American® Chemistry Council

Plastic fuel tanks can decrease vehicle weight and incidence of corrosion

plastics & autos

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- Metal fuel tanks, which have historically been made of terne-coated steel (an 8% tin-lead coating), are susceptible to interior corrosion from fuel and exterior corrosion from elements such as road chemicals, salt, mud, and gravel.[1,2]
- Over time, fuel tanks that experience corrosion can become weak and subsequently wither. A defective fuel tank can pose serious risk of the vehicle burning or exploding.[3]
- High-density polyethylene (HDPE) tanks are inert to the corrosive environments inside and outside of the tank.[2]
- In addition, the plastic resins that compose plastic fuel tank systems together can help dissipate electrostatic charge to prevent igniting fuel.[4]
- The structural integrity of plastic tanks can also add to vehicle safety. Rather than welding metal pieces together, plastic tanks are formed by blowing a thick continuous tube of plastic within a mold that determines the final shape of the virtually seamless part, which can include the filler neck. Not only does this seamless construction afford auto manufacturers design flexibility, but it also prevents failure in seam areas, so that plastic tanks can be safer in crashes.[1,2]
- Often, plastic tanks are made of up to six layers, which work together to prevent vapor permeability and provide additional structural stability.[5]
- Plastic tank systems also serve the dual purpose of decreasing the vehicle's overall weight, as an average plastic tank weighs two-thirds less than an average steel tank.[5,6]

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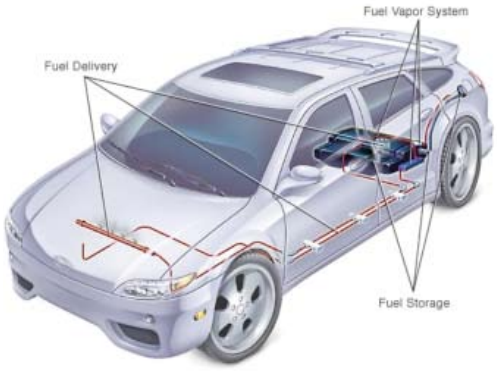
Photo Source: American Plastics Council.

A blow molded fuel tank saved the Audi A6 up to 20% in weight, with an efficient utilization of space, but without risk of corrosion.[9]



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A fuel system made of plastic can be formed to fit unique spaces in a vehicle. This design flexibility and the lightweight nature of the plastic allow manufacturers to save overall vehicle weight.*

*Information drawn from bullets.

Additional Information

- For all vehicles involved in fatal crashes, about 26 fires per 1,000 vehicles occur.[7]
- "Generally, plastic tanks are considered safer in crashes because they are seamless and, thus, not prone to failures in the seam areas. Also, plastic tanks deform and have some ability to rebound back to shape."[2]
- In an Environmental Protection Agency (EPA) comparison test of a steel and plastic fuel system for a 1996 GMT600 passenger van, a steel tank system weighed in at 21.92 kg (48.32 lbs.), while the plastic system weighed only 14.07 (31.02 lbs.). (The fuel system tested consisted of three components: a fuel tank, straps to secure tank to frame, and a shield with unique function for each fuel tank system.)[8]
- In the same EPA test, the lighter weight of the plastic fuel tank system resulted "in significant savings in use phase energy relative to the steel." This contributes to an overall lower life cycle energy requirement for the plastic tank system, and a potential significant savings in fuel cost.[8]

This blow molded "ship in a bottle" plastic fuel tank from TI Automotive encloses the fuel pumps, level sensors, and other components into the tank. This design weighs less, costs less, and significantly reduces evaporate emissions to enable automakers to meet stringent regulations.[10]

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Photo Courtesy of the SPE Automotive Division.

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Pictures

Blow Molded Fuel Tank: ACC PD brochure

Fuel System in Car: http://www2.dupont.com/Automotive/en__US/applications/fuel__sys/Fuel__Systems.html

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