

The Power Behind Performance



# Safety. First.

*Always*

Warehouse managers are responsible for human lives, workplace safety, and efficiency.

*How do you know whether your next batteries are safe?*

Ask these questions to get started:	CROWN BATTERY'S LEAD BATTERIES	EMERGING BATTERY TECHNOLOGIES
Are they safe from thermal runaway?	<b>YES</b>	<b>NO</b> <sup>1</sup> <i>These batteries can enter thermal runaway at temperatures as low as 150°F to 200°F</i>
Are they 99% recyclable - a closed loop?	<b>YES</b> <sup>2</sup>	<b>NO</b> <sup>3</sup> <i>These batteries are 0%-60% downcycleable</i>
Are they 100% free of the potential to release deadly gasses like hydrogen fluoride?	<b>YES</b>	<b>NO</b> <sup>4</sup> <i>Some chemistries "(release) a large number of toxic gases, for example, hydrogen fluoride which, even in small doses, can be life-threatening"</i>
Are all fire departments trained in proper fire suppression?	<b>YES</b> <i>Safety is known and well trained-on</i>	<b>NO</b> <sup>5</sup> <i>Many fire departments don't know best practices (and scientists are still researching them)</i>
Do they operate safely without a battery management system (BMS)?	<b>YES</b>	<b>NO</b> <i>This technology requires BMS to avoid most explosions and fires</i>
Are existing code-approved fire suppression systems suitable?	<b>YES</b> <i>Regular safety systems are proven to work</i>	<b>NO</b> <i>R&amp;D is still in progress, and you may need new fire suppression systems that the manufacturer may not have told you about</i>
Will existing training and emergency protocols work?	<b>YES</b> <i>With billions of lead batteries in safe use, optimal safety protocols are known industry-wide</i>	<b>NO</b> <i>But this cost is not listed on any invoice</i>
Is fire suppression simple and straightforward?	<b>YES</b>	<b>NO</b> <sup>6</sup> <i>Many of these batteries have reignited hours, days, or weeks after a fire was "put out"</i>
Has your battery technology (and specific chemistry) been around longer than the warranty period?	<b>YES</b> <i>Lead batteries have been tested in multiple fields for more than 100 years and evolved with robotic manufacturing and aerospace R&amp;D</i>	<b>MAYBE</b> <i>Large-format emerging storage technologies first entered the market in 2007, but specific chemistries may have less than a decade of real-world use</i>

*\*Source materials for above information listed on page 2.*

## Want to get the most out of your batteries?

Learn battery handling, maintenance, and testing best practices at [www.crownbattery.com/how-to](http://www.crownbattery.com/how-to)

## Sources for Safety. First. – Always

1. Source: *Battery University*
2. Source: *“Advancing Sustainable Materials Management: 2015 Fact Sheet”* (page 10)  
– United States Environmental Protection Agency
3. Source: Read more at: *“To Recycle, Or Not to Recycle, That is the Question: Insights from Life-Cycle Analysis”*  
– Materials Research Society Bulletin, Volume 37, Issue 4
4. Source: *“Batteries and Fire Hazards Making Their Way Into Our Buildings”*  
– Confederation of Fire Protection Associations Europe (CFPA Europe)
5. Source: For examples of hazards: *“Best Practices for Emergency Response to Incidents Involving Electric Vehicles Battery Hazards: A Report on Full Scale Testing Results”*  
– The Fire Protection Research Foundation
6. Source: *National Fire Protection Association Journal, January-February 2016*