



## Lightning Strikes — Yikes!

September 2022



▲ Two storage tanks exploded after a lightning strike at a polymer plant in Bristol, PA (1).

In the early morning hours of May 16, 2012, a thunderstorm rolled into an acrylic polymer plant in Bristol, PA. Lightning struck in the tank farm area. Within seconds, an ethyl acrylate tank exploded, and a few minutes later, a butyl acrylate tank exploded. The explosions and ensuing fires destroyed the two tanks and caused a lengthy shutdown. Two people were in the area of the tank farm doing paperwork during the lightning strike; fortunately, no one was injured.

The tanks were grounded according to industry lightning standards, so it is unclear why the explosion happened. The ignition of the atmosphere in the ethyl acrylate tank most likely occurred because an internal component was not bonded to the tank. A spark may have been generated across a small gap and ignited the flammable vapor, similar to the way a spark plug ignites fuel in a combustion engine.

1. Kas, K., and D. Morrison, "It Was a Dark and Stormy Night — Investigation of Acrylate Storage Tank Explosions," *Process Safety Progress*, 41 (2), pp. 293-306 (2022).

### Did You Know?

- Static sparks can occur whenever there is friction between materials during material movement, such as transfer.
- Grounding and bonding can help dissipate an electric charge. To work, the grounding and bonding must be in good condition, in good contact with the metal container, and connected to a proper ground.
- Lightning is a massive spark that is created when water droplets, dust, or ice particles move around a cloud, generating static electricity.
- Lightning can strike anywhere — it is not safe to work outdoors in an electrical storm.
- An electrical current can travel through connected equipment and cause an incident far away from where the lightning actually struck.

### What Can You Do?

- Be sure to always ground and bond flammable containers. This includes pails, drums, isotainers, trucks, railcars, and storage tanks.
- Make sure that grounding clamps "bite into the metal" to get good contact. If a clamp cannot bite into the metal, replace the clamp.
- Report any connection point that is painted; paint could prevent the good contact with the grounding clamp that is needed to dissipate the accumulated static.
- Report any grounding wire that is frayed, corroded, not attached, etc. These grounding wires cannot prevent ignition of a flammable container or storage tank in the event of a lightning strike or other stray electrical current.
- Lightning is unpredictable and can even damage grounded equipment. If you are performing a transfer and a storm comes, stop the transfer and leave the area until you are given approval to safely resume operations.

Take precautions against static sparks — especially lightning.