

Plastic & the Automobile Trifecta: Performance, Fuel Efficiency, and Safety

Ever wonder what materials our cars and trucks* are made of? How much metal, glass, and plastic are in your favorite vehicle? Those questions and more are answered in a new report titled, "Chemistry and Automobiles." Car fans can dig into it at:

plasticmakers.org/chemistryinautos.

Report highlights:

Plastics are used in a variety of innovative ways to make cars safer and more fuel efficient. Plastics can make vehicles more lightweight, help increase fuel efficiency and reduce carbon emissions, and help provide safety benefits like seatbelts and airbags.

The Automobile Trifecta

Plastic and polymer composites are innovative, modern materials that significantly contribute to:



PERFORMANCE



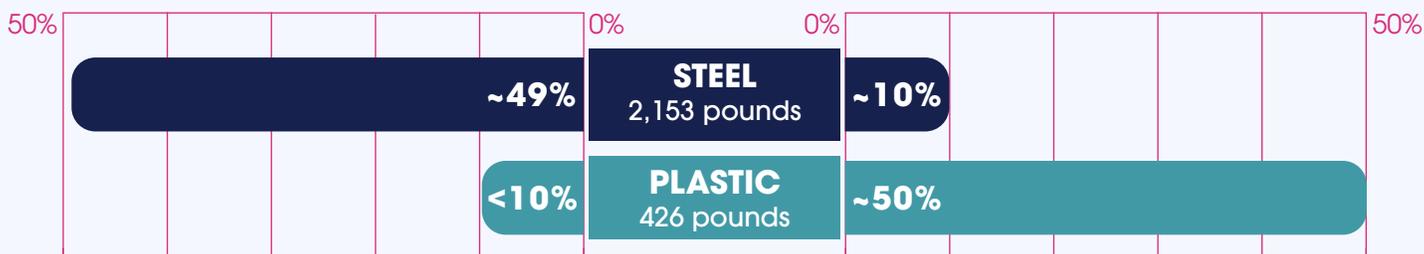
FUEL EFFICIENCY



SAFETY



Weight | VS | Volume



Plastic and polymer composites are really strong yet lightweight.

Ford Motor Company

"Few innovations provide a more wide-ranging performance and efficiency advantage than reducing weight. All factors of a vehicle's capabilities - acceleration, handling, braking, safety, efficiency - can improve through the use of advanced, lighter materials."

* Includes both passenger automobiles and light-duty trucks (pick-up trucks, minivans, and sport utility vehicles) in North America in 2023.

The Value Of Plastic In Autos Is Rising

PLASTIC/POLYMER COMPOSITES

2014 **\$589** PER AUTO
2023 **\$695** PER AUTO

The Amount Of Plastic In Autos Also Is Rising

PLASTIC/POLYMER COMPOSITES

2023 **426** Lbs PER AUTO
UP **18%+** SINCE 2014

Over a dozen types of plastic are used in our cars ([Click here](#) to see what's being done to recycle that plastic.)

Advanced Lightweight Materials Improve Auto

Performance



HOODS:

Can improve a vehicle's aerodynamics, while also contributing to the overall design aesthetic.



OPTIC CABLES:

Enhanced illumination of the interior, more accurate GPS data, and highly responsive ABS sensors.



CHASSIS:

Providing lighter weight, higher stiffness, and lower cost than traditional materials such as steel.

Fuel Efficiency



WEIGHT REDUCTION:

Is a key driver in boosting fuel efficiency, reducing emissions and lowering costs.



AVERAGE FUEL EFFICIENCY:

Real-world miles per gallon reached 26.9 in 2023, more than double the 1975 average.



IN TODAY'S CARS YOU'RE SURROUNDED BY CUSHIONING PLASTIC.

Safety



ESSENTIAL SAFETY FEATURES:

Are made possible by chemistry and plastic. From bumper to bumper, plastic helps keep the vehicle – and the passengers inside – safe.



ACCORDING TO NHTSA:

Seat belts – which are typically made from polyester – saved nearly 15,000 lives in 2017.



FIBER-REINFORCED POLYMER COMPOSITES:

Can absorb 4X the crush energy of steel while plastic foams and other polymer composites provide additional impact protection.

Electric Vehicles Are Surging In Popularity. Plastic Helps.

In general, EVs are significantly heavier than their gasoline-powered counterparts, primarily due to the battery weight.

Even more so than in ICE (internal combustion engine) cars, plastic plays a significant, helpful role in these heavy EVs.

Given their light weight, plastic and polymer composites can help to offset added weight from the introduction of autonomous and advanced propulsion mechanisms, including batteries and hydrogen fuel cells.

Compared with metal assemblies, large-format all-plastic housings enable cycle time reductions and contribute to lighter vehicle weight, thus extending the range of electric vehicles.

Example: the GM Hummer EV's battery alone weighs around 2,800 pounds.



Plastic on average weighs 35% less than metal enclosures for batteries.

Helping Keep EV Batteries Safe

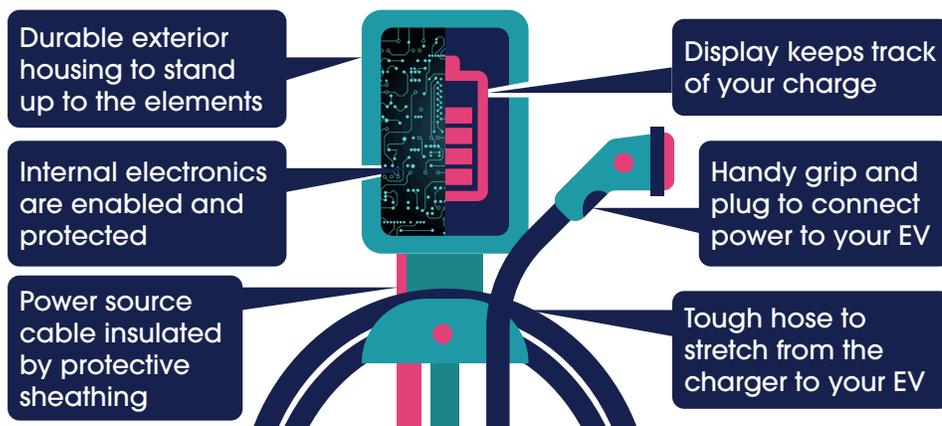
Desirable Properties

Due to their insulating properties, plastic and polymer composites are sought-after materials for various components of electric vehicle batteries, including battery casings and enclosures.

Advantage: Plastic

Replacing metal components with plastic aids in weight reduction, reduces corrosion, provides design flexibility, and helps keep batteries safe during collisions.

And all those charging stations?



Plastic and other products of chemistry can be used for a wide array of components within the larger structure of alternative fueling stations and electric vehicle charging ports, such as charger housings, covers over front displays or touchscreens, lenses, connectors, light guides, and other components.

The 2024 report "Chemistry in Automobiles" captures the role that lightweight plastic and other chemistry products play in the automobile trifecta.

Read the Report: plasticmakers.org/chemistryinautos