

Wheels: What is P-series fuel?

Halderman: P-series fuel is recognized as being an alternative fuel because it can be used in a vehicle designed to operate on gasoline without any modifications. P-series fuel, patented by Princeton University in Princeton, New Jersey, is a non-petroleum-based fuel. P-series fuel contains ethanol, pentane, butane, and methyltetrahydrofuran. P-series fuel is not available at any retail fuel outlet at the present time, but it is recognized by the U.S. Department of Energy as being an alternative fuel.

Wheels: You mentioned that hydrogen is an alternative fuel, but isn't this the same gas used in the Hindenburg airship that caught fire?

Halderman: All automotive fuels represent a fire hazard and as with gasoline, hydrogen can be safely used. Hydrogen is lighter than air and this is why it was used in a lighter-than-air dirigible. If hydrogen escapes from a vehicle or during refueling, the hydrogen simply rises and is dispersed into the air. Gasoline fumes are actually more dangerous because they are heavier than air and can accumulate close to the ground and be ignited by any ignition source, such as a pilot light on a water heater.

Wheels: Where does hydrogen come from? Is it readily available?

Halderman: Hydrogen is called an "energy carrier" and is not found naturally, but instead must be created from natural gas (methane) or by electrolysis of water. Using an electrical circuit through water can break the bond between the hydrogen and oxygen in water thereby releasing hydrogen for use. However, this process, like that of getting hydrogen from natural gas, takes energy. The energy it takes to create a fuel is called "energy balance" and it varies with the fuel used.

Wheels: How can hydrogen be used in a vehicle?

Halderman: Hydrogen can be used in a vehicle with a conventional piston engine, but it requires an expensive fuel delivery system, which would take a lot of space. Hydrogen is the fuel of choice for use in fuel cells, which creates electricity leaving behind only water vapor. Using hydrogen is believed to be the future. In California, there are hydrogen fuel refilling stations every 20 miles around major cities. Similar to CNG, hydrogen must be stored under high pressure, usually 5,075 pounds per square inch.

Wheels: What is the future of hydrogen?

Halderman: I think eventually we will use hydrogen because it does not release any carbon into the atmosphere. However, it must be created so the energy to make hydrogen, plus the infrastructure needed, could be a huge cost to society. When will the "hydrogen economy" arrive? I heard twenty years ago that it would happen in twenty years. I am still hearing twenty years.

