Lithium Batteries in the Energy Sector

HAZARDS OF LITHIUM BATTERIES

As the energy industry is growing and diversifying, so are its needs—and lithium batteries meet many of them. Their high energy density provides larger and longer-lasting amounts of energy than other batteries.

Despite their common use in various consumer and industry products, lithium batteries still pose several hazards, primarily fires and explosions.

Due to their high energy density, explosions and fires from lithium batteries are rapid, intense and can result in violent releases of stored energy. These fires can also be made worse by thermal runaway or the production of dangerous gases and chemicals.

Thermal runaway occurs when heat generated by a battery's internal processes create a feedback loop of further heat generation that rapidly raises temperatures, causing explosions.

These combustions can create hazardous gases, such as carbon monoxide, carbon dioxide, hydrogen fluoride and phosphorus pentafluoride, as well as other volatile organic compounds.

Near-bit Inclination Sub

48V Forklift Battery

Lithium Power Tool Battery

WHERE THEY CAN BE FOUND

- Computers, laptops and backup UPS systems
- Downhole tools (e.g. Measurement While Drilling, Rotary Steerable Systems, wireline logging tools)
- Security cameras
- Smart ID tags on rental equipment
- Gas detection sensors and systems
- Portable power tools
- Wireless geophones
- Powered mobile work site equipment (e.g. forklifts, mobile elevating work platforms)
- Emergency lighting, signal devices and power systems
- Facility backup systems

Back-up Power

Wireless Geophone

Deep Cycle 12V for Aerial Work

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Transportation and Identification

Under Canada's Transportation of Dangerous Goods (TDG) Act, lithium batteries are considered dangerous goods or hazardous materials due to the risks they pose during transportation, handling and storage. The TDG classifies them as miscellaneous dangerous goods, or Class 9 goods.

Lithium batteries are identified with the following UN numbers:

- UN 3090: Lithium Metal Batteries
- UN 3091: Lithium Metal Batteries Contained in Equipment
- UN 3480: Lithium-Ion Batteries
- UN 3481: Lithium-Ion Batteries Contained in Equipment

Not all lithium batteries used in the field require a TDG UN placard. For example, Dewalt batteries for handheld tools.

Resources

Lithium battery explosion video

AB OHS Lithium battery information for employers, supervisors and workers

AB Hazard Assessment and Control handbook

Lithium batteries: Be aware of what you buy!

Transport Canada tools for planning and responding to dangerous goods incidents

LITHIUM BATTERY FIRES

Before fighting lithium battery fires, associated hazards must be carefully considered. Evacuating and letting fires burn out is often the best option aside from calling for professional firefighter assistance:

- Evacuate the area and raise an alarm to alert others.
- Never use water to extinguish the fire—lithium's reactivity with water can intensify the blaze and release more dangerous gases.
- If available, use a Class D fire extinguisher. Designed specifically for metal and lithium fires, these typically use dry powder agents such as sodium chloride or copper, to smother the fire.
- Maintain safe distances and stay mindful of the wind direction and potential dispersal of toxic gases.
- If possible, attempt to contain or isolate the fire by moving materials or equipment away from the area.

Employers should consider the following:

- Do hazard assessments assess potential fires and explosions where lithium batteries are used or in proximity to equipment and work processes?
- Have employees working with or near lithium batteries been appropriately trained on the hazards?
- Are manufacturer instructions for use and disposal of lithium batteries followed accurately?

Emergency drills or tabletop exercises are another option employers can use to train their workforce and test their emergency response procedures.