

# GN 6-50 Lithium-Ion Batteries

Guidance to fire departments regarding the hazards of lithium-ion batteries.

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## Background

As society becomes more dependent on lithium-ion batteries for uses from transportation (mobility devices), manufacturing and daily use, which can result in a fire or explosion and create toxic gases which are treated as Immediately Dangerous to Life and Health (IDLH).

## Concerns/hazards

Although lithium-ion battery manufacturers build several safety features into lithium-ion batteries, fire crews should be aware that these systems can create a rapid uncontrolled release of heat energy known as thermal runaway. Thermal runaway creates fire gases which are highly toxic and can cause severe adverse effects to firefighter's health.

# Actions for employers

## Employers should:

- Familiarize firefighters with the hazards of lithium-ion batteries
- Train firefighters on the methods provided by manufacturers to shut down, control or extinguish lithium-ion battery fires
- Establish and continually update standard operating guidelines for responding to lithium-ion battery emergencies
- Include measures for limiting interaction with lithium-ion batteries and when crews should allow the lithium-ion batteries to continue to burn
- During (where possible) call taking, have dispatch assess whether a lithium-ion battery is involved and its location in or near a structure (home, garage and parking garage)
- Protect the work area per department policy

## Considerations

These are some important safety considerations for responding to lithium-ion battery incidents:

Fire departments should ensure the hazards posed by lithium-ion batteries are mitigated safely and effectively through early identification, assessment, appropriate personal protective equipment (PPE) use and proper scene management.

## Procedure

For incidents involving any class of lithium-ion battery fires:

- Personnel interacting with (or operating in an area adjacent or connected to) a lithium-ion battery fire shall wear full PPE and don Self-Contained Breathing Apparatus (SCBA) with facepiece, to protect their skin and respiratory system. During thermal runaway, a lithium-ion battery poses a significant burn and inhalation hazard to responders from off-gassing, fire or explosion.
- Use a thermal imaging camera to assess and monitor heat signatures.
- Identify and protect exposures and consider letting the fire continue to burn.
- Assume a defensive approach, unless a life safety hazard is identified.
- Lithium-ion batteries with suspected or known damage or those subjected to extreme temperatures (such as being present in a fire environment) should be removed from interior/confined areas and isolated from other combustibles. Do not remove via elevators.

- Prior to overhauling a structure fire, conduct a diligent search and remove any lithium-ion batteries to prevent them from being covered up. Damaged lithium-ion batteries can reignite and cause a rekindle when combustible materials are next to them.
- The heat from lithium-ion battery fires may have damaged additional cells, which may require additional suppression activities. Batteries should always be treated as energized. To prevent secondary ignition risks, continuously monitor for heat from the battery.
- Have sufficient fire personnel and apparatus on scene for an extended operation.
- Do not handle lithium-ion batteries directly.
- Establish procedures related to the safe disposal of damaged or impacted lithium-ion batteries.
- Conduct continuous air monitoring.
- Ensure that lithium-ion battery fires are investigated and reported.

## Applicable regulations and acts

Read:

- [Occupational Health and Safety Act](#)
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

## Relevant standards

Read NFPA 921 Fires and Explosions, or safety during post-response investigation, arson investigation and vehicle investigation.

[NFPA - Emergency Response Guides for Alternative Fuel Vehicles](#)

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## Related

Guidance Note 4-1 Firefighters Protective Clothing

Guidance Note 6-1 Hygiene and Decontamination

Guidance Note 6-19 Hybrid/Electric and Electric Vehicle Safety