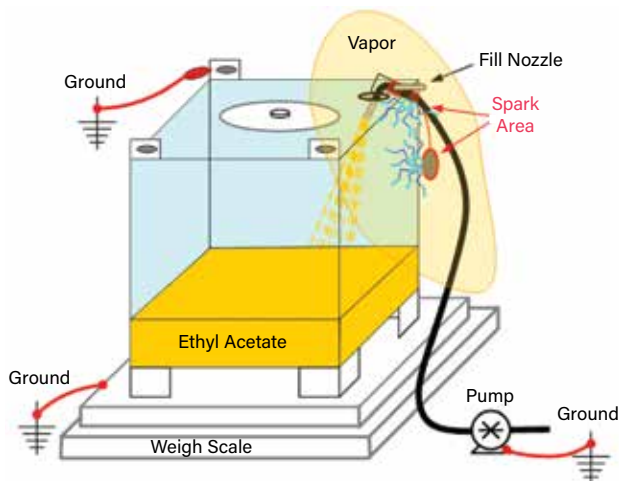


Static Discharges Are Frequent Ignition Sources

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▲ Static discharge ignited flammable vapors while an intermediate bulk container (IBC) was being filled. Image adapted from U.S. Chemical Safety Board (CSB) Report No. 2008-02-I-IA.

Within a 100-day span, a U.S. company had fires at two of its locations. Both fires were caused by static sparks that ignited flammable liquids and vapors.

Incident 1. On July 17, 2007, a tank farm supervisor was transferring flammable varnish makers' and painters' (VM&P) naphtha from a tanker truck to a vertical 15,000-gal (57-m³) above-ground storage tank. After the supervisor started the final transfer from the tanker, the storage tank exploded. Additional tanks exploded and others were set ablaze by the pool of burning solvents. The nearby town was evacuated and the entire tank farm was destroyed. An employee and a firefighter were injured.

Although the truck and storage tank were grounded and the tank was being filled from the bottom, the float-style level gauge was not continuously grounded due to turbulence in the tank. Turbulence separated the linkage in the gauge tape connected to the float, breaking the ground and generating a spark. (Read the U.S. Chemical Safety Board [CSB] Report No. 2007-06-I-KS for more details.)

Incident 2. On October 29, 2007, an operator placed the short nozzle of a hose into a fill opening on top of a metal intermediate bulk container (IBC) and suspended a steel weight on the nozzle to keep it in place. The valve was opened to fill the IBC and then the operator walked across the room. A short time later, he heard a popping sound and saw the IBC engulfed in flames and the fill nozzle laying on the floor discharging ethyl acetate.

The IBC was grounded, but flow through the nonconductive hose generated static electricity. Static discharge between the IBC and the steel weight ignited excess vapors that were outside the IBC, because the tank was being filled from the top. (For more details, read CSB Report No. 2008-02-I-IA.)

Did You Know?

- Static discharge can ignite vapor-air mixtures inside tanks.
- The flow of liquids, gases, and solids through pipes and ducts can generate static electricity.
- A spark of 0.2–0.3 mJ can ignite flammable vapors; a static spark from a person can have 100 times that amount of energy.
- Static electricity typically has to accumulate on an ungrounded conductor (usually metal), such as the level gauge and the steel weight.
- Synthetic materials, such as nylon, can promote static generation. These materials may be used for flexible intermediate bulk containers (FIBCs) or filter media.
- Most fire-retardant clothing (FRC) has low static generating properties.

What Can You Do?

- To reduce static, ground and bond all equipment that comes into contact with flammable materials or combustible solids, prevent free-fall of flammable liquids into vessels, and use conductive materials for all parts of the system.
- Filling containers from the bottom and/or using inert gases during filling operations can prevent a flammable atmosphere in or near the container.
- Inspect the grounding cables and clamps in your area. Clamps must be kept clean to provide intimate contact between the clamp and container. Clamps should also be sharp enough to penetrate paint or rust on the container and strong enough to clamp tightly.
- Inspect ductwork used for transporting combustible solids or dusts to verify all sections are grounded or bonded together.

Generating static is easy, but controlling it requires extra diligence.

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