

LITHIUM-ION BATTERIES: EXPLODING IN THE PRESENT, FIRED UP FOR THE FUTURE!

Author:



Neal R. Novak

Partner

312.425.2516

nnovak@wglaw.com

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INTRODUCTION

Since the first lithium-ion battery was commercially produced by Sony in 1991, the demand has grown exponentially – from portable electronic devices to power tools, to electric vehicles and more, their ubiquity is undeniable. But if mishandled, abused or defectively constructed, they can become explosive fireballs of toxic gas with devastating consequences.

This note looks at the challenges of attempting to manage the insurance risks presented by lithium-ion batteries, a product with an upside of unlimited social benefit but also with a deadly downside. The advancements in information technology in the 1980s increased the demand for energy in small packages. Initially these devices were powered by nickel cadmium and alkaline batteries, but the rechargeability feature of lithium-ion batteries made handheld devices immediately more desirable.

The increasing number of property damage and bodily injury losses caused by fires has made lithium-ion batteries one of the fastest growing risks in the insurance industry. The U.S. Consumer Product Safety Commission (“CPSC”) has stated that over a five-year period ending in 2022, there were at least 25,000 reported incidents of batteries overheating and catching fire resulting in over 140 injuries and more than 19 deaths.

Since then, there have been over 800 fires in New York City alone increasing the death toll to over 30 and the number of injuries to over 400. In 2023, New York City became the first city in America to enact safety legislation reducing the exposure of lithium-ion battery losses to the public with the passing of Initiative 663-A.

The increasing number of property damage and bodily injury losses caused by fires has made lithium-ion batteries one of the fastest growing risks ever seen in the insurance industry.



THE POWER AND PERILS OF LITHIUM-ION BATTERIES

The Power

The power is clear – by aggregating the appropriate number of cells into a battery pack, anything can be powered by a lithium-ion battery from electric automobiles to a 426-foot aluminum catamaran ferry. The biggest “boom” is currently in micromobility devices such as e-bikes and e-scooters. While they have unlocked unprecedented societal progress, the ultimate legacy of lithium-ion batteries depends on how well the industry manages the ethical and environmental challenges of their production and how well consumers respond to the safety and disposal concerns.

Thermal runaway fires present a unique hazard because they vent toxic gases and often reignite whereas “normal fires” involve the ignition of combustibles (wood, paper, etc.) and are fueled by oxygen. Chemical fires are extremely difficult to extinguish, often reigniting hours to days later.

The Perils

Anything extremely good has the potential to be extremely bad and with lithium-ion batteries, the “extremely bad” comes in the form of thermal runaway – a chain reaction where heat from one cell causes the neighboring cells to fail leading to explosive, self-sustaining fires. The main causes of thermal runaway are mechanical (punctures, crushing, dropping); electrical (overcharging or using non-certified chargers); thermal (exposure to extreme heat or cold); and manufacturing defects (cell construction issues or quality control flaws).

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Underwriters Laboratory Solutions (“UL”) is the global leader in applied safety science and is recognized as the gold standard for testing, inspection and certification. Although UL has not yet certified a fire suppression system, it has certified certain extinguishing agents making them suitable to be used in suppression systems. The point of any suppression system or agent is to suppress the chemical fire allowing the cells to cool to stop thermal runaway and to smother the battery with a specialized agent. As discussed below, a combination of State and Federal legislation along with an increasing awareness of underwriters in learning how to manage the risk is required to optimize the benefits these batteries offer.

LOCAL AND NATIONAL LEGISLATION

Local Legislation

As mentioned above, New York City enacted Initiative 663-A in 2023 requiring any e-bike sold, distributed or rented in New York City to comply with UL Standard 2849. This UL Standard looks at the entire electrical system of an e-bike – the battery, the drive train, the motor and the charger. The law also requires UL certification of batteries used in light electrical vehicles (UL 2271) and UL certification of the electrical systems in e-scooters (UL 2272). California enacted a similar statute, SB 1271, effective January 1, 2026. Like New York's Ordinance, it requires certification under UL 2849 and UL 2272.

New Jersey passed Bill S4834 set to take effect on July 1, 2026. However, the law is aimed at public safety and not the hazards of lithium-ion batteries. It amends current law to remove all classifications of electric bicycles and to replace them with one classification of “motorized bicycle” including a pedal bicycle with fully-operable pedals and an electric motor that helps when the rider is pedaling. By designating all pedal bicycles with electric motors as motorized bicycles, a person owning or operating one will be required to comply with the provisions of the law concerning motorized bicycles, including obtaining insurance, a license (minimum age 15), and registering the bicycle. The bill has been criticized as “confusing” and “overly restrictive.” Also, how it will be enforced against non-New Jersey residents who bring e-bikes into the State is not yet known.

National Legislation

On the national level, we have not been as fortunate as New York City and California to regulate lithium-ion batteries. The Committee on Commerce, Science and Transportation of the United States Senate passed Senate Bill 389 on July 29, 2025 but it has not yet been brought to the Senate for a vote. The bill echoes New York City's Initiative 663-A requiring the CPSC to adopt the same three UL certification standards that are included in the NYC ordinance: UL 2849 (safety standard for electrical systems and e-bikes); UL 2272 (safety standard for electrical systems in other e-mobility devices); and UL 2271 (safety standard for batteries in light electric vehicles). If the bill is passed, compliance with the UL standards will become compulsory, rather than voluntarily, which is how the standards established for the American lithium-ion battery manufacturers have been implemented. More importantly, the proposed standards will apply to batteries and products imported into the United States.

It is unknown when the bill may be brought to the floor for a vote, but it was recently reportedly estimated at approximately 45% likelihood of passage. Consumer safety should be a national priority not a partisan issue, but under the current environment, there is no common ground.

THEORIES OF LEGAL LIABILITY

While there have been thousands of reported incidents of significant property damage and bodily injury caused by LIB fires and explosions, the quantification of the total number of lawsuits filed in America involving damages caused by lithium-ion batteries is not possible. However, there are several reported decisions, although the issues before those Courts often related to technical procedural or evidentiary matters, such as whether a complaint stated a claim for relief or whether experts were competent to testify. Nevertheless, there are several recurring legal theories alleged in most cases and most likely will be alleged in all cases involving property damage or bodily injury caused by lithium-ion batteries. Those theories are:

- Products liability (strict products liability – looks at condition of the product and removes negligence of the manufacturer as an element of the claim)
- Negligence-based claims including failure to warn and negligent misrepresentation
- Breach of contract claims including breach of express and implied warranties
- Fraudulent misrepresentation
- Fraudulent concealment
- Various Consumer Protection Act violations and other statutory violations

The cases identified to date are set forth in the Appendix to this note.

COVERAGE ISSUES FOR CGL AND HOMEOWNERS POLICIES

There is a significant and growing exposure but the P&C markets are not heeding the warnings. There are some commercial and specialized coverage endorsements in force for lithium-ion battery manufacturers but not much aimed at consumers and homeowners.

A few years ago, McKinsey & Company prepared a report where it estimated that the global demand for lithium-ion batteries will increase by almost 30% annually by 2030. This will generate almost a 700% increase in gigawatt hours of energy (a unit of energy measured over time). By way of example, one gigawatt hour provides enough energy to power approximately one million homes for one hour. (A 700% increase in available energy is staggering, and proportionately, the increased risk will be staggering.) Unless steps are taken soon to manage the risk, the property and casualty markets will be covering these losses without even attempting to explore a way to limit the exposure or to create a subrogation option.

COVERAGE ISSUES FOR CGL AND HOMEOWNERS POLICIES, CONT'D

As for CGL Policies, they are typically triggered when there is “bodily injury” or “property damage” caused by an “occurrence” during the policy period which is otherwise not excluded. Typical exclusions that may apply under a CGL Policy to a claim for property damage or bodily injury caused by an exploding battery are:

- Pollution Exclusion (LIB fires include toxic smoke, gases and hazardous materials from firefighting runoff such as water contaminated with heavy metals like cobalt and nickel)
- Auto Exclusion (LIB fire caused by overcharging EV battery resulting in BI or PD)

Business Exclusions:

- j(1) (damage to property you own, rent or occupy)
- j(3) (damage to property loaned to you)
- j(4) (personal property in the care, custody or control of the insured)
- j(5) (property damaged by you or subcontractors working on your behalf performing operations)
- j(6) (property damaged because “your work” was incorrectly performed on it)
- k (“property damage” to “your product” arising out of it or any part of it)
- l (“property damage” to “your work” arising out of it or any part of it and included in the “products-completed operations” hazard. Subcontractor exception might apply)

As for Homeowners’ Policies, there are three coverage forms:

1. Basic (covers listed perils with conditions and exclusions)
2. Broad Form (covers basic perils and additional perils but excludes perils not specifically identified)
3. Special Form (all risks are covered unless specifically excluded)

In their current condition, most ISO Coverage Forms and even Manuscript Forms are going to be covering these losses because fire is always a covered peril. The insurers need to take matters into their own hands if there is not going to be legislation reducing the exposure, and currently that does not seem likely to happen on the national level.

INSURER OPTIONS TO REDUCE RISK

“Maintaining the status quo” is always the enemy of change but sometimes change is triggered by a seismic shift in the landscape. For insurers, the volume of losses to be experienced will increase exponentially with the significant increased demand for these batteries, which should occur by 2030. So what can an insurer do to take into its own hands the ability to manage and limit these losses?

First, follow the lead established by New York City’s Initiative 663-A and insure only certified products. Next, insurers could exclude losses caused by the failure to follow manufacturer instructions on charging and storage of lithium-ion battery powered devices. Finally, if a particular product requires installation, the insurer could require the item to be professionally installed. This would apply to products such as home solar battery-panel systems and similarly complicated installations.

The balance between managing the challenges presented by this risk and maintaining a marketable insurance product is tricky, but it can be done and it should be done. Otherwise, the losses from this expanding exposure will become problematic.

CONCLUSION

While it is not yet too late, it will soon be if the markets do not adopt a proactive attitude to manage the inevitable onslaught of new lithium-ion battery losses. The insurers should take control and hope their efforts will be enhanced by state or national legislation.

APPENDIX

1. *Great American E & S Insurance Co. v. Power Cell LLC*, 365 F.Supp.3d 730 (N.D. Ill. 2018). (Declaratory judgment action brought by insurer to determine duty to defend; insured's counterclaim alleged **negligence and breach of warranty**.)
2. *Recytech USA, Inc. Han Metal USA, Inc. v. Grange Ins. Co.*, 754 F. Supp.3d 1328 (N.D. Ga. 2024). (Pallets of lithium-ion batteries combusted on two separate occasions. EPA assessed clean-up costs and landlord/property owner sought indemnification for property damage. Complaint alleged **breach of contract and bad faith**.)
3. *Riley v. Tesla, Inc.*, 603 F.Supp.3d 1259 (S.D. Fla. 2022). (EV case; Complaint alleged **negligence and strict products liability** for defects in the lithium-ion battery cells and battery pack.)
4. *Gopalratnam v. Hewlett-Packard Co.*, 877 F.3d 771 (7th Cir. 2017). (Laptop battery fire killed son; Complaint alleged **negligence, strict products liability and breach of warranties**.)
5. *State Farm Fire Cas. Co. v. Amazon*, 528 F. Supp. 3d 686 (W.D. Ky. 2021). (Subrogation claim for losses caused by hoverboard fires; Complaint alleged **negligence, strict products liability, and negligent failure to warn**.)
6. *Fox v. Amazon.com, Inc.*, 930 F.3d 415 (6th Cir. 2019). (Hoverboard fire caused loss; Complaint alleged **products liability, failure to warn, and violations of the Tennessee Consumer Protection Act**.)
7. *Am. Fam. Ins. Co. v. Pecron, LLC*, 2023 U.S. Dist. LEXIS 222962 (D. Minn. 2023). (Defective portable battery-powered generator caught fire; Complaint alleged **strict products liability and negligent design**.)
8. *In re Chevrolet Bolt EV Battery Litigation*, 633 F.Supp.3d 921 (E.D. Mich. 2022). (Class action suit for loss of propulsion and fires caused by defective battery system. Complaint alleged **misrepresentation, fraudulent concealment, violations of various State and Federal statutes and breach of express and implied warranties**.)
9. *In re Chrysler Pacifica Fire Recall Prods. Liab. Litig.*, 706 F.Supp.3d. 746 (E.D. Mich. 2023). (Class action suit alleged defects in the battery system causing thermal runaway fires and explosions. Complaint alleged **breaches of express and implied warranties, violations of State consumer statutes, deceptive marketing and unfair trade practices**.)
10. *Snelling v. Tribal Vapors*, 2021 U.S. Dist. LEXIS 62453 (D.N.M. 2021). (E-cigarette exploded; Complaint alleged **negligence, strict products liability and breach of implied warranties**.)
11. *Connally v. Samsung Sdi Co*, 2020 Cal. Super. LEXIS 43345 (Cal. Super. Ct. 2020). (E-cigarette exploded causing bodily injury; Complaint alleged **products liability, negligence and negligent failure to warn**.)
12. *L.D. v. Brooklyn Kings Plaza LLC*, 128 N.Y.S.3d 795 (N.Y. App. Div. 2020). (E-cigarette exploded; Complaint alleged strict **products liability, negligence and breach of warranties**.)

APPENDIX

13. *National Power Corporation v. Federal Aviation Administration*, 864 F.3d 529 (7th Cir. 2017). (Shipping case involving violations of multiple hazardous material regulations resulting in the assessment of fines and penalties against Plaintiff. Grounds asserted to reverse **statutory penalties** were rejected and the FAA's decision was upheld.)
14. *Podpeskar v. Makita U.S.A. Inc.*, 247 F.Supp.3d 1001 (D. Minn. 2017). (Lithium-ion battery in drill ceased working after two years and manufacturer refused to replace the battery. Complaint alleged **negligence, breach of warranties, fraudulent misrepresentation and violation of various State consumer protection acts.**)
15. *Chalco v. GM, LLC.*, 2025 Cal. Super. LEXIS 51415 (Cal. Super. Ct. 2025). (Plaintiff's Chevrolet Bolt developed lithium-ion battery defects and manufacturer was unable to conform the vehicle to the warranted standards within a reasonable number of attempts. Complaint alleged **breach of the implied warranty of merchantability, fraudulent inducement and violations of various California codes.**)
16. *Fiedler v. Truth Aquatics, Inc.*, 2025 Cal. Super. LEXIS 10979 (Cal. Super. Ct. 2025). (Electronic devices plugged into a shipboard electrical system caused a thermal runaway fire resulting in the death of passengers. Complaint alleged **wrongful death, survival, negligence, and strict products liability.**)
17. *Fluence Energy, LLC v. M/V BBC Finland*, 726 F.Supp.3d 1086 (S.D. Cal. 2024). (Consolidated maritime action involving improperly secured cargo which resulted in a fire and damage. Plaintiff's Verified Complaint, in rem, alleged **breach of maritime contract, negligence, and breach of bailment**; defendant's counterclaim for declaratory judgment sought to enforce an **alleged liability limitation in contracts between the parties.**)