Dos & Don'ts at the Gas Pump

Static Electricity Fires - How to Prevent Them

What is Gasoline?

Gasoline is a flammable liquid and should always be stored in approved containers or tanks at room temperature (<80˚ F) and away from potential heat sources such as the sun, hot water heater, furnace or space heater, plus any other ignition sources. Storage in anything other than an approved container is strictly prohibited by fire prevention codes. Gasoline vapors not only are highly flammable but are heavier than air and can travel along the floor to ignition sources. Therefore, gasoline should be stored more than 50 feet away from any ignition source.

Handling and Storing Gasoline

Gasoline stored for four to six months or that will be exposed to direct sunlight or temperatures above 80˚ F, should have a fuel stabilizer/additive (available at most auto parts stores) added when you first buy it. Fuel stabilizers contain antioxidants that prevent gum and other compounds from forming in gasoline; biocides, which prevent microbial growth; and corrosion inhibitors, which prevent the formation of rust and corrosion.

Freshness of the gasoline is improved if the container or gas tank is stored in a cool place and is kept about 95 percent full. However, leave some headroom for gasoline to expand if it warms up in storage. Without an air space, expansion will force liquid gasoline out of the container or distort the container.

Gasoline Disposal

Gasoline requires precautions for spill cleanup. Minor spills should be absorbed with kitty litter or an absorbent clay material available at auto parts stores. Even paper or rags are acceptable. Larger spills should be contained and collected.

Check with your local government or hazardous waste disposal center to determine the proper avenues for disposing of spilled gasoline.

NEVER dispose of spilled gasoline or cleaning materials on the ground or in your garbage, drains, toilets, or sewers. A fire could result or the gasoline could seep into streams, lakes, or groundwater.

Static Electricity and Refueling Your Car

Static electricity is an electric charge caused by an imbalance of electrons on the surface of a material. It is most commonly caused by the contact and separation of materials. The area of contact, the speed of separation, relative humidity, and other factors determine the amount of charge created.

EXAMPLE: A person walking across a carpeted floor. Static electricity is generated as their shoe soles contact and separate from the carpet. The amount of static electricity generated will increase in proportion to the size of the sole surface, lower humidity, and increased speed of movement.

How Does it Happen?

In automobiles, static electricity buildup occurs when exiting and re-entering a vehicle, particularly in cool or cold and dry conditions. As you pull into a gas station to refuel, most people:

- Open - then shut - the car door,
- Open the fuel pipe cover on the vehicle,
- Touch the nozzle on the gas pump, and
- Perhaps touch the pump to use your credit card ….all before you insert the nozzle into the fill pipe.

Any static charge that was picked up in the car has been dissipated several times.

BUT, a static charge can be picked up if you get back into the car after the refueling has started. The synthetic material of the car seats and clothing add to the possibility of picking up a static charge. If you don't touch metal before returning to the nozzle and fuel pipe, that static charge can be transferred from your body to the fuel nozzle upon touching the nozzle, thus igniting the gasoline vapors around the fill spout and causing a flash fire.

Once the vapors ignite, the fire will continue until the fuel supply is shut off from the pump. Once a fire starts, serious injury and property damage can occur.

Main Causes of Static Electricity Refueling Fires

- 50% - Refueler returns to vehicle during refueling – and doesn't shut door or touch other metal when leaving car
- 29% - Refueler unscrews gas cap
- 21% - Something else.

Who are the Victims?

Of the cases reported, it's estimated 50% involve the person getting back into their vehicle while the gas is still flowing into the tank. When they return to the fill area and touch the nozzle to complete the fill up, a static spark ignites the fumes, causing a flash fire. Of the static fires reported, 78 percent happen to women. Why? Some of the reasons why motorists re-enter their cars during refueling seem to be gender specific:

- Return the credit card to purse
- Check on the kids
- Get warm
- Use the cell phone
- Get money out of purse
- Write a check
- Write down odometer reading
- Put on lipstick

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There are several theories about why static fires occur at the pump and why more seem to be occurring every day. One is the almost universal switch to self-serve pumps that requires millions of people, unfamiliar with the volatility of gasoline, to handle it once or twice a week. Also, vehicles today have more electronics – CD players, geopositioning systems, satellite radios, cruise control, ABS, on-board diagnostics, and electronically controlled fuel injection. Those elements, plus nylon seat covers, can create the potential for a static buildup.

Other theories include: More volatile fuels – fuel meant to be sold during cold weather is blended to be more volatile; tires – less carbon and more silica in them; fill pipe cover release inside the vehicles; and dissimilar automobile parts, such as plastic and metal.

Safety Guidelines when Refueling

1. **Always** turn off your vehicle engine while refueling.
2. **Stay near** the vehicle fueling point during the process.
3. **Never** smoke, light matches or use lighters while refueling.
4. Cellular phones and other electronic devices may have the potential to emit electrical charges, and should therefore be left in the vehicle during fueling.
5. **Do not** get back into your vehicle during refueling – even when using the nozzle's automatic hold-open latch. If you must re-enter your vehicle, discharge static electricity buildup when you get out by touching the outside metal portion of your vehicle, away from the filling point, before attempting to remove the nozzle.
6. To avoid gasoline spills, **do not** overfill or top off your tank. The fuel dispenser will shut off automatically when the tank is full.
7. Use only the hold-open latch provided on the gasoline nozzle. **Never** jam or force the hold-open latch open by using some other object, such as the gas cap.
8. When dispensing gasoline into a portable gasoline can, use only an approved container. Always place the container on the ground and keep the pump nozzle in contact with the container when refueling to avoid a static electricity ignition of fuel vapors. Containers should never be filled inside a vehicle, in the trunk, on the bed of a pickup or flatbed truck, or on the floor of a trailer. The bed of the truck and the bed liner act as insulators, as does the carpeting in a car or in its trunk, which may allow static electricity to build up in the can while it is being filled. That static electricity could create a spark between the container and the fuel nozzle.
9. If a flash fire occurs during refueling, you should **leave the nozzle in the vehicle fill pipe** and back away from the vehicle. Notify the station attendant at once so that all dispensing devices and pumps can be shut off with emergency controls. If the facility is unattended, use the emergency intercom to summon help and the emergency shutdown button to shut off the pump.

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Additional Precautionary Measures

- NEVER smoke near where gasoline is handled or stored.
- Always keep gasoline out of the reach of children.
- Handle gasoline outdoors for proper ventilation.
- Keep gasoline containers tightly closed and handle them gently to avoid spills.
- Never mix gasoline with kerosene or diesel fuel.
- Do not use gasoline in kerosene heaters or lamps.
- Store gasoline in a building separate from the house or place of occupancy, such as a shed or garage.
- Put gasoline in a small engine (such as a lawnmower) only when the engine and attachments are COOL.

Signage at the Pump

The following warnings are on nozzle scuff guards (the plastic cover on the top of the nozzle) made after April 1, 2003:
WARNING

- Improper use may cause a hazardous condition
- No smoking/extinguish all flames
- Avoid static hazard — remain at nozzle
- Do not top off
- Licensed drivers only
- Refer to posted warnings

Some state legislatures may have approved additional signage, now approved by The National Fire Protection Association.

- Discharge your static electricity before fueling by touching a metal surface away from the nozzle.
- Do not re-enter your vehicle while gasoline is pumping.
- If a fire starts, do not remove nozzle – then back away immediately.
- Do not allow children under licensed age to use the pump.

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Resources

American Petroleum Institute, http://api-ec.api.org/newsplashpage/index.cfm. Follow the link "About Oil and Natural Gas," then the link "At the Pump."

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Oklahoma State Department of Health Injury Prevention Service, *Gasoline- Related Burns Fact Sheet,* www.health.state.ok.us/PROGRAM/injury/factsheets/gasoline_related_burns.htm

Petroleum Equipment Institute "Stop Static" safety campaign, http://www.pei.org/static.

Safety Sense. *Shriners Hospitals Offer Gasoline Safety Tips*, http://www.napsnet.com/pdf_archive/65/50942.pdf.

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