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A typical door module



Glass content of structural plastic  
door module

# The future of automotive door technology

It is expected that the global automotive industry will become even more competitive, more fast-paced, and more diverse in terms of vehicle choice than it is today. Multiple variants of vehicles and crossover vehicles will be the norm.

OEMs the world over will continue to seek ways to maximize use of existing plant space and reduce vehicle assembly times while also reducing vehicle development times to as little as 15 months from concept to production, thereby reducing cost.

One of the ways OEMs will meet these challenges will be to continue the trend of sourcing larger subassemblies, such as door modules. Suppliers will be relied on as door-technology specialists and may have complete responsibility from design to delivery. Ultimately, complete doors—having been entirely designed, engineered, manufactured, assembled, and tested by the supplier—will be shipped in sequence to the OEM assembly plant.

This “complete door” level of integration will require suppliers with full competence in component hardware engineering, as well as a thorough understanding of all aspects of the door’s structure and safety performance.

With a challenge to help an OEM build a new vehicle in an assembly plant where space was limited for a new assembly line, **Magna Closures** recommended and implemented a solution to preassemble the door components on a steel carrier and deliver one item to the customer’s line. The steel-carrier door module incorporated the latch, window regulator, and inside handle, thus reducing vehicle assembly time, decreasing capital investment, and improving quality. Until recently, few improvements were made to this design largely due to the inflexibility of steel to allow for additional component integration and the unavailability of cost-effective engineered plastics.

The development in long-fiber molded plastics has now enabled suppliers to produce structural plastic door modules that improve door module design and function. By integrating functionality into a plastic carrier plate, the structural plastic door module allows features such as a window regulator and even the side-impact block to be integrated, increasing the function of the module itself. Using 40% glass-filled polypropylene with 8 to 12-mm (0.3 to 0.5-in) glass strands and a thickness of 2 mm (0.08 in) or less for the carrier plate, the structural plastic door module provides weight advantages similar to those of an aluminum one at a lower cost and, as a result, is able to take on more and more door content.

It is predicted that these modules will become mainstream as OEMs discover their advantages, especially the opportunity to integrate hardware components. By understanding the structural performance of the door and by using engineering analytical tools, suppliers are able to create structural rigidity in the door module while reducing overall product cost.

One of the last challenges in providing a complete door in sequence to an OEM assembly plant is the ability to color-match the paint on a supplier-provided door to the rest of the vehicle. Suppliers are addressing this challenge by continuing to develop breakthrough techniques to guarantee customers a perfect match of color and a seamlessly integrated product.

The future of automotive door technology is fast-approaching, and in one case it is here. Magna designs, manufactures, and delivers in sequence the complete door for the **Smart City Coupe** in France. To realize the full potential and benefits of the complete door module, the industry must continue to combine advances in plastics manufacturing with an understanding of the complete vehicle structure as it relates to the design and performance of the entire door. **aei**