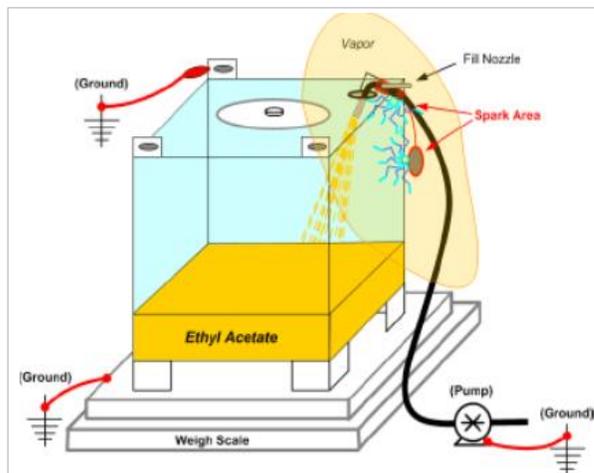


## Static discharges are frequent ignition sources

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**Figure 1. IBC filling operation before fire**

A U.S. company had fires at 2 of its locations about 100 days apart. Both were caused by static sparks igniting flammable liquids and vapors.

On July 17, 2007, flammable VM&P naphtha was being transferred from a tank truck to a vertical 15,000 gallon (57 m<sup>3</sup>) above-ground storage tank. After the tank farm supervisor started the transfer of the last compartment of a tanker-trailer 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.

While the tanker and storage tank were grounded and the tank was bottom-filled, the float-style level gauge was not continuously grounded due to the rocking caused by turbulence in the tank. (Source: CSB Report No. 2007-06-I-KS and video)

On October 29, 2007, an operator placed a short nozzle on the fill hose into a fill opening on top of the 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, 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 non-conductive hose generated static, and top-filling caused excess vapors that was ignited outside the IBC by a static discharge between the IBC and the steel weight. (Source: CSB Report No. 2008-02-I-IA)

### Did You Know?

- Static can ignite vapor-air mixtures inside tanks.
- Flow of liquids, gases and solids, through pipes and ducts can generate static electricity.
- A spark of 0.2 to 0.3 millijoules (mJ) can ignite flammable vapors. A static spark from a person can have 100 times that energy.
- Generally, static has to accumulate on an ungrounded conductor (usually metal) – like the level gauge or the steel weight.
- There are several ways to reduce static:
  1. Ground and bond all equipment handling flammable or combustible liquids.
  2. Preventing free-fall of flammable liquids into vessels.
  3. Using conductive materials for all parts of the system.
- Synthetic materials, such as nylon, can promote generation of static; 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?

- Ground and bond all containers when transferring flammable materials or combustible solids.
- Many operating companies operate their filling operations to prevent flammable mixtures, by bottom filling, and/or using inert gases to prevent a flammable atmosphere in or near the container.
- Inspect the grounding cables and clamps in your area, to provide good contact they should be:
  - Clean to provide intimate contact between the clamp and container
  - Sharp to penetrate paint or rust on the container
  - 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. Controlling static takes extra diligence.**