Fueling Operations & Static Electricity

The discharge of static electricity while dispensing fuel is a serious hazard that can potentially result in a catastrophic fire or explosion. To help you understand the need for bonding and grounding of fuel dispensing equipment, the following information is offered. It can help you identify conditions and situations that are hazardous and provide you with knowledge to make decisions that you can (literally) live with.

Much of the research on bonding requirements involves dispensing fuel from Marine Service Stations. All piping, tanks, valves and dispensing equipment must be bonded continuously so that all non-current-carrying metal parts have the same potential to ground. This is especially important at the dispensing hose and nozzle because fuel passing through a hose creates static electricity. **The risk of static electricity discharge is greatest when the nozzle is being removed from the tank being filled.**

All dispensing equipment including pumps, hoses and nozzles must be Underwriters Laboratories (UL) listed for the intended usage. This UL listing ensures that the hose and nozzle are designed to provide a continuous bond from the equipment to the tank being filled, which allows static electricity to flow to ground. When the hose and nozzle are not bonded to the equipment, static electricity dissipates slowly. Under these conditions, when the nozzle is removed, a spark is likely to occur.

To avoid static electricity discharge, all equipment must be bonded. If UL listed equipment is not used, it is necessary to attach a bonding wire from the piping/container to both the nozzle and the tank being filled.

Pumping from a truck is a different situation, and requires that a bonding wire be attached anytime flammable liquids are discharged into a top fill tank. Trucks are insulated from ground by rubber tires, so when a bonding wire is attached to the tank that is being filled, a continuous path to ground is provided. But the length of time required for static electricity to dissipate varies. If the bonding wire is removed before static electricity is dissipated, a spark is likely to occur. Therefore, grounding the truck in addition to bonding to the tank being filled addresses this issue and is required by OSHA regulation. Grounding trucks during fuel dispensing is prescribed in National Fire Protection Association (NFPA) guidelines as well. Allowing a few minutes before removing nozzles when the pumping is complete also helps assure that static electricity has dissipated.

Many workers are aware of these requirements but for some reason do not take the time to follow them. Bonding while dispensing diesel fuel is also a commonly overlooked practice. Diesel fuel is considered a combustible liquid and because the flash point is above 100 degrees Fahrenheit, many of the safety codes exempt bonding requirements. The code does require bonding and grounding as discussed above, however, when diesel fuel is pumped into a container that has previously held a higher grade product.

Static electricity is "an accumulation of electric charge on an insulated body." Don't set it free to disperse and create havoc in the presence of flammable and combustible fuels.
FOUR RULES FOR SAFE REFUELING
1) Turn off engine.
2) Don't smoke.
3) Don't use your cell phone-leave it inside the vehicle or turn it off – though not believed to be responsible for any fires.
4) Don't reenter your vehicle during fueling

Bob Renkes of Petroleum Equipment Institute is working on a campaign to try and make people aware of fires as a result of "Static Electricity" at gas pumps.

His company has researched 150 cases of these fires. Below are the results:
1. Out of 150 cases, nearly all of them were women because typically men do not get back in their vehicle until completely finished. This is why they are seldom involved in these types of fires.
2. Almost all cases involved the person getting back in their vehicle while the nozzle was still pumping gas, when finished and they went back to pull the nozzle out the fire started, as a result of static.
3. Most had on rubber-soled shoes.

The Petroleum Equipment Institute stresses to NEVER get back into your vehicle while filling it with gas. If you absolutely MUST get in your vehicle while the gas is pumping, make sure you get out and close the door, TOUCHING THE METAL, before you ever pull the nozzle out. This way the static from your body will be discharged before you remove the nozzle.

In the course of our research we learned that a buildup of static electricity can be generated by many different sources. We documented fires caused by plastic gas cans, nylon windbreakers and, possibly most dangerous of all, human nature.

Always place approved portable gas cans on the ground while fueling, keep the nozzle in contact with the container and fill only to the maximum level to allow for expansion of the fluid. Never fill a gasoline or diesel container in the bed of a pick up truck!

The following link contains a video clip showing gasoline vapors being ignited by static electricity. The woman began pumping fuel, got back into her car and upon touching the pump handle ignited the fumes.

http://www.pei.org/static/index.htm

Also see SIPE website 8-2002 Hazard Alert – Fueling Safety

Suggested SIPE Safety Videos:
None Available