Pre-consultation: Proposed new requirements for lithium-ion batteries and consumer products containing lithium-ion batteries under the Canada Consumer Product Safety Act

From: The Canadian Association of Fire Chiefs

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1. **Do you agree that the risks of overheating, off-gassing, smoke, fire, thermal runaway, and explosion posed by lithium-ion batteries require mandatory requirements to address these hazards?**
    a. **Yes. Please explain why**
    b. No. Please explain why

Response: Lithium-ion batteries are safe when they are manufactured properly, with attention paid to electrolyte materials selection, design and fabrication of cells and battery packs. Reputable and skilled manufacturers follow these principles; however, there are counterfeit battery manufacturers that will make lithium-ion batteries without taking the above principles into consideration. They are then sold to consumers for lower prices. Many lithium-ion battery fires are caused by off-market batteries used in incompatible devices, or by improper use or tampering by consumers. Mandatory requirements ensure that the risks posed by lithium-ion batteries are safely mitigated, and can help educate consumers on what is the best practices when using products with lithium-ion batteries in them. (Source: Abraham, K. M. (2023). How safe are Li-ion batteries?. *Journal of the Electrochemical Society*, *170*(11), 110508)

The following two-part question is about lithium-ion batteries as a consumer product or as a component of a consumer product. The question further delves into certification. Being certified by an accredited certification body means that a third-party, has tested the product to verify that it meets applicable standards and requirements, as well as providing for a certification label.

2. **Do you agree that the hazards posed by defective or poor quality lithium-ion batteries can be significantly mitigated by requiring mandatory safety requirements (such as the requirements in CSA C22.2 No.62133-2, UL 1642, UL 2054) for lithium-ion batteries, that are consumer products, or are components of consumer products, that are manufactured, imported, advertised or sold in Canada?**
    a. **Yes. Please explain**
    b. No. Please explain

Response: Yes. Over 700 communities responded to lithium-ion battery fires in 2025. In Toronto, it is one of the fastest-growing areas; “Our experience has been that most LIB fires originate from micro mobility devices, such as e-bikes, e-motorcycles, e- scooters, and hoverboards. These devices and their batteries are more likely to be weathered and heavily used, and they are frequently found in public and private settings, in apartment buildings, subways, trains, and in the public realm. It is also important to note that places like New York City, USA and London, UK already have legislation in place on LIBs mandating compliance with UL/ULC in both cities”. (Correspondence from Toronto Fire Chief Jim Jessop, July 2, 2025).

3. **Do you think that mandatory requirements for lithium-ion batteries that are consumer products or are components of consumer products should include a requirement for certification by an accredited certification body to a standard such as CSA C22.2 No.62133-2, UL 1642, UL 2054?**

a. **Yes. Please explain why**
b. No. Please explain why

Response: Yes. As mentioned above, lithium-ion batteries pose a significant safety risk if not handled properly. Certifications and warning labels can help mitigate these risks by ensuring they are consistently produced safely by producers, and consumers know that they are purchasing a legitimate battery. It would also reduce the number of fires caused by second-market or counterfeit batteries by giving consumers a way to verify the battery they purchase is legit. (Source: Ali, H., Khan, H. A., Khalid, M., & Pecht, M. (2025). A review and analysis of the safety labeling of lithium-ion batteries. *Journal of Energy Storage*, *120*, 116461).

4. **If key safety requirements for lithium-ion batteries in Canada were made mandatory through regulation, potentially including a requirement for lithium-ion batteries to be certified: Q3.2 How important is it for potential regulations for lithium-ion batteries in Canada to align with standards or requirements in other jurisdictions?**
    a. **Very important. Please explain why**
    b. Somewhat important. Please explain why
    c. Not Important. Please explain why

Response: It is very important. At this time, certifications and regulations on lithium-ion batteries can vary depending on the region, though some consistent standards are followed, such as UN 38.3 certification (for transport). Aligning standards or requirements in other jurisdictions would allow all battery manufacturers to have consistent guidance on certifications and reduce disruptions in the global market (fewer producers need to accommodate various standards). It would also reduce confusion about what different jurisdictions deem appropriate for regulations and certifications for lithium-ion batteries. (Source: Melin, H. E., Rajaeifar, M. A., Ku, A. Y., Kendall, A., Harper, G., & Heidrich, O. (2021). Global implications of the EU battery regulation. *Science*, *373*(6553), 384-387.)

5. **Do you agree that ensuring that a lithium-ion battery is operated within its specified operating parameters is critical to the safety of the consumer product it is used in? This could include the use of battery protection or battery management system circuitry.**
    a. **Yes. Please explain why**
    b. No. Please explain why

Response: Yes. The Great Canadian Fire Census 2025 indicates that about 96% of urban centres are responding to lithium-ion battery fires that are also present in electric vehicles. Toronto Fire Service reported a 162% rise in lithium-ion battery fires and recommended that consumers only use manufacturer's batteries for their devices, avoid second-hand or off-market batteries, and avoid making modifications to the batteries. Safe storage, packaging and labelling practices, as well as public awareness campaigns on the safe use of lithium-ion batteries, will help reduce any safety risks to

consumers (Source: Lisbona, D., & Snee, T. (2011). A review of hazards associated with primary lithium and lithium-ion batteries. *Process safety and environmental protection*, *89*(6), 434-442.).

6. **What are the barriers, technical or otherwise, to consumer product manufacturers designing safeguards into the product to ensure that lithium-ion batteries are operated within their specified safe operating parameters? For example, the inclusion of a protective integrated circuit or other battery management system to monitor battery conditions and provide charging control?**

Response: Battery materials, design, abuse conditions and battery status can be barriers to consumer product manufacturers designing safeguards into products to ensure that lithium-ion batteries are operated within their specified safe operating parameters. As well, battery life cycle, safety and temperature difficulties can make it difficult for manufacturers to implement safeguards. (Source: Chen, S., Gao, Z., & Sun, T. (2021). Safety challenges and safety measures of Li-ion batteries. *Energy science & engineering*, *9*(9), 1647-1672.) On the fire and life safety side, these fires burn hotter and faster than traditional fires, and right now, firefighters are submerging the batteries in water and waiting for them to self-extinguish. There is no clear consensus on how to extinguish a lithium-ion battery fire.

7. **Do you think that mandatory requirements for battery protection and battery management systems of consumer products containing lithium-ion batteries should include certification by an accredited certification body to applicable Canadian national product safety standards?**
    a. **Yes. Please explain why**
    b. No. Please explain why

Response: Yes. National standards and testing requirements play an important role, including ensuring safety for consumers and producers, increasing product competitiveness, and reducing trade barriers. Research shows that certifications can also help producers maintain credibility and reputation in their products through independent verifications and audits (Sources: Aristyawati, N., Fahma, F., Sutopo, W., Purwanto, A., Nizam, M., Louhenapessy, B. B., & Mulyono, A. B. (2016, October). Designing framework for standardization and testing requirements for the secondary battery, a case study of lithium-ion battery module in electric vehicle application. In *2016 2nd International Conference of Industrial, Mechanical, Electrical, and Chemical Engineering (ICIMECE)* (pp. 207-212). IEEE; Rutovitz, J., Dominish, E., Li, W., Farjana, S., Northey, S., & Giurco, D. (2020). Certification and LCA of Australian Battery Materials–Drivers and Options. *Prepared for Future Batteries Industry CRC by the Institute for Sustainable Futures, University of Technology Sydney and The University of Melbourne*.)

8. **Further to the existing standards listed in the proposal, are there any other standards, regulations, or other design and testing requirements that you are aware of that adequately mitigate the risks of overheating, off-gassing, smoke, fire, thermal runaway and explosion posed by lithium-ion batteries?**
    a. **Yes. Please specify**
    b. No.

Response: We have not assessed the existing standards. Ruiz et al. (2018) report that the following bodies have worked in this area: International Electrotechnical Commission (IEC), the International Organisation for Standardisation (ISO), the Society of Automotive Engineers International (SAE) at the international level and the European Committee for Standardisation (CEN) and European Committee for Electrotechnical Standardisation (CENELEC) at the European level. Standards can also be issued by National bodies (e.g. British Standards Institution (BSI), Japanese Industrial Standards Committee (JISC)) or regional organisations.

Ruiz et al. (2018) also advise that regulations have been issued by the United Nations Economic Commission for Europe (UNECE), which define uniform technical prescriptions for wheeled vehicles, their parts and equipment, and state conditions for reciprocal recognition of type approvals by several countries; the National Highway Traffic Safety Administration (NHTSA) in the US issues regulations via the Federal Motor Vehicle Safety Standards (FMVSS). (Source: Ruiz, V., Pfrang, A., Kriston, A., Omar, N., Van den Bossche, P., & Boon-Brett, L. (2018). A review of international abuse testing standards and regulations for lithium ion batteries in electric and hybrid electric vehicles. *Renewable and Sustainable Energy Reviews*, *81*, 1427-1452.)

9. **What considerations should be taken for potential regulations so that innovation in battery technology is not hindered? Similarly, how can potential regulations encourage research and development of safer chemistries and technology, leading to more sustainable batteries?**

Response: When looking at the EU regulations as an example, they were seen as a stimulus to innovation, as they were taken into account at all stages of the innovation process. They also define producer responsibilities, enhance safety standards, and enable data sharing. Some unintended consequences include hindering innovative activity and technical and organizational challenges like non-standardized battery designs, competitive dynamics that may favour recycling over repurposing, and uncertainties regarding repurposed battery lifespans. Keeping these in mind as regulations are created will lead to more sustainable batteries. Potential regulations should take into account a balance of allowing innovation to occur and ensuring that consumer safety is not pushed to the side. Regulations give producers a guide to follow and help maintain credibility in the batteries they produce. (Source: Pelkmans, J., & Renda, A. (2014). Does EU regulation hinder or stimulate innovation?; Chun Lin, Y. (2023). Impact of the EU Battery Regulation on Circular Economy of EV Batteries-barriers and opportunities for battery repurposing.)

Fire and life safety should also be taken into consideration, and more research into how to suppress lithium-ion battery fires. The number of lithium-ion battery fires is increasing, and there is no clear consensus on how to respond to them, and not all fire departments are equipped to respond. Firefighter Personal Protective Equipment (PPE) is also not equipped to protect firefighters from the chemicals released during these fires. Further research into extinguishing methods can lead to the development of safer chemistries and technology by keeping firefighters and first responders safe from prolonged exposure and being able to quickly and effectively respond to these fires.

10. **How can the risks associated with incompatible chargers/batteries (whether due to poor design, user error, or user misuse) be mitigated?**

Response: Consumers purchase incompatible chargers or batteries mainly because they are seen as a cheaper alternative to the battery or charger straight from the manufacturer, or they are unable to tell the difference between a counterfeit and a legitimate battery. This increases the risk of a fire in people's homes, as mentioned in previous questions. To mitigate these risks, device manufacturers and retail stores should make clear what batteries and chargers are from the manufacturer, and which are third-party or counterfeit. Clearly marked regulations and certifications for device manufacturers and the batteries they produce can also help inform consumers that the products they are purchasing are from legitimate sources. Public campaigns on the dangers of incompatible and third-party chargers/batteries can also keep consumers informed on their risks. (Sources: He, F. (2021, June). Risk Analysis and Accident Causes of Mobile Phone Charger. In *Journal of Physics: Conference Series* (Vol. 1952, No. 3, p. 032037). IOP Publishing; Kong, L., Das, D., & Pecht, M. G. (2022). The distribution and detection issues of counterfeit lithium-ion batteries. *Energies*, *15*(10), 3798.)

11. **Should all consumer products containing lithium-ion batteries be subject to the same mandatory requirements, or is there reason to differentiate or categorize requirements based on application, risk, or battery capacity?**

Response: At this time, this would be easier than trying to stratify the risk.

12. **What other actions could be taken to reduce the risks posed by lithium-ion batteries in consumer products?**

Response: This response is provided by the Canadian Association of Fire Chiefs (CAFC). We would be interested in continuing the dialogue. Limited time for response has precluded our standard consensus-building process. However, we believe that these responses will provide you with appropriate guidance. We commend your effort to bring a regulatory framework to this issue. We would also like to note that lithium-ion batteries have been identified by the NFPA as one of the top fire, emergency, and life safety risks. Lithium-ion battery safety is multifaceted.

While the scope of this consultation is necessarily focused and narrow, it may not be sufficient to cover all issues that will impact lithium-ion battery safety. This underscores the complexity of fire, emergency and life safety issues related to lithium-ion batteries, from building codes to manufacturing to transportation and other domains.

As we have said in every other safety consultation in other areas of government, a national fire liaison or advisor is required to connect the government with fire and life safety across different domains. This would include lithium-ion batteries (Source: The Great Canadian Fire Census 2025).

Lithium-ion batteries are safe when they are used as intended and are manufactured correctly, which includes extra care and attention to the materials used, the manufacturing process, and quality control processes. Reducing risks posed by lithium-ion batteries includes proper capacity matching of individual electrodes of cells during cell fabrication, and using optimum mechanical and electrical components in cells and battery packs for efficient heat management (Source: Abraham, K. M. (2023). How safe are Li-ion batteries?. *Journal of the Electrochemical Society*, *170*(11), 110508.).

However, they can pose a safety hazard as they are at risk for thermal runaway, and fires caused by lithium-ion batteries have an extremely quick flashover and are difficult to put out; traditional firefighting methods do not work, and they require cooling and waiting for them to self-extinguish. At this time, there is no consensus on how to best extinguish them. The standard firefighter PPE is not able to protect them from the emissions from these fires; it will need to be improved, which will take an exorbitant amount of research at the expense of the taxpayers.

Combine these issues with consumers choosing lithium-ion batteries as a cheaper replacement to lead-acid batteries and then improperly installing them themselves, light wood frame construction, the push for single egress buildings, rapid new constructions, and little to no regulations on how to store lithium-ion battery devices in private residences, fire departments are feeling the strain on their resources, and cannot wait for a consensus on how to deal with these fires. It should be noted that there may be a relationship between the use of e-mobility devices, which are at high risk of lithium-ion battery fires because they are often manipulated, and multi-unit housing in less affluent areas. This can create catastrophic risks in areas that already need more support.

In conclusion, while lithium-ion battery technology is progressing with improved battery management systems, safety regarding storage or installation locations, education on the risks, or awareness of the consequences of misuse is not. A collective approach is needed when creating these regulations to ensure all levels of government are on the same page and that all safety issues are addressed. A national fire liaison or advisor can help coordinate with the government to ensure that fire and life safety needs are addressed as lithium-ion battery regulations are created. This way, there are no inconsistencies, and fire departments and first responders can address these fires safely.