

## Ultra Low Density SMC

<b>Resin:</b>	Proprietary unsaturated polyester
<b>Composite Applications:</b>	Sliding sunshade (for sunroof opening)
<b>Dimensions:</b>	36 by 18 inches (91.4 by 45.7 centimeters)
<b>Nominal Thickness:</b>	0.089 inch (2.25 millimeters)
<b>Weight:</b>	2.75 pounds (1.25 kilograms)
<b>Nominal Composite Density:</b>	1.05 (grams per cubic meter)



Sheet molding composite (SMC) charts new technological territory with a revolutionary new ultra-low density (ULD) SMC that Continental Structural Plastic Industries developed with help from automotive composite resin leader AOC.

CSP's proprietary ULD-SMC is specified over reaction injection molded (RIM) urethane foam for sunshades on sunroof-equipped Ford light trucks. The part covers the 36 by 18 inch (91.4 by 45.7 centimeter) opening for the vehicle's sunroof but weighs only 2.75 pounds (1.25 kilograms). Nominal thickness of an unribbed section is 0.089 inch (2.25 millimeters).

John Berwald, Advanced Engineering Manager, says the sunshade is molded with a custom AOC unsaturated polyester.

"AOC worked directly with the CSP team who developed ULD-SMC in our research facilities," he says. "We needed just the right resin chemistry to make it work, and AOC came through for us."

According to Berwald, the AOC base resin system is engineered to provide a consistent thickening response that is key to maintaining the process window for manufacturing quality ULD-SMC. AOC also engineered the resin to meet stringent specifications for low shrinkage, uniform color and excellent adhesion of the headliner to the molded substrate.

"With AOC's help our new ULD-SMC crosses a new threshold for automotive SMC and rejuvenates our sunshade business," he says. "This material surpasses the current industry standard for lowering SMC density while still meeting performance requirements."

# Ultra Low Density SMC,continued

"With AOC's help our new ULD-SMC crosses a new threshold for automotive SMC and rejuvenates our sunshade business," he says. "This material surpasses the current industry standard for lowering SMC density while still meeting performance requirements."

The AOC resin technology contributes to the composite's flexural modulus, dimensional stability and heat resistance - properties that are critical to part performance. The ULD-SMC's dimensional stability allows the part to be molded to very close tolerances that ensure a tight fit when the part is closed over the sunroof opening. The CSP material resists warping and maintains close tolerances as the part is subjected to extreme thermal cycling in the field.

Even with 31% chopped glass fibers by weight, CSP's new ULD-SMC has a nominal specific gravity of only 1.05 (grams per cubic meter). By comparison, a conventional SMC with 27% glass by weight has a density about 1.9. The lower density translates into a lower inertia that prevents the sunshade from shifting during high rates of acceleration or deceleration. Lower density also means reduced weight for improved fuel economy and engine performance.

## Advantages Over RIM

A significant advantage of ULD-SMC over the fiberglass mat-reinforced RIM urethane is the SMC's ability to use detailed molded-in rib structures to increase part stiffness. In contrast, a RIM version of the sunshade would need to encapsulate metal strips for stiffness. Using metal strips would add a processing step and contradict the objective of turning to plastics to reduce weight.

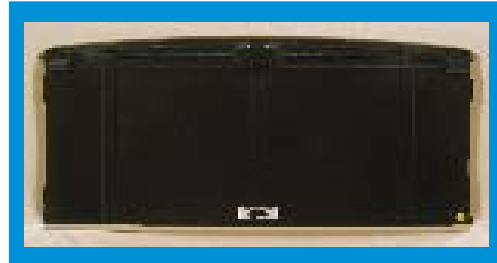
"In addition to design flexibility, ULD-SMC provides the benefit of improved dimensional stability over fiberglass mat reinforced RIM urethane," says Allman. "This is significant as our customers continue to demand tighter tolerances for our products to support their objective to build higher quality vehicles."

The sunshade (designated Part Number UN-93) is compression molded in CSP's Hartford City, Indiana, composites molding facility. Post-finishing steps include the application of the headliner, pull cup, Velcro and label.

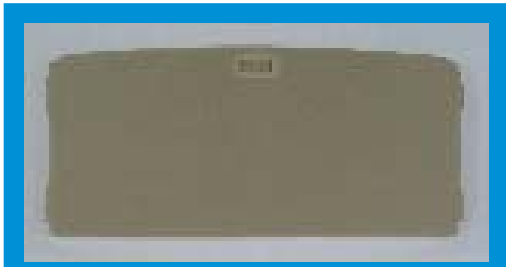
Parts are then shipped to Ford assembly plants in Michigan, Kentucky, Virginia and Missouri.



Rib Detail



Back View



Front View

The sunshade is installed on sunroof-equipped Ford Expeditions, Super Duty F-Series 350s and 250s, F-150s, and Lincoln Navigators.

## About Continental Structural Plastics

With world headquarters in Troy, Michigan, Continental Structural Plastics is a premier global platform supplier and is the world's leading supplier of automotive integrated plastic systems. For more information on CSP contact John Berwald, Advanced Engineering Manager for Continental Structural Plastics at (440) 812-8289, email: [John.Berwald@cspplastics.com](mailto:John.Berwald@cspplastics.com), or visit [www.cspplastics.com](http://www.cspplastics.com)

## About AOC

Headquartered in Collierville, Tennessee, USA, AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic systems for composites and cast polymers. AOC is the world leader in innovative resins for automotive composites. For more information on AOC materials and the industry's best technical support, phone Steve Martin at (901) 854-2847, E-mail: [smartin@aoc-resins.com](mailto:smartin@aoc-resins.com), or visit [www.aoc-resins.com](http://www.aoc-resins.com).