

Lithium-Ion Battery Hazards

September 2023



Figure 1: Damage to buildings caused by a lithium-ion battery fire.



Figure 2: Lithium-ion battery fired demonstration.

Industrial use of lithium-ion batteries has been increasing over the past decade due to their long life, superior power/energy output, low maintenance, and lower weight. These benefits provide increased efficiency and cost saving. However, there is a flip side to consider. Additional hazards need to be identified, understood, and considered when changing and approving the devices used in classified areas.

In this Beacon, we will provide some lessons learned from incidents with lithium-ion batteries and some recommendations on what you can do to better understand and prevent lithium-ion battery fires and explosions.

Refer to the July 2023 Beacon for a review of battery-powered devices as ignition sources and guidance on their proper use in hazardous areas.
(<https://www.aiche.org/ccps/resources/process-safety-beacon/archives>)

Did You Know?

- Battery fire incidents are becoming more common because lithium-ion batteries are now in many consumer products, such as laptops, cameras, smartphones and more.
- Devices have increased hazards during charging. Larger capacity batteries have a higher fire risk.
- Fires involving Lithium-ion batteries are fast, intensive, difficult to contain or extinguish, and can produce hazardous fumes and gases. The batteries can also explode. After extinguishing, quarantine and monitoring are necessary – the batteries can re-ignite.
- Faulty manufacturing, damage, misuse and aging of batteries can also increase the risk of battery fires.
- Advice on safe handling of lithium-ion batteries is available from many sources. (such as, <https://www.usfa.fema.gov/a-z/lithium-ion-batteries.html>)
- Emergency response personnel must be trained on the proper extinguishing methods when responding to a lithium-ion battery fire. Underwriter's Laboratories (UL) has a webinar on this topic.

(<https://ul.org/research/electrochemical-safety/battery-safety-science-webinar-series>)

What Can You Do?

- Buy electronic devices from reputable retailers and use compatible batteries and chargers certified by a reputable agency.
- If a fire occurs, unplug the battery if it can be done safely. Then evacuate the area and call emergency services. DO NOT try to put the fire out.
- Batteries should also be routinely inspected to make sure there is no cracking, bulging or leaking.
- Charging lithium-ion batteries creates heat. Do it on a solid surface and in an area with good ventilation. When charging a lithium-ion powered device, do it in a safe area and monitor the charging. Once a battery is fully charged, unplug it.
- Never throw lithium-ion batteries in the general trash. They require special disposal. Consult local waste disposal services for proper handling.
- If you use battery-powered vehicles in your plant only park them in approved areas, never near flammable materials.

DO NOT let Lithium-ion batteries power a fire !