Carbon Fiber Reinforced Plastic - the Car Material of the Future

Compositeconsists of polymer matrix andfibrous reinforcement.Compared to traditional automotive structures, composite motor components can achieve 30%-50% weight reduction, without the cost of loss of strength and stiffness, which makes it ideal as structural material for automobile parts.

As is known to all, a lighter car generally emits less CO2.Given tougher CO2 exhaust standards,lightweight construction is becoming more and more important for the automotive industry. The BMW i3 all-electric car, which features a resin-transfer-molded composite passenger cell,allows engineers to drop the battery size to 22 kWh, versus 46 kWh in traditional electric cars. Inthis regard, composite is especially suitable for such new energy vehicles.

Composite engine is just one breakthrough in composite manufacturing process. With a six-piece aluminum jigsaw puzzle consisting of a base plate, four side panels, and a top cover,the forming moldplays an important role in this process.A removable core is fit insideto form the water jacket, oil drains, and main oil galley.Afterwards, epoxy resin and six-mm-long short carbon fibers are stirred together in a mixer.They’re warmed slightly and then poured into the mold, then left to cure for two hours. In spite that the curing time is relatively longer than traditional engine manufacturing process, the main innovative point isthe use of short-fiber reinforcement, which enables the forming of complex-shaped compositeproducts.

However, the greatest challengesofcompositeapplication lie in high cost and long production cycle.Fortunately, automanufacturershaveadoptednewtechniques and various material systemsto reduce costs and improve production efficiency. For instance, Henkel has just developed polyurethane-based composite matrix resin. It cures significantly faster than the epoxy products usually employed for composite, which has made it possible to mass-produce lightweight, fiber-reinforced car parts.With all these efforts, it is believed that composite will have extended application in automotive industry.