Increasing the Safety of Aviation Ground Support Equipment with Lithium Batteries

UL 5840, the Standard for Electrical Systems of Battery Powered Aviation Ground Support Equipment, addresses risks to fire, electrical shock and explosion.

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Introduction

Looking to reduce CO2 emissions and meet increased environmental requirements, airlines and airports are replacing diesel-fueled ground support equipment (GSE) with lithium-ion (lithium) powered machines. Airports worldwide have announced policy commitments to remove all diesel-powered vehicles from the apron and airside over the next three decades. While eliminating carbon emissions, these changes also significantly reduce diesel fuel costs and the costs of maintaining internal combustion engines. Ground personnel health risks are reduced by eliminating CO2 emissions and noise from internal combustion engines.

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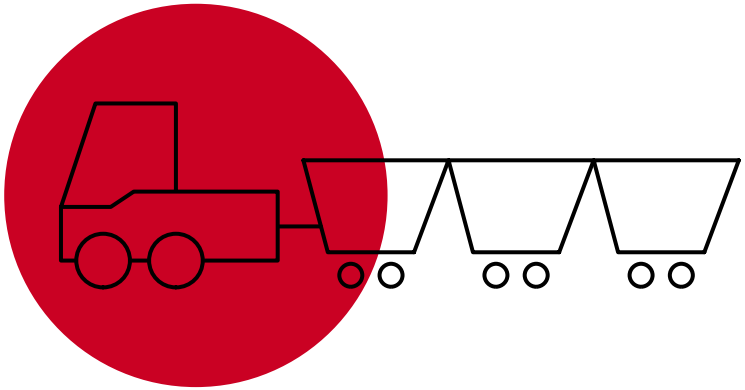
With lithium-ion batteries, benefits come safety risks

Although lithium battery-powered vehicles offer many benefits, this new and evolving technology presents some risks. Recognizing the current and increasing need for safety requirements, UL Solutions recently launched a new service for evaluating lithium battery-powered aviation GSE. UL 5840, the Standard for Electrical Systems of Battery Powered Aviation Ground Support Equipment, provides requirements that address the risk of fire, electric shock and explosion for the electrical systems of battery-powered airport GSE.

A widespread agreement among managers of dangerous goods and ground support teams in the aviation industry is that prevention is the most effective method of increasing safety. We can provide testing and certification services for UL 5840, which can help mitigate potential issues related to the use, installation and maintenance of lithium batteries in GSE vehicles, including:

- Tugs
- Tractors
- Pushbacks
- Firefighting equipment
- Freight carts
- Container loaders
- Belt loaders
- Refuelers
- Food and water
- Ground power units
- Passenger boarding stairs
- De/anti-icing vehicles



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Key players across the aviation industry support the development of these safety standards as they work to transform their existing ground support equipment into more energy-efficient electric vehicles.

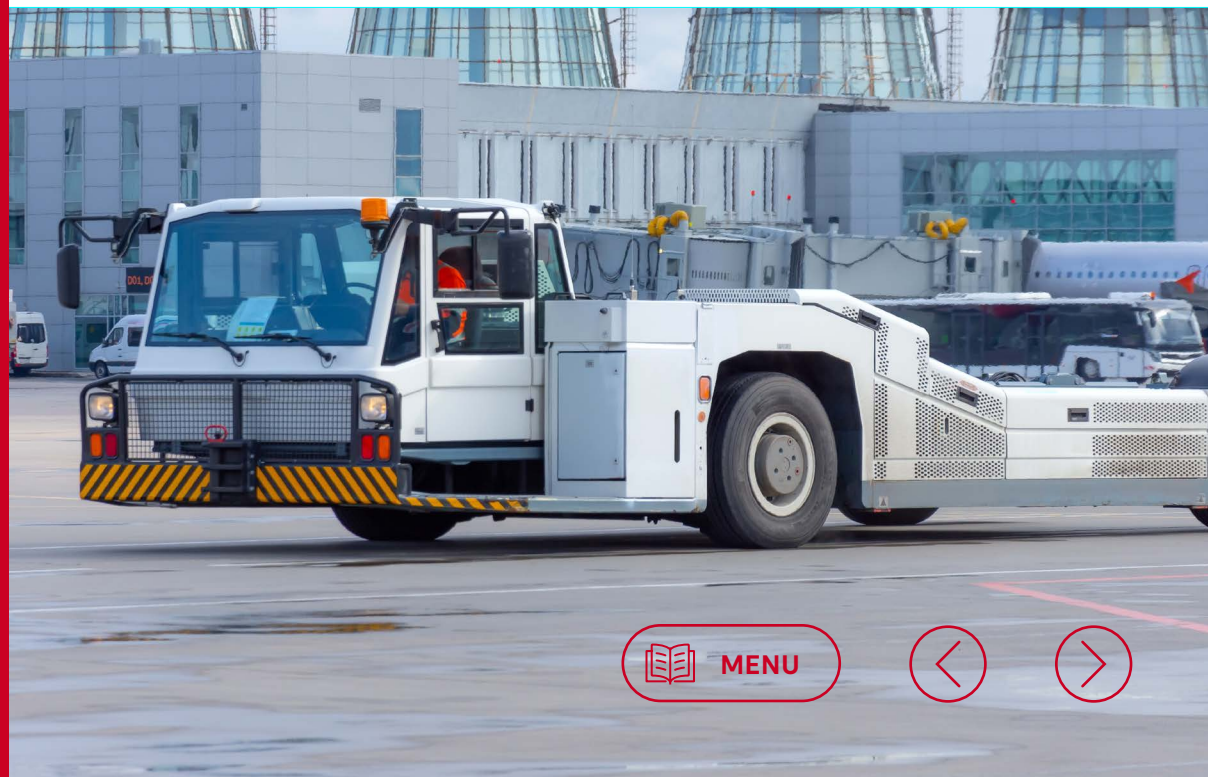
The Chicago Department of Aviation awarded a $640,000 (USD) grant toward a United Airlines joint-EPA investment of $1.43 million (USD) to purchase 26 new zero-emission GSE vehicles, replacing older, diesel-fueled equipment.

United Airlines will save more than 1.4 million gallons of diesel fuel and reduce emissions of carbon dioxide (CO_2), the primary air pollutant in the generation of greenhouse gases, by more than 16,000 tons (as well as other byproducts of fuel emissions).[1]

GSE lithium battery retrofit

Some aviation GSE is already electrified with lead-acid batteries. However, lithium batteries are significantly lighter, smaller and superior to lead-acid in energy storage and physical space. For these reasons, the aviation industry is retrofitting its current lead-acid-powered GSE fleets with lithium batteries.

The aviation industry is especially concerned about the safety of lithium retrofit batteries since this portion of the industry is not closely regulated. To address this concern, the Standard contains the retrofitting of lithium batteries into more traditional diesel-powered and lead-acid-powered equipment.



Airport maintenance and operations

Compared to lead-acid batteries, lithium batteries require no maintenance except for charging. Most airline operations facilities are already equipped with charging equipment due to the prevalence of lead-acid powered GSE in their fleet inventory. We can assess lithium battery chargers, new battery charging stations and their facilities for compliance with safety requirements and for risk of fire, electric shock and explosions.

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U.S. Canada binational recognition

As a binational U.S./Canadian Standard, UL 5840 is nationally recognized and approved by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC), offering greater consistency in the safety requirements for battery-powered GSE across both countries and jurisdictions. It also provides greater efficiency in maintenance, with one document rather than two. Additionally, the binational status reduces potential trade barriers, enabling manufacturers to design and evaluate GSE for both countries, and eliminates the risk of de-harmonization when updates are implemented.

Why UL Solutions?

We are a global leader in applied safety science. The company addresses safety, security and sustainability challenges and develops solutions for customers in more than 100 countries. UL Solutions delivers testing, inspection and certification services, software products and advisory offerings that support product innovation and business growth. The UL Certification Marks serve as a recognized symbol of trust in our customers' products and reflect an unwavering commitment to advancing our safety mission. We help our customers innovate, launch new products and services, navigate global markets and complex supply chains and grow sustainably and responsibly into the future. Our science is your advantage.

Learn more at https://www.ul.com/services/industrial-mobility.

Sources

1. The Business Journals, United Airlines gets federal help to reduce diesel emissions at O'Hare, https://www.bizjournals.com/chicago/news/2018/02/12/united-airlines-gets-federal-help-to-reduce-diesel.html

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