

TECH NOTE: ROBOMOLD® + HOSTAFORM®

ROBOTIC ROTATIONAL MOLDING OFFERS NEW CUSTOM PART SOLUTIONS OPPORTUNITIES WITH HOSTAFORM® POM RF POLYACETAL COPOLYMER



ROBOMOLD® + HOSTAFORM® POM RF = A PERFECT MATCH

As the first manufacturer in the United States to offer robotic rotational molding, Gemstar's proprietary Robomold® technology is ideal for leveraging the full capabilities of Hostaform® POM RF, Celanese's unique single-layer acetal solution designed specifically for rotational molding.

The partnership between Gemstar and Celanese is a synergy which has perfected the use of Hostaform® POM RF material in Gemstar's precision automated robotic rotational molding process. This combination of Robomold® Technology and Hostaform® POM RF has provided Gemstar with the capability to manufacture the highest-quality fuel tanks available on the market.

ROBOMOLD® TECHNOLOGY

Robomold® robotic rotational molding is a leading-edge technology offered exclusively by Gemstar that is ideal for applications where precision and repeatability are essential. This robotic rotational molding technology allows for:

- Tighter tolerances, which can be held with precision-distributed heat and material control for consistent part-to-part repeatability with optimized strength-to-weight ratios.
- Unsurpassed design flexibility, which includes the ability to layer different compounds and coatings into finished parts where conventional rotational molding cannot satisfactorily meet evolving design requirements.
- High process control of materials due to zoned heat controls and the natural-release features of both the material and process.

HOSTAFORM® POM RF

Celanese is known as the leading acetal copolymer supplier and has specifically formulated Hostaform® POM RF to deliver a drop-in solution for rotational molding applications. The material can be tailored to deliver ideal impact resistance and has a wide operating temperature range, from -40 degrees Fahrenheit to 212 degrees Fahrenheit.

This RF resin system delivers:

- Low fuel permeation
- High wear resistance Dimension stability
- Excellent toughness & rigidity
- Low swelling during exposure
- Temperature resistance

Hostaform® POM RF is a cutting-edge material for fuel applications such as fuel tanks and hydraulic tanks. End-use applications span a number of markets, such as lawncare products, agricultural equipment, military equipment, recreational vehicles, and industrial equipment.



Image 1: After & Before of a fuel tank utilizing Hostaform® POM RF + Robomold® Technology

HOSTAFORM® POM RF FOR FUEL TANKS

Hostaform® POM RF is an ideal solution for fuel tanks and hydraulic tanks. Hostaform® POM RF offers low fuel permeation inherent to the base resin. It can accommodate the following fuels: alcohol, hydrogen, unleaded race fuel, compressed natural gas, diesel, ethanol 85, gasoline, propane, and more.

Hostaform® POM RF and Robomold® Technology come together to maximize the design potential of fuel tank systems. Unlike current options on the market, Hostaform® POM RF does not require secondary steps such as fluorination or multilayer/barrier layer molding to improve fuel permeation. Hostaform® POM RF's single-layer solution is formulated to enable CARB and EPA fuel tank applications.

BENEFITS OF ROBOMOLD® + HOSTAFORM® POM RF

Delivers new, unique properties to the rotomolding toolkit.

	XLPE	Multi-layer barrier	Hostaform® RF
Tank system cost	\$\$\$	\$\$\$\$	\$
Processing cycle time	100%	300%	100%
Secondary Operations (fluorination)	\$	-	-
Operational Access	✓	Limited	✓
Certification	EPA	EPA/CARB	EPA/CARB
Supply Chain Complexity	Inventory, shipping, offsite fluorination	Available to sell after molding	Available to sell after molding

PROCESSING WITH ROBOMOLD® TECHNOLOGY

Hostaform® POM RF can be used with traditional molding techniques but performs best when utilized with Robomold® robotic rotational molding. The primary reason for this is that Robomold® Technology perfectly controls and disperses Hostaform® POM RF in the molding process. Because Robomold® is automated, Gemstar’s design engineers can use high-precision temperature control during the molding process that allows for the perfect forming of the Hostaform® POM RF material. This process is more precise and allows for optimized material usage, reducing processing time by up to 50% to produce a tank compared to other rotational molding methods. These factors result in more consistency and overall, higher quality product than traditional molding methods.

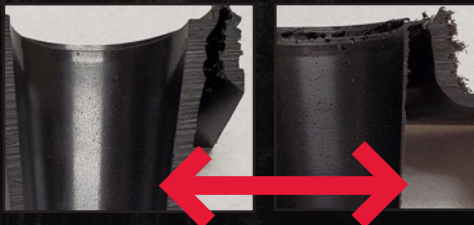


Image 2: Controlled heat focus allows for unique geometries not possible with conventional rotational molding.

DESIGN FLEXIBILITY

The use of Hostaform® POM RF with Robomold® robotic molding technology offers unparalleled design flexibility. This includes:

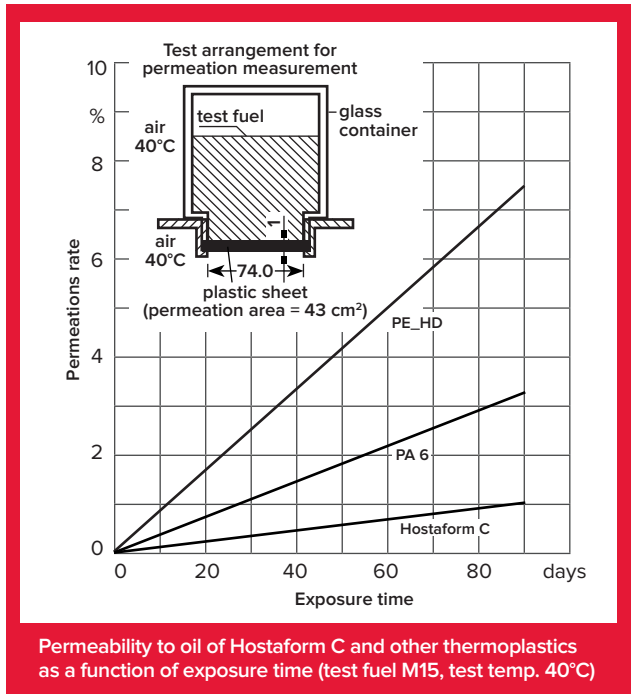
- Ability to create unique geometries (Image 2) and variable wall thicknesses (Images 3 & 4)
- Create molded-in inserts with high adhesion and pull-out strength
- Obtain excellent definition of molded in threads (Images 5 & 6) resulting in significant scrap reduction
- Generate higher stiffness and heat deflection temperatures than polyethylene’s and some nylons leading to design flexibility in pressurized vessels
- Eliminates the need to hydrate molded parts and scrapping wet resin due to exposure to moisture
- Creates product in black or natural color, as well as a high capacity for accepting custom colors
- Hostaform® POM RF offers a sustainable ECO-B option containing up to 97% bio-content via the ISCC+ certified mass-balance approach



Images 3 & 4: Direct heat flow allows for varying wall thicknesses, even within the same wall



Image 5 & 6: Heat flow could be focused on the appropriate area for improved material dispersion to create improved threading.



Hostaform® POM RF Permeation Results

EPA AND OTHER REQUIREMENTS

Hostaform® POM RF’s low permeation and toughened POM delivers an unprecedented balance of impact and durability performance required for manufacturers to meet EPA regulations including U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB) regulations for SORE and other fuel systems. Additionally, Hostaform® POM RF products manufactured by Robomold® Technology pass UV testing, aging, application-specific drop tests, and ABYC HY24 flammability and shock testing.

Hostaform® POM RF is a trademark of Celanese or its affiliates. used under license by Hoechst GmbH, used by Celanese Corporation under license

LEARN MORE

To learn more about the use of Hostaform® POM RF, check out the case study: [Specialized Fuel Tank Made with Robomold Technology on the Gemstar website.](#)

ABOUT GEMSTAR MANUFACTURING

Gemstar Manufacturing is an engineering-based solutions provider with 60 years of manufacturing experience and knowledge. The company is a family-owned business supported internally by long-term employees. The firm’s history is rooted in custom manufacturing and the dedication of a customer-centric organization. Gemstar’s mission is “to test the limits of plastic manufacturing and exceed the expectations of customers,” which is shown through their dedication to provide value add solutions to customers through innovative design and technology.

ABOUT CELANESE ENGINEERED MATERIALS CELANESE - THE CHEMISTRY INSIDE INNOVATION™

Celanese Corporation is a global chemical leader in the production of differentiated chemistry solutions and specialty materials used in most major industries and consumer applications. Our businesses use the full breadth of Celanese’s global chemistry, technology and commercial expertise to create value for our customers, employees, shareholders and the corporation. As we partner with our customers to solve their most critical business needs, we strive to make a positive impact on our communities and the world through The Celanese Foundation. For more information about Celanese Corporation and its product offerings, visit www.celanese.com.