

Lithium Primary and Rechargeable Battery Safety Guidelines for Cell and Battery makers User Manuel's

Unfortunately, lithium primary and lithium rechargeable cells incorporate safety risks of explosions, fires, leaks of gasses and liquids. For minimizing the damage, it is recommended for cells and battery makers, and companies that sell batteries to include safety warning instructions for their cells and battery customers and users. That document is a draft guideline wringing's recommended by Shmuel De-Leon Energy. We recommend you to order from us a 1 day battery safety training and safety internal audit to be run once a year.

1. Cells and batteries should be inspected for physical damage (Corrosion, Blows, Leaks...). If any is noted, they should be disposed of properly.
2. Do not assemble cells which fail acceptance tests.
3. Do not solder wires or tabs directly to a cell pouch packaging. Solder only the free end of solder tabs welded to the cell pouch case.
4. Always assemble the same cell chemistry, types, State of charge, manufacturers and date codes in a battery pack.
5. Take care to connect the cells in the correct polarity.
6. Do not connect cells of different chemistries, size, manufacturers, date codes, freshness or depletion in the same battery holder or device.
7. Do not short circuit a cell, battery or a charger.
8. Use cells and batteries only with the device and Charger they belong to.
9. Do not attempt to heat or burn cells/batteries.
10. Do not expose cells/batteries to high level of impact.
11. Do not attempt to over charge, force discharge, disassemble, crush, puncture, or incinerate a lithium cell/battery.
12. Do not use corroded cells/batteries.
13. Do not leave alkaline batteries for a long storage inside the device.
14. Turn off the device and immediately disconnect the cells/batteries if they become hot and there is a liquid/gas leaking. Wait for them to cool, and do not reuse them.
15. Do not charge devices near combustible materials.

16. Do not charge primary cells/batteries.
17. Don't charge non-weather protected batteries outdoor under rain, snow or ice conditions.
18. Keep the cells/batteries dry – no contact with water or any liquid.
19. Keep lithium cells/batteries far away from children.
20. Dispose of all batteries in accordance with local, state, and federal hazardous waste disposal regulations.

Procedures for Handling a Hot, Leaking, Vented, Exploded Cell

1. As soon as safety event occurs, the first action is to completely evacuate all personnel from the area.
2. Injures should be provided with a first aid and than to treatment on the nearest Hospital.
3. Ventilation should be initiated and continued until after the cell is removed from the area and the pungent odor is no longer detectable.
4. The area should remain evacuated until the cells has cooled to room temperature and has been removed from the area (at least 2 hours from event time).
5. Remove the cell from the work area once it has cooled and return to a normal operation.
6. Dispose of the cell.
7. Put on lab coat, rubber gloves, high-impact safety glasses, and respirator before handling the cell.
8. Place each remains materials in a separate, sealable plastic bag and seal the bag.
9. Place one cup of vermiculite or other absorbent material in a second bag along with the first bag and seal the bag.
8. Place the double-bagged cell in a third bag containing approximately one cup of lime or baking soda. Seal the bag and dispose of it.
11. Absorb and/or neutralize spilled electrolyte with an absorbent material or baking soda.
12. Sweep contaminated baking soda or absorbent material into sealable plastic bag for disposal.
13. Clean the area with copious amounts of water mixed with baking soda.

Lithium Battery Fires

1. In the event of a lithium fire, the room could become filled with dense white smoke that could cause severe irritation to the respiratory tract, eyes, & skin.
2. Lithium metal melts at 180°C and then it becomes highly reactive. When ignited, lithium fires can throw off molten lithium metal particles.
3. Furthermore, cells adjacent to any burning material could overheat causing a violent explosion + chain reaction that cause other cell to explode.
4. Fire-fighting team must be made aware of any hazardous material in the vicinity of the fire.
5. Completely bury the burning material with lith-x or sand to extinguish the fire.
6. After all material has burned and cooled, carefully turn over the remaining residue and be prepared to extinguish, should re-ignition occur.

Battery safety training and battery safety audit is recommended to be done once a year

Contact Shmuel De-Leon Energy shmuel@sdle.co.il for having 1-day in-house battery safety training and battery safety audit