

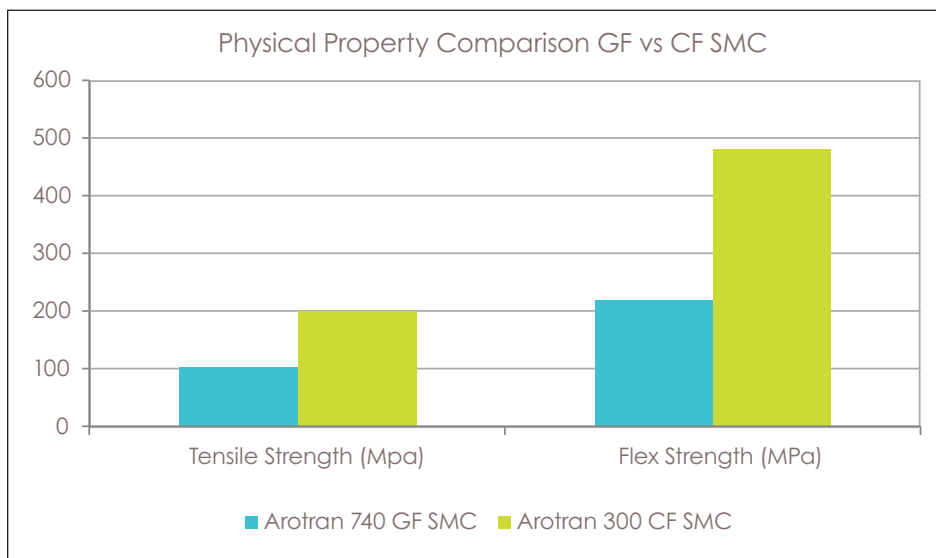
Arotran™ 300 carbon fiber SMC resin system

Carbon fiber SMC parts are now available

The automotive industry needs to quickly meet the National Highway Traffic Safety Administration's (NHTSA) Corporate Average Fuel Economy (CAFE) standard requirements. While the goal of CAFE is to continue to reduce energy consumption by increasing the fuel economy of cars and light trucks, NHTSA's new standards rapidly increase over the next several years. That rapid increase in fuel economy requirements is driving OEM's to design and produce lighter vehicles. According to the U.S. Department of Energy's Vehicle Technologies Office, a 10% reduction in vehicle weight can result in a 6% to 8% fuel-economy improvement. However, traditional lower-density sheet molding compounds (SMC), may not provide sufficient strength and toughness for structural applications.

The Arotran 300 resin system was developed to address the automotive industry's need for light-weight, high-strength resin systems utilizing carbon fiber. Parts made with this resin technology will produce carbon fiber SMC structural composites with very high mechanical properties. The resin system is based on epoxy vinyl ester chemistry and nano-composite technology. Mass reduction, low tooling costs, noise reduction, heat and corrosion resistance are all deliverables with the use of Arotran 300 resin system in structural applications.

Ashland's Arotran 300 carbon fiber based SMC resin system has significantly higher tensile and flex properties as compared to glass-fiber materials.

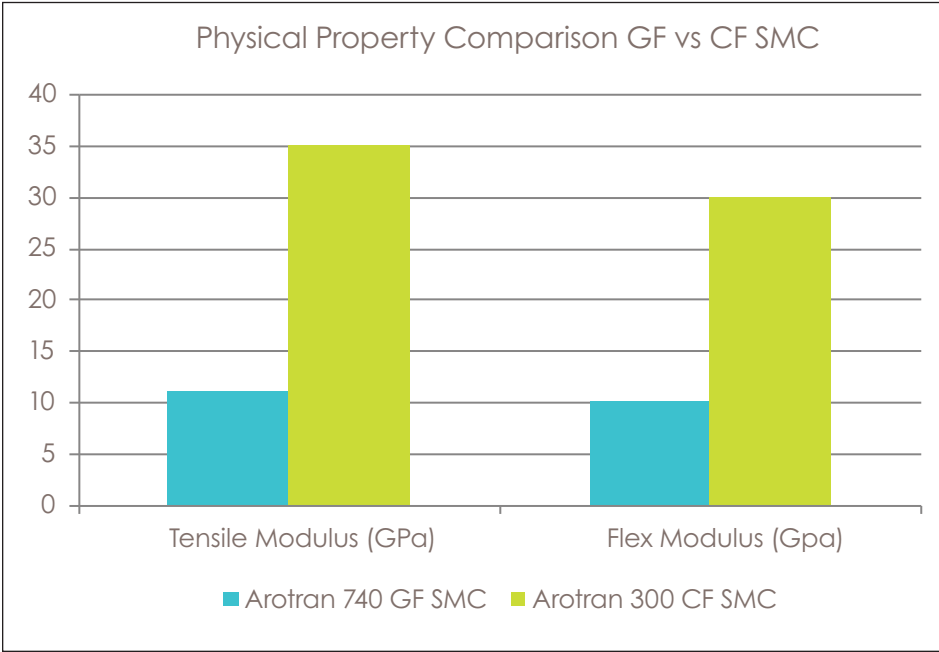


Applications:

- Deck lid inner
- Bumper impact beam
- Cross-member
- Drive shaft
- Leaf spring
- Wheels
- Wiper-system carrier
- GOR/GOP/headlamp support
- Closure inners
- Oil pans

Benefits:

- Low mass
- Excellent strength to weight ratio
- Corrosion resistance
- Design flexibility



Worldwide resources dedicated to helping the automotive industry design and manufacture the cars of tomorrow.

From door panels to deck lids and valve covers to heat shields, Ashland's products and technical abilities will help in the manufacture of lightweight parts. While primary research and development activities are based in the United States, we also maintain product development teams in Asia and Europe to ensure we develop solutions suited to our global customer base.

Ashland's technical service team has an industry-leading reputation for solving problems and helping customers improve processes. We will work closely with our customers to understand specific application challenges and recommend the best product to meet business objectives. Whether focused on product design, process optimization or new product development, Ashland prides itself on building partnerships that lead to innovative solutions. Visit ashland.com/transportation to learn more.

North America — Dublin, OH USA
Tel: +1 614 790 3361

Europe — Barcelona, Spain
Tel: +34 93 206 5120

India — Navi Mumbai
Tel: +1 800 209 2475

Asia Pacific — Shanghai, P.R. China
Tel: +86 21 2402 4888

Latin America — Araçariquama, Brazil
Tel: +55 11 4136 6477

ashland.com/transportation

* Registered trademark, Ashland or its subsidiaries, registered in various countries
™ Trademark, Ashland or its subsidiaries, registered in various countries
© 2016, Ashland / PC-13310.1

The information contained in this brochure and the various products described are intended for use only by persons having technical skill and at their own discretion and risk after they have performed necessary technical investigations, tests and evaluations of the products and their uses. Certain end uses of these products may be regulated pursuant to rules or regulations governing medical devices, drug uses, or pesticidal or antimicrobial uses. It is the end user's responsibility to determine the applicability of such regulations to its products.

All statements, information, and data presented herein are believed to be accurate and reliable, but are not to be taken as a guarantee of fitness for a particular purpose, or representation, express or implied, for which seller assumes legal responsibility. No freedom to use any patent owned by Ashland, its subsidiaries, or its suppliers is to be inferred.

