

TIPS FOR MITIGATING RISKS OF LITHIUM-ION BATTERY FAILURES

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EARLY DETECTION. SMART MAINTENANCE. CERTIFIED CONTAINMENT.

Lithium-ion batteries are essential to modern operations. Their performance is unmatched—and so is the responsibility to manage them safely.

- Most lithium-ion battery failures don't happen suddenly
- Early warning signs often appear well before thermal runaway
- Fast action prevents incidents, downtime, and facility damage

EARLY WARNING SIGNS

Performance clues

- Rapid loss of runtime
- Won't charge to 100%
- Unexpected shutdowns at 30–50%



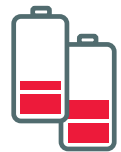
Physical signs

- Swelling or bulging
- Excess heat during normal use
- Smoke or sweet chemical odor



PREVENTION STARTS WITH MAINTENANCE

- Operate batteries within safe charge range
- Avoid full depletion and constant 100% storage
- Follow consistent charging patterns
- Perform routine visual inspections
- Keep batteries dry and temperature controlled



30-50%

STORAGE AND HANDLING MATTER

Proper storage

- Maintain mid-range state of charge
- Store in cool, dry environments
- Avoid temperature extremes and humidity



< 50%

Avoid handling mistakes

- Don't drop batteries
- Protect exposed terminals
- Keep away from conductive surfaces



IF DAMAGE OCCURS: ISOLATE DAMAGED BATTERIES IMMEDIATELY

- Use rigid, insulated, compliant containment systems
- Do not use plastic or cardboard boxes
- Avoid open shelving



RISK IS MANAGEABLE WITH THE RIGHT APPROACH

1. Recognizing early warning signs
2. Practicing disciplined maintenance
3. Proper storage and handling
4. Using certified containment when needed

Providing **INNOVATIVE SOLUTIONS**
to complex problems.