

# Safety in the Sun with Flexible, Colorful LUKI Children's Eyewear Featuring DuPont™ Hytrel® TPC-ET

Children's sunglasses have a practical function—protecting the eyes against damaging ultraviolet (UV) light. But kids typically regard them as toys. Exuberant youngsters can be tough on the frames, subjecting them to twisting, tossing and dropping. That's why the best sunglasses combine durability and resilience with kid-friendly colors and a soft, comfortable feel.

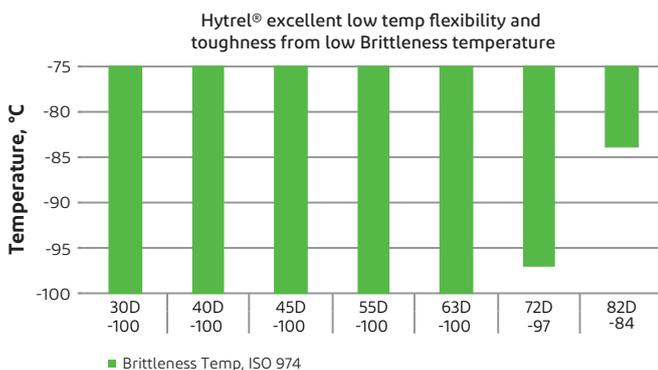
To meet these needs and offer high-end children's sunglasses, the LUKI Kids Eyewear brand was created. These sunglasses are designed specifically for children from infants to pre-teens, while maintaining the brand's goals of safety and style.



## The Challenge: Flexible Yet Stylish Frames

The development of the children's eyewear met with some initial design challenges. One was finding a material that would provide sufficient flexibility for the frames. After children repeatedly bend, twirl or flex the temples (arms) of the frames, these parts need to be able to recover without becoming loose or deformed (exhibiting flexural fatigue).

Identifying an appropriate polymer for the frames posed a significant dilemma. The current thermoplastic the company was using for its adult eyewear (a polyamide) was too rigid for children's eyewear. With this material, there was an increased chance of the frames breaking due to the typical rough handling of children. Broken frames could result in facial or eye injuries. On the other hand, conventional thermoplastic elastomers (TPEs) and thermoplastic urethanes (TPUs) were too soft to hold the lenses in place.



Therefore, the company sought a thermoplastic material that was sufficiently soft and flexible to bend but not easy to break under stress. Yet the material needed to be stiff enough to secure the lenses. It also had to be free of bisphenol A (BPA) to allay parental concerns about potential health risks.

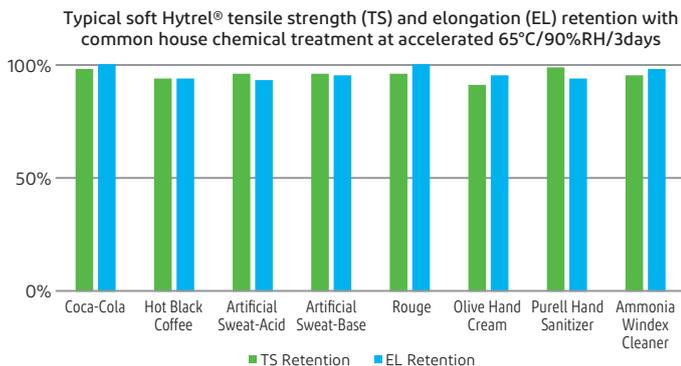
In addition to safety, the company wanted the LUKI glasses to be stylish and fun to wear. To please young fashionistas, the frame material needed to provide easy colorability and a high-quality surface finish without the need for secondary painting.

Consistency of supply was another challenge the manufacturer had to overcome. When they finally settled on a material that met all their requirements, it was imperative that the supplier provide a material with consistent performance, including reliable durometer properties. Lot-to-lot variation could cause manufacturing and performance problems and threaten the brand's high-quality image.

## The Solution: Hytrel®, A Better TPC-ET

After carefully assessing their options, the eyewear manufacturer turned to DuPont, their longstanding supplier, and ultimately chose DuPont™ Hytrel® thermoplastic polyester elastomer (TPC-ET) as the best candidate for the LUKI frames. Two grades of Hytrel® TPC-ET with different Shore D hardnesses were ultimately selected by the customer to meet the needs of different LUKI designs for specific age groups (softer for younger children and babies, stiffer for older kids).

The Hytrel® materials chosen for the children’s eyewear meet all the manufacturer’s safety requirements. The grades are durable, resilient, non-BPA co-polyesters that feature high resistance to impact, creep and flexural fatigue. With excellent chemical resistance, they stand up to just about everything kids send their way, from soda to sunscreen to sweat.



From a design perspective, the Hytrel® TPC-ET materials come in a natural color, enabling the manufacturer to custom color the frames using masterbatches. The design flexibility and the resulting attractive surface finish without secondary operations contribute to the fashion-forward look of the LUKI sunglasses.

The processing capabilities of Hytrel® TPC-ET are also well-suited for this eyewear application. The material’s good flow properties support design freedom and enable easy processing using injection molding or extrusion. These grades can also help control system costs, due to fast cycle times. As a thermoplastic elastomer, Hytrel® can be 100% recycled. With the unusually good melt stability, Hytrel® can be reground and blended with virgin polymer at a level up to 50% following recommended processing guide. Further, the flexibility of the TPC-ETs makes it easier and faster to assemble components of the eyewear, such as the nose pieces.

In addition to finding the right material, the eyewear manufacturer also benefited from DuPont’s consistent high quality of supply, material expertise and technical services in design, computer-aided engineering (CAE) analysis and molding trials to optimize injection molding.

Because new styles of LUKI sunglasses are designed and produced every year, DuPont experts continue to add value by providing ongoing technical and design support, including mold flow analysis and on-site molding trials. Currently, the company is leveraging the DuPont Innovation Center in Shanghai, China, to achieve thinner, lighter frame designs using Hytrel® materials.

## The Success: Kids (and Parents) Love LUKI

Creation of the LUKI brand has yielded important business benefits for the manufacturer, including access to a younger population. This represents a new, high-end market sector for the company, with significant global growth opportunities and increased positive visibility. Parents appreciate the safety, protection and durability of LUKI glasses, while their children love the vivid colors and clever designs.

“DuPont’s technical expertise, together with their advanced Hytrel® materials, plays a key role in our business, which is expanding globally thanks to the popularity of our LUKI product line,” said Eason Lin, company spokesperson. “Although we had the option to use local sources of TPC-ET, we chose Hytrel® resin from a trusted source to ensure consistent quality and superior performance. As a loyal customer, we rely on DuPont for its unwavering commitment to safety, reliability and customer centricity. The DuPont brand gives our customers high confidence in the overall quality of our products.”

Thanks to its desirable combination of properties, Hytrel® TPC-ET grades are also popular choices for sporting goods such as footwear, winter sports binding components, fitness products, protective equipment and wearable fitness trackers.



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