

# Trinseo Material Solutions for Automotive

Our innovative portfolio of automotive rigid and soft-touch plastics enables the production of lightweight applications – from lower density materials to thin wall design – for all demands of today’s and future mobility. Trinseo’s products are especially developed for high-quality appearance and premium haptics over time: supporting increased end-customer satisfaction and higher resale value.

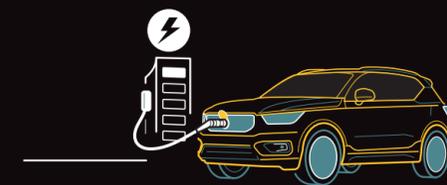
## Rigid Plastics for Automotive Applications

MAGNUM™ ABS Resins	Interior, Exterior
PULSE™ PC/ABS Resins	Interior, Exterior
ENLITE™ Structural Polymers	Semi-structural
INSPIRE™ Polypropylene	Interior, Exterior
VELVEX™ Reinforced Elastomers	Interior

## TPE Portfolio for Automotive Applications

MEGOL™ TPS-SEBS Compounds	Interior, Exterior, Chassis, Under the hood
APIGO™ TPO Compounds	Interior, Exterior
TIVILON™ TPV Compounds	Interior, Exterior, Chassis, Under the hood
API L™ TPC Compounds	Chassis
APILON™ 52 TPU Polymers and Compounds	Interior, Exterior, Under the hood
APIZERO™ EVA-based Compounds	Chassis

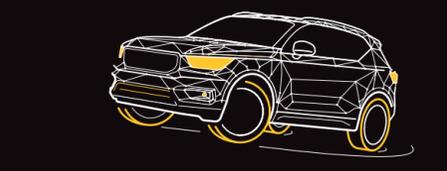
# Our Automotive Solutions Clusters



Electrification



Assisted & Autonomous



Lightweighting



Car-Sharing Interiors

trinseo.com

# We are Trinseo

## A Strong Track Record, a Bold Direction

A global materials solutions provider and manufacturer of plastics, latex binders, and synthetic rubber. We are focused on delivering innovative and sustainable solutions to help our customers create products that touch lives every day – products that are intrinsic to how we live our lives – across a wide range of end-markets including automotive, consumer electronics, appliances, medical devices, lighting, electrical, carpet, paper and board, building and construction, and tires.

## Global Resources, Local Production

Trinseo is a technology leader and innovator in performance plastics solutions. Our manufacturing, Research & Development (R&D), and testing facilities located strategically across the globe allow us to collaborate, develop and manufacture seamlessly across regions.

**\$4.6 B**  
REVENUE IN 2018

**2,500**  
EMPLOYEES IN 25 COUNTRIES

**11**  
R&D FACILITIES GLOBALLY

**16**  
MANUFACTURING SITES GLOBALLY



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Trinseo Automotive

# ENLITE™ PP LGF

Innovative long glass fiber thermoplastics for reduced weight and part costs



# Reduced Weight. High Performance. Premium Aesthetics.

## Advanced ENLITE™ PP LGF for lightweight design with cost-saving potential

As a global leading partner for the automotive industry, Trinseo supports automotive manufacturers and their suppliers to meet the needs of megatrends such as electrification, assisted and autonomous driving, car-sharing interiors, and – most critically – reduction of fuel consumption and carbon emissions. Therefore, weight reduction is an essential attribute for today's and future automotive design. Lighter weight is not a trend. It is a necessity.

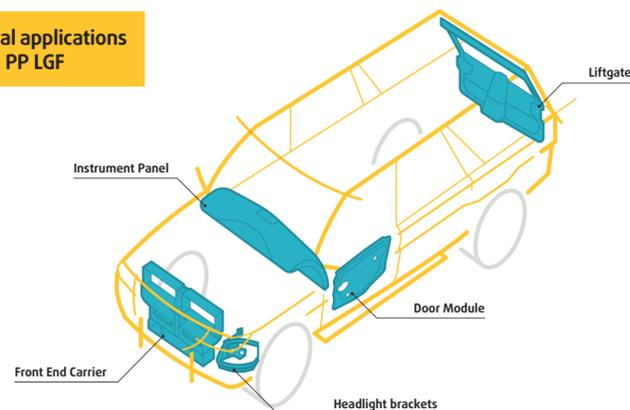
Trinseo's long glass fiber reinforced structural polymers ENLITE™ PP LGF allow for up to 20 percent savings in part weight and offer significant cost-saving potential when used as a metal alternative. Wherever stiffness, dimensional stability, and thermal resistance are important, the system-based approach of the ENLITE™ Structural Polymers product family provides maximum flexibility.

Ideal for specific areas where process constraints are limiting, our advanced ENLITE™ PP LGF solutions can replace aluminum or steel and enable lightweight semi-structural parts – also with unpainted Class A surfaces where this is a requirement.

## ENLITE™ STRUCTURAL POLYMERS

ENLITE™ ABS LGF	ENLITE™ PP LGF
ENLITE™ LGF 2601 – 60 % ABS LGF Concentrate	ENLITE™ LGF 9411 – 40 % PP LGF product
ENLITE™ LGF 2501 – 50 % ABS LGF Concentrate	ENLITE™ LGF 1602 – (DLGF 9621) 60 % PP LGF Concentrate plus 30 and 40 % LGF products
	<b>NEW:</b> ENLITE™ LGF 1604 – 60 % PP LGF Concentrate
	<b>NEW:</b> ENLITE™ LGF 1404 – 40 % PP LGF product
	<b>NEW:</b> ENLITE™ LGF 1603 – 60 % PP LGF Concentrate

## Semi-structural applications with ENLITE™ PP LGF



## Processing advantages and better dimensional stability

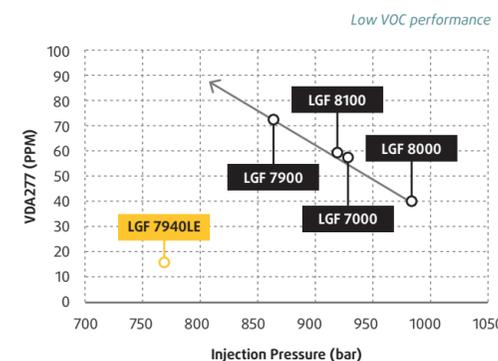
When compared to PP SGF, ENLITE™ PP LGF provides enhanced creep performance for better dimensional stability. It offers a robust, affordable solution for lightweight semi-structural applications. Tests showed that the loose fiber formation is equally low for 40 and 60% LGF concentrates. The ENLITE™ PP LGF system allows for great manufacturing flexibility. PP and PP LGF concentrates can be blended directly at the injection machine to achieve the blend ratio required for your application.

## Advanced PP dilution resins: High flow and low VOC emissions

Our new dilution PP for ENLITE™ PP LGF provides very easy flow for thin wall design resulting in lighter part weight. In addition, it meets customers' key requirements for low emissions and odor.

	NA & EU			NA	
<b>PP Dilution Resin</b>	LGF 8100 (MFR 44)	LGF 7000 (MFR 52)	LGF 7940LE (MFR 140)	LGF 7600 (MFR 35)	LGF 7900 (MFR 120)
<b>Generic</b>	High impact	Standard	Thin wall	Standard	Thin wall
<b>Optimized for VDA 277 &amp; 278</b>			Thin wall		

Advanced dilution PP for thin walls



## New generation ENLITE™ PP LGF for aesthetic surfaces

In a comparison with current LGF40, the new generation of LGF40 and LGF60 solutions offer superior aesthetics along with improved physical properties, better flow, and lower emissions.

	Current LGF40		New Generation LGF40	
	LGF 9411	LGF 9621 NA + 33.3% LGF7600	LGF 1404 NA	LGF 1604 NA + 33.3% LGF7600
<b>n. Charpy Impact</b>	<b>kJ/m²</b>	24	23	28
<b>Tensile Modulus</b>	<b>N/mm²</b>	8659	8611	9138
<b>Rupture Stress</b>	<b>N/mm²</b>	115	119	129
<b>Spiral Flow</b>	<b>cm</b>	47	52	58
<b>VOC (VDA277)</b>	<b>ppm</b>	108	172	22

# Lightweight Liftgate Design with ENLITE™ PP LGF

We collaborated with a global OEM for the development and production of a thermoplastic liftgate. We introduced the polypropylene long glass fiber material system ENLITE™ Structural Polymers, and helped to optimize the part construction, tool design, and injection-molding processing conditions.

Our customer's main objectives were weight savings, styling freedom, easy recycling, and optimal function integration. A complex part like the liftgate must meet high standards for visual appeal and perfect fit and be able to invisibly accommodate many hidden elements (hinges, lock mechanisms, electrical wiring). Impact resistance, expansion, and durability are critical factors, since the application is subject to mechanical and climatic forces that can lead to deformation. Still, the liftgate must be able to fulfill its function while remaining stable and watertight.

Based on positive experience with a previous similar project, the semi-structural liftgate component was outfitted with our all-thermoplastic solution using PP TF and PP LGF. We achieved not only a significant weight reduction but also a cost reduction of 10 percent, which is also possible for other applications (e. g. instrument panel carriers, seat pans, door module carrier plates, and front-end carriers).

Using ENLITE™ PP LGF, our customer was able to not only reduce the part weight for optimal fuel efficiency and benefit from low VOC/odor, but also promote easier recyclability without disassembly of the application. By increasing the long glass fiber content, the robustness and stiffness of the injection-molded parts could be enhanced.

## Key results of the liftgate development:

- Low density resulting in lighter and cost-optimized parts
- Low odor & VOC to meet all global automotive OEM specifications
- Low gloss allowing paintless, visible applications
- Easy flow, reduced scrap, and faster cycle times
- Thin-wall part design for mass reduction
- High-impact strength even at low temperature
- Medium heat resistance optimized for the majority of automotive interior components
- Consistent natural white color produces high-quality part appearance when used with color concentrates (self-coloring) or Trinseo Color Masterbatch Technology

## Key benefits of PP LGF for semi-structural applications:

- Weight reduction of up to 20% (vs. steel)
- Cost efficiencies (reduced material/production/application costs)
- Dimensional stability (stiffness, low CLTE)
- Durability (impact, scratch and mar, long-term thermal aging strength)
- Appearance (low gloss, UV stability)
- High level of dimensional stability
- Processing flexibility (Trinseo At-Press Technology)
- Recycling by regrinding and re-processing

