intricate, precisely fabricated, eye-catching designs.

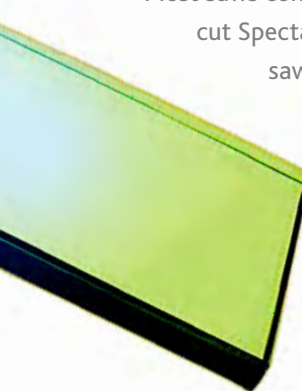
Thermoforming

Spectar sheet can be thermoformed on virtually any horizontal thermoforming equipment without the need for predrying. Very deep draws can be achieved due to its wide thermoforming window. And Spectar sheet maintains both optical and physical properties after thermoforming.

The most common thermoforming techniques include line bending, free forming, and vacuum forming. Line bending and free forming limit the variety of shapes that can be produced from Spectar sheet. There is, however, virtually no limit to the variety of shapes that can be created through vacuum forming.

Sawing

Most saws commonly used for wood or metal should satisfactorily cut Spectar sheet. These include circular saws, band saws, saber saws, jigsaws, hacksaws, or handsaws. Circular saws and band saws usually produce the smoothest, cleanest cuts.



Welding

Technology has been developed that allows plastic sheet fabricators to obtain clear, strong bonds by welding with a rod of Spectar sheet material. The technology can be used to bond Spectar sheet to itself or to other plastic sheet materials.

Cutting

Spectar sheet can be laser cut using the same equipment used for cutting acrylic. Laser cutting Spectar is an effective way to create complex pieces with glossy, polished edges. Spectar can also be die cut, sheared, and punched when proper tools and techniques are used.

Routing

Routing with sharp, two-flute, carbide-tipped straight cutters produces very smooth edges on Spectar sheet. Twisted two-flute cutters also work exceptionally well. And depending on the application, spiral-cut router bits have been found to work successfully.

Polishing

Spectar sheet can be polished using a variety of techniques such as mechanical polishing, flame polishing, or solvent polishing. This fabrication method is very technique dependent with best results being achieved when a uniform rate of movement is used.

Edge finishing using mechanical polishers is best done by starting with as flat an edge as possible. Use fairly light pressure on the part and be sure to keep a constant feed rate across the polishing surface.

For best results when flame polishing, use a butane or propane flame after the sawed edge has been deburred, jointed, routed, or diamond polished. Flame treatment can embrittle the sheet edge.

To solvent polish Spectar sheet, use methyl ethyl ketone (MEK) or methylene chloride. Be sure to avoid spillover and poor technique. This method of polishing is more difficult than mechanical or flame polishing Spectar sheet.

Mechanical fastening

Because of its outstanding toughness, Spectar adapts to mechanical fastening more readily than some other materials. This method is useful when assembling or installing large or heavy parts, or when a suitable solvent or adhesive system is not available.

Drilling

Spectar sheet can be readily drilled using a standard drill press or handheld drill. The drill bits should be sharp and clean and designed for use with plastic.

Bending

Cold bending can be used to produce simple shapes from sheet of Spectar. When brake forming, the maximum amount of bend will depend on the sheet thickness and rate of deflection. The most attractive bends are obtained with thicknesses less than 3.0 mm ($\frac{1}{8}$ in.). An electric strip heater set at optimum sheet temperature may be used for hot bending.

Line bending can also be used with sheet of Spectar. To line bend, heat the sheet on one side along a straight line, bend to the desired angle, and hold in place until the part has cooled and the new shape is set.

Bonding

Solvent bonding is generally preferred when joining components made from Spectar copolyester. Use of proper solvent, good technique, and cure time should result in a clear, haze-free joint that is strong and durable. When joining dissimilar materials, the use of adhesives is often recommended. The adhesive selection must be compatible with each material involved.

*Thermoformed
Spectar dog bowl*

Decorating

There are literally hundreds of commercially available inks and paints that can be used to decorate sheet of Eastman Spectar™ copolyester. When choosing ink or paint, consideration should be given to the fitness-for-use requirements of the decorated parts.

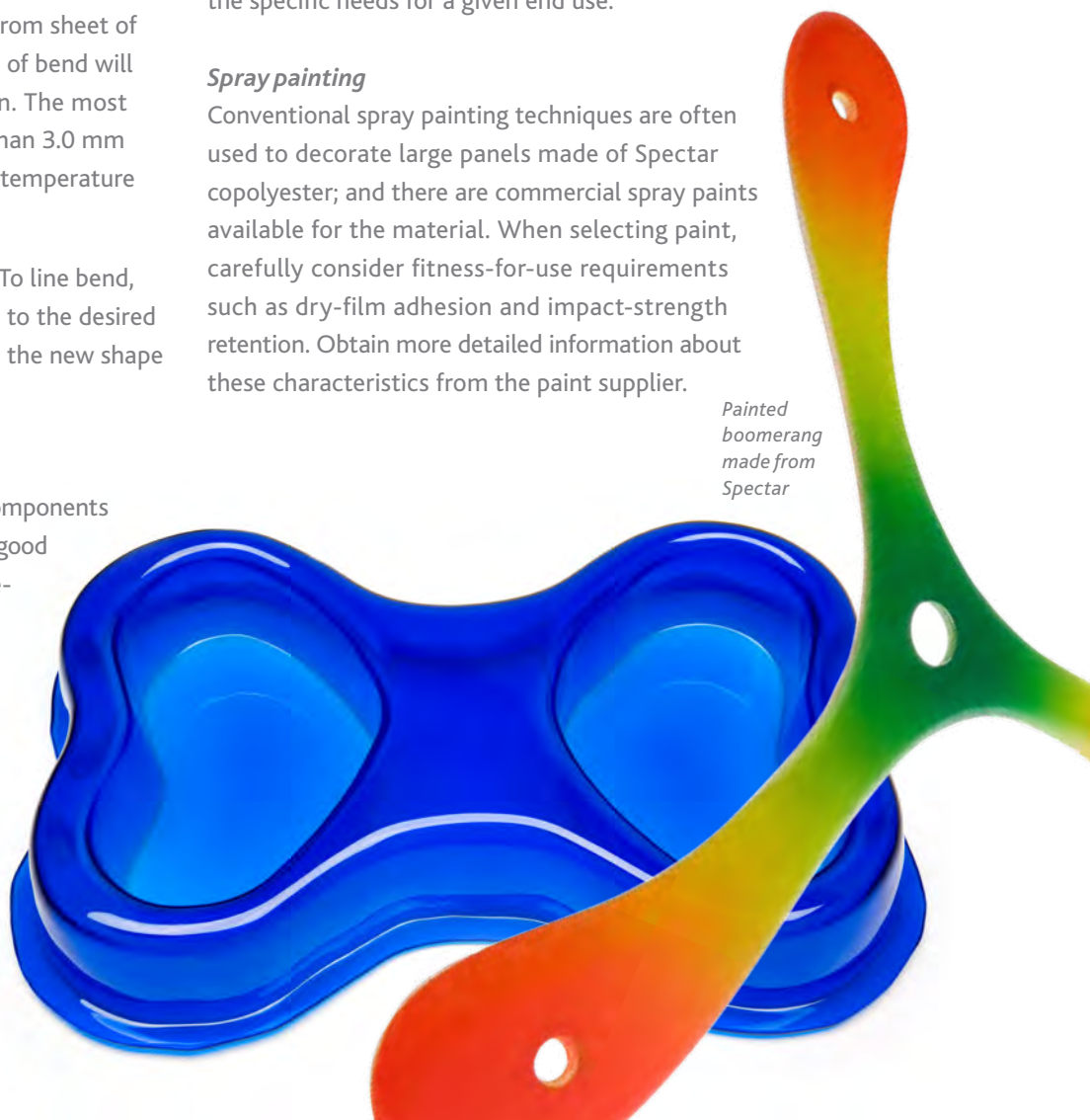
Printing

Many printing processes can be used with Spectar sheet. The recommended process depends largely on the configuration, production volume, and fitness-for-use requirements of the finished part. Specifically formulated inks are available to meet the specific needs for a given end use.

Spray painting

Conventional spray painting techniques are often used to decorate large panels made of Spectar copolyester; and there are commercial spray paints available for the material. When selecting paint, carefully consider fitness-for-use requirements such as dry-film adhesion and impact-strength retention. Obtain more detailed information about these characteristics from the paint supplier.

*Painted
boomerang
made from
Spectar*



Spray masking

Traditional spray masking materials work well with Spectar sheet. Compared with acrylic or polycarbonate, it may be easier to cut away the masking since parts formed from Spectar generally exhibit crisper forming details to guide the knife.

Hot stamping

Hot stamping can be used to transfer copy, trademarks, and other design elements to flat, smooth surfaces of Spectar sheet. Various foil and transfer decals have been used successfully.

Vinyl decorating

Benefits of vinyl decorating include uniform color distribution and correct color matches. Vinyl can be applied to first and second surfaces of Spectar sheet prior to forming. The compatibility of Spectar sheet with vinyl can allow thicker gauge sheet to be used than with polycarbonate without fear of damaging the vinyl. Because Spectar forms at lower temperatures, it may be used with less concern about overheating preapplied inks or vinyl films.



Splat lighting featuring Spectar Stratus



Spectar shelving

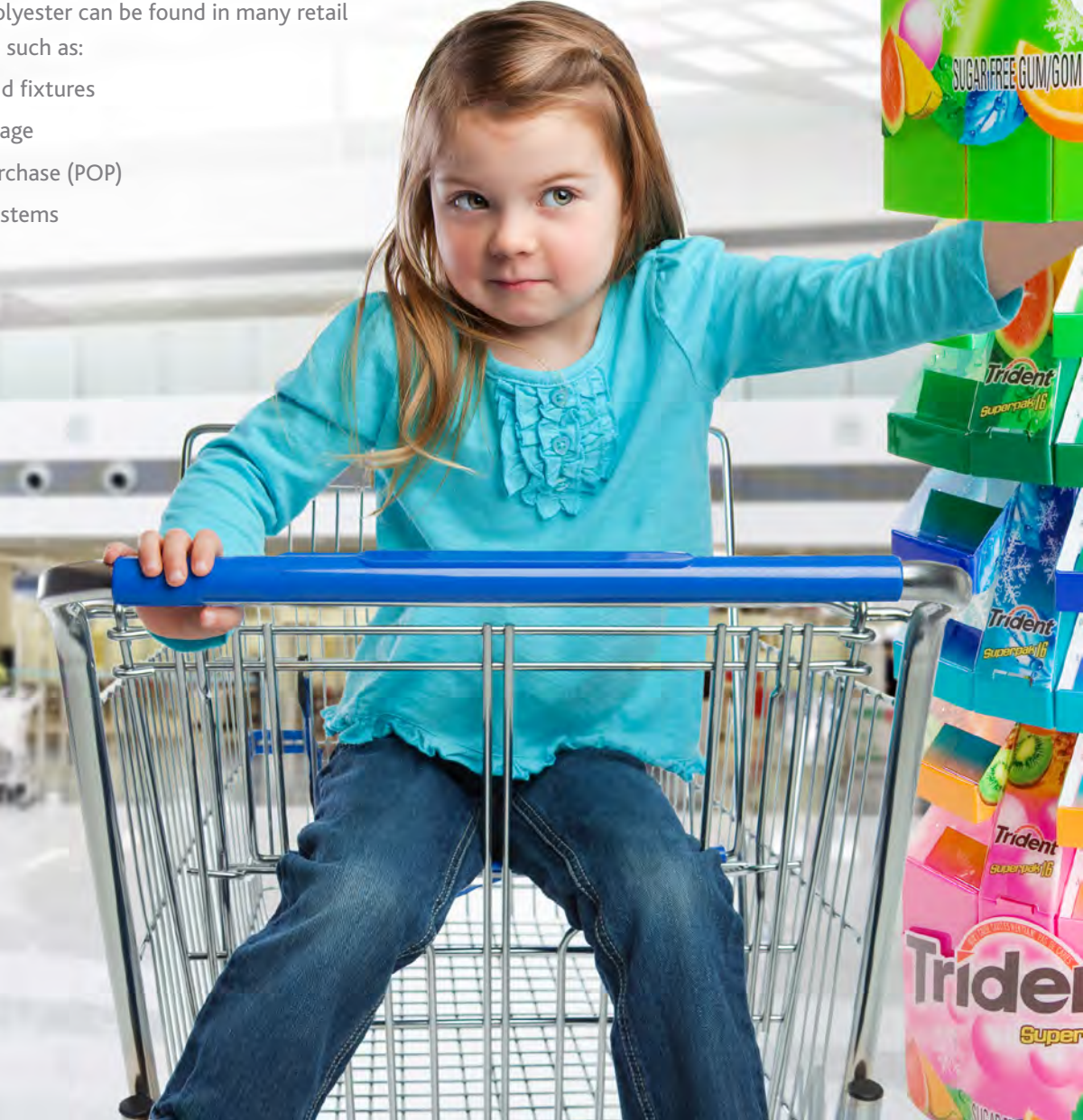
Markets

Retail

Sheet made of Eastman Spectar™ copolyester is the answer to breakage and cost concerns associated with glass or acrylic store fixtures and displays. The sparkling clarity and durability of Spectar make it ideal for showcasing products in a harsh retail environment. And the design possibilities are limited only by your imagination.

Spectar copolyester can be found in many retail applications, such as:

- Displays and fixtures
- Indoor signage
- Point of purchase (POP)
- Shelving systems



Architecture

Few building materials offer designers and architects more freedom than plastics. Formed in a limitless array of shapes and colors, plastics are lightweight and easy to install. They can promote energy efficiency—in structures and in processes alike. And they can be made into highly durable, highly appealing installations that can withstand the wear and tear of heavy use. Spectar copolyester can help you build something beautiful, sustainable, and truly remarkable.

You'll find Spectar in a variety of architectural applications, including:

- Lighting diffusers—commercial and industrial
- Skylights
- Decorative walls and partitions
- Wall protection, handrails, and corner guards
- Decorative laminates



Spectar FR1000 on walls and railings

The Spectar family of products

Eastman offers a family of Eastman Spectar™ copolyesters to meet your specific market needs.

Eastman Spectar™ copolyester

Spectar gives you the strength to create and worry less about breakage. While the toughness of Spectar allows the use of thinner gauge sheet compared to other common materials, it can be extruded into sheet as thick as 12 mm (½ in.). Spectar can be finished easily; and it forms clear, strong bonds with commercially available cements and solvents.

Eastman Spectar™ FR1000 copolyester

Spectar FR1000 is a concentrate that can be added to Spectar to produce extruded sheet and profiles that meet ASTM E-84 requirements for a Class A flammability rating for interior finish applications. These applications include wall protection panels, corner guards, and handrails typically installed in offices, hospitals, hotels, and schools.

Key attributes:

- Chemical resistance
- Class A flammability rating (ASTM E-84)
- Compliant with regulations restricting BPA, halogens, and certain heavy metals
- Longevity of product life
- Stain resistance

Eastman Spectar™ copolyester has passed the National Fire Protection Association's (NFPA) 286 flammability test required by regional and national building codes.



Spectar Frost appearance effect



Original image

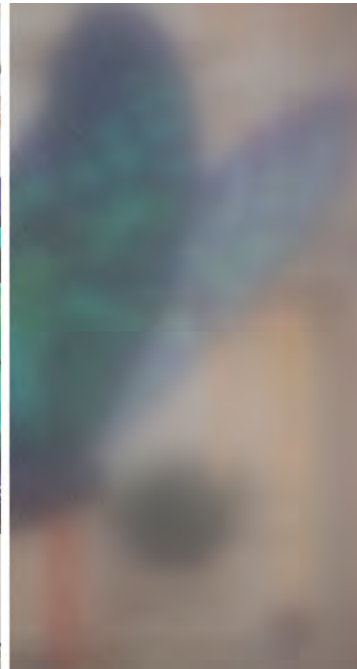


Image with Spectar Frost overlay

Eastman Spectar Frost™ copolyester

Spectar Frost has a matte finish with outstanding durability and toughness. It retains its matte finish after fabrication processes and may be cut, sawed, routed, and drilled easily with very low risk of chipping.

Key attributes:

- Lasting visual appeal
- Significantly reduces surface light reflection
- Excellent toughness and durability
- Design freedom

Thermoformed
sample showing
Spectar capabilities



Eastman Spectar™ Stratus copolyester

Spectar Stratus was formulated specifically for the lighting market. It exhibits excellent diffusion, high transmission, and superb processability. Light diffuser sheets made with Spectar Stratus can be extruded or injection molded and are designed to handle the intensity that LEDs bring to the industry. Best of all, Spectar Stratus allows optimum light output while “hiding” the light source.

Key attributes:

- High light transmission
- Outstanding hiding power
- Durability
- Design flexibility
- Simple processing

Eastman Spectar UV™ copolyester

Spectar UV is a UV-protected Spectar material that exhibits low color shift and retains its impact resistance even when exposed to the sun.

Key attributes:

- UV absorption for long-term outdoor use
- Low color shift
- Impact resistance retention
- Easy to print and decorate



If you would like more information about Eastman Spectar™ copolyester, visit www.eastman.com/Spectar or contact your Eastman representative.

Cradle to Cradle Certified™ is a certification mark administered by the Cradle to Cradle Products Innovation Institute.

EASTMAN
The results of **insight™**

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