

Baydur®



## Expanding what's possible

Collaboration brings Long Fiber Injection into new markets with enhanced technical capabilities



# Advantages of Long Fiber Injection



**Lighter than Steel**



**Lighter than Aluminum**



**Lighter than SMC**



**Lighter than FRP**

Source: Romeo RIM

Weight reduction, strength, durability, good aesthetics and processing efficiency. These desirable traits are critical for a multitude of applications spanning across many markets, and they can all be achieved with Long Fiber Injection (LFI) utilizing Baydur® polyurethane from Covestro LLC.

Romeo RIM is an LFI leader and innovator, with a long, successful track record. The company brought LFI, an automated process for producing structural polyurethane composites, to North America over 15 years ago. Using Baydur® polyurethane from Covestro, Romeo RIM successfully established LFI in North America with its first commercial application – interior sleeper cabs for heavy trucks.

Romeo RIM has collaborated closely with Covestro for over a decade. Covestro's versatile Baydur® polyurethane allows for cost-efficient production of large moldings and accurate reproduction of surface details. Collaboration with Covestro on part design and structural analysis techniques enables Romeo RIM to achieve optimal part designs, which translate into superior end products for OEMs. In addition to supplying the polyurethane, Covestro also provides Romeo RIM with material development and process technology support.

The lightweighting value proposition of polyurethane LFI positions it as an attractive alternative to steel, aluminum and other polymers, such as sheet molding compound (SMC) or fiber reinforced plastic (FRP). With LFI it is possible to achieve 40 – 50 percent weight savings over competitive technologies while maintaining the same performance level, according to Romeo RIM.

Polyurethane LFI is ideal for large components requiring a stringent balance of strength and stiffness to weight, such as roofs, body panels, spa cabinets and entry door skins. Key markets include mass transit, agricultural and construction, heavy trucks and spas.

## Technology:

Baydur® polyurethane, Long Fiber Injection (LFI), In-Mold Paint (IMP) and Pigmenting

## Benefits:

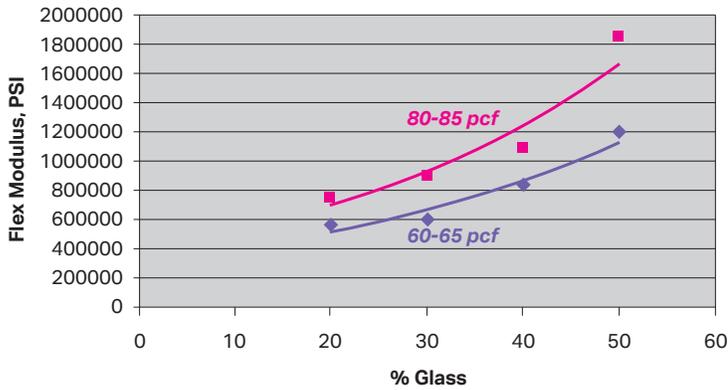
- 40-50% weight savings over competitive technologies
- Significant improvements in strength to weight ratio



Truck interior sleeper cab

**BAYDUR® STR LONG FIBER INJECTION**  
 Flexural modulus increases with addition of glass and density.

Source: Covestro LLC internal testing of inherent properties



During the LFI process, long glass fibers (typically 12.5 mm to 100.0 mm or 0.5 in. to 4.0 in.) are cut and injected along with polyurethane resin in a one-step process. A fiberglass chopper works in tandem with the polyurethane dispensing mix-head, both of which are attached to a robot arm. The robot is programmed to move over the open mold cavity while simultaneously dispensing both the long glass fibers and the polyurethane resin in an open-pour method. The mold, which is capable of incorporating complex three-dimensional shapes, integral stiffening and structural elements and deep draws, is then closed and compressed to form large, glass-reinforced parts. Managing the process through robotics reduces production variation, thus improving part consistency and quality.

Romeo RIM houses one of the largest double shuttle presses, along with one of the fastest production LFI presses in the world. This combination enables the company to provide customers with a continuous part as large as 11.5 ft by 11.5 ft, a size beyond traditional injection molding, but also the ability to produce high gloss painted composite parts directly out of the mold in less than 120 seconds.

Unlike a traditional molding process that requires multiple parts, with the versatile double shuttle press Romeo RIM can manufacture a large part in one mold, reducing cost and improving efficiency. Alternatively, the company can use the double shuttle press to simultaneously produce multiple parts as small as 2 ft. by 2 ft., offering another productivity improvement.

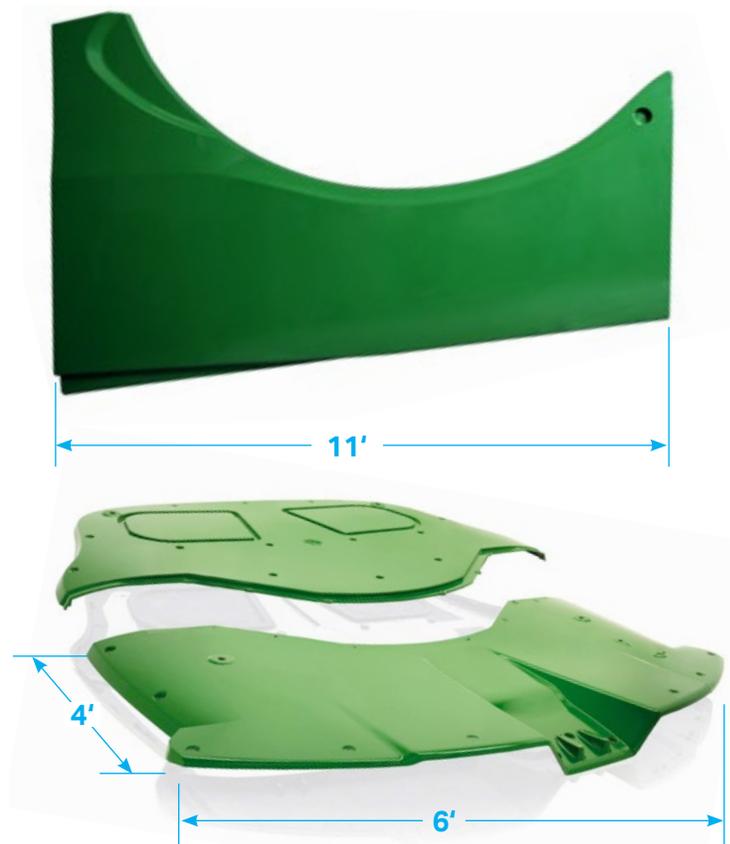
While LFI boasts a lower cycle time and more streamlined process than competitive techniques, it does not compromise the performance or aesthetic quality of the resulting parts. In fact, the technology offers a variety of attractive Class-A surface finishes achieved through a barrier coat and in-mold painting method pioneered by Covestro and Romeo RIM. By applying the paint directly to the open LFI mold before dispensing the Baydur® polyurethane and chopped-glass material, a decorated part can be formed in one step, eliminating secondary operations, increasing manufacturing efficiency and lowering cost and waste. Baydur® polyurethane's ability to replicate intricate tool surface effects allows high gloss, fine wood grain and other surface textures to be achieved in the same one-step LFI process.

At the heart of Romeo RIM's successes are LFI and its collaboration with Covestro. It's a proven, winning formula for pushing the boundaries of what's possible, and in doing so, expanding market adoption and industry awareness to bring the next generation of LFI to market.

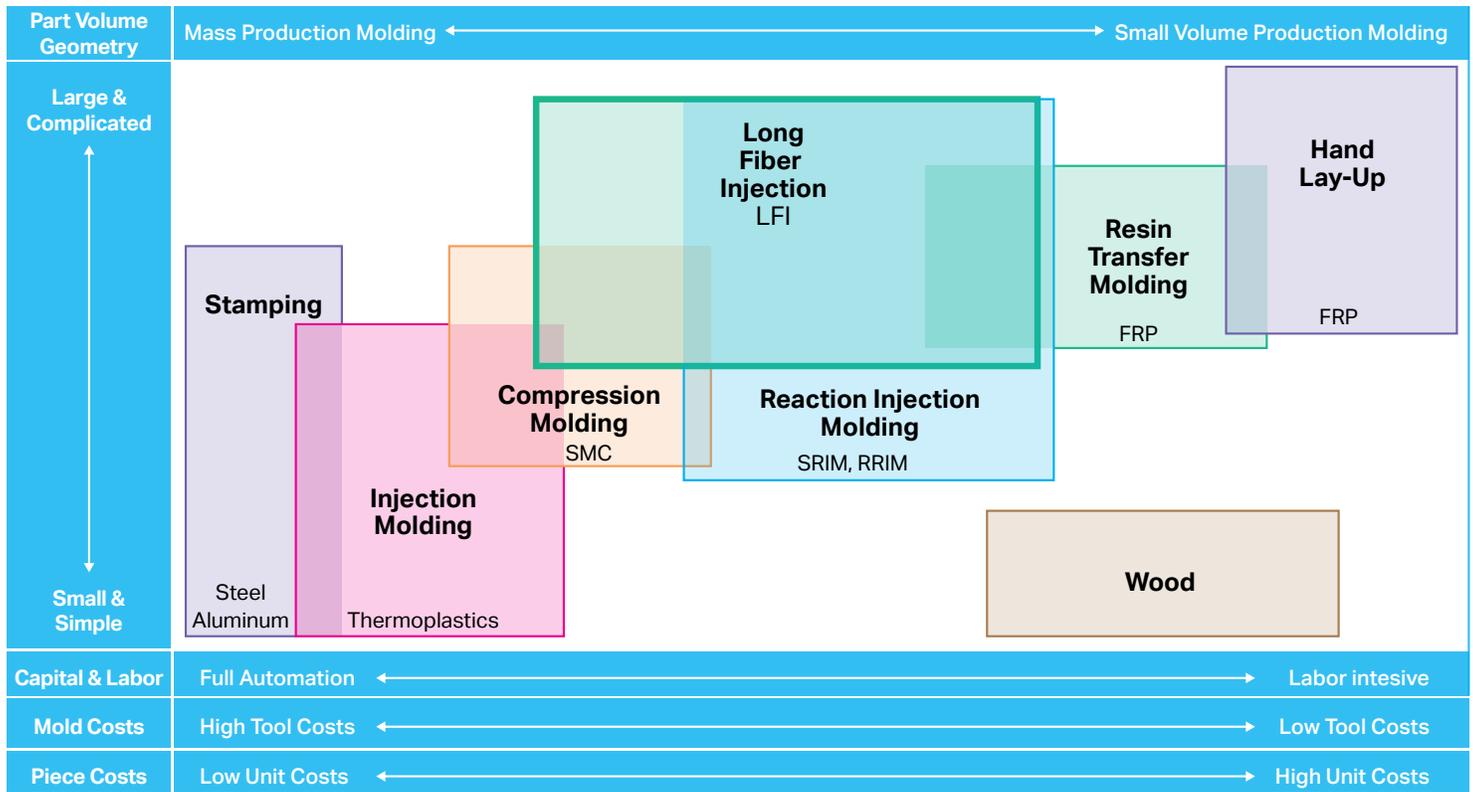
**BAYDUR® STR 822**  
 Typical Properties\* of Composite

Property	Value
Thickness, in.	0.199
Density, pcf	70
Glass Content, %	39
Elongation, %	2.1
Flexural Modulus, psi	832,000
Tensile, psi	8,436
Demold Time	3 minutes or less
Coefficient of Linear Thermal Expansion, E-06	24

\*These items are provided as general information only. They are approximate values and are not part of the product specifications.



Using the LFI process, Romeo RIM's double shuttle press enables the production of large, continuous parts, such as the agricultural panels pictured.



For more information about Covestro LLC polyurethane materials and technologies, call 412-413-2000 or visit [www.polyurethanes.covestro.com](http://www.polyurethanes.covestro.com).

For more information about Romeo RIM and Long Fiber Injection, call 586-336-5800, visit <http://www.romeorim.com/> or email [sales@romeorim.com](mailto:sales@romeorim.com).



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