United States
Consumer Product Safety Commission

September 30, 2025

Ms. Aimee Sinnott
Chair, TC 2849
UL Standards & Engagement
1603 Orrington Avenue, Suite 2000
Evanston, Illinois 60201

Re: *Proposed Changes to Standard for Safety for Electrical Systems for eBikes, UL 2849*

U.S. Consumer Product Safety Commission technical staff (CPSC staff or staff[1]) appreciates the opportunity to comment on the July 28, 2025, bulletin for UL 2849 - *Electrical Systems for eBikes* that was circulated to the Technical Committee for preliminary review. Staff will submit the following comments into the Collaborative Standards Development System (CSDS). In general, staff supports the proposed changes. but is providing the specific comments listed below on Topics 4, 8, and 10.

In January 2025, CPSC staff completed a draft Notice of Proposed Rulemaking on Lithium-Ion Batteries Used in Micromobility Products and Electrical Systems of Micromobility Products Containing Such Batteries, and staff is proposing the requirements recommended in the draft proposed rule to improve the safety of eBikes. Therefore, staff is providing the following recommended revisions in conjunction with the July 28, 2025, bulletin as follows:

- **Topic 4 – Add Battery Compartment Requirements**

Staff identified incidents in which modifications to the battery pack resulted in fires and deaths/injuries. Staff supports the proposed revision but proposes that the exception for units that have a seal be deleted because the exception does not adequately protect consumers from injury or death. A broken seal will likely create confusion about the meaning of the broken seal and therefore is not an effective substitute for a substantive performance requirement. During development of the draft proposed rule, staff identified a hazard pattern whereby consumers were removing or replacing the battery pack in their eBikes, resulting in a thermal event, injury, or death. Staff identified that this hazard pattern is not addressed in the current revision of UL 2849 and that this new requirement should be added to provide greater consumer protection from this hazard.

The draft exception proposed does not adequately protect consumers because the seal is an

[1] *This letter was prepared by the CPSC staff. It has not been reviewed or approved by, and may not represent the views of, the Commission.*

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inadequate deterrent to opening the battery. In incidents reviewed by staff, battery packs modified by unauthorized personnel contained non-certified or reused cells that failed, entered thermal runaway, and led to structure fires.

- **Topic 8 – Addition of Charger Requirements**

Staff identified incidents in which a consumer reportedly used an aftermarket charger that resulted in fires and deaths/injuries. Staff supports the changes proposed under Topic 8, but because use of an aftermarket charger is a foreseeable use scenario, staff proposes the following additional new requirement:

> 32.11 (new) Aftermarket (Non-specified) Charger - Reverse Polarity Test
> 32.11.1 This test evaluates the ability of the system or battery pack to withstand connection of a charger to the battery or eBike with an output connector that is the opposite polarity of the recommended charger.
> 32.11.2 With a fully charged representative battery pack, a programmable DC supply power set to a current limit of 8A and at 125% of the maximum charge voltage is to be connected in the reverse polarity as intended for normal charging.
> 32.11.3 Protective devices that have been determined reliable may remain in the circuit.
> 32.11.4 The reverse voltage is to be applied for 4 hours or until a fire or explosion occurs. Temperatures shall be measured on the cell/module where temperatures may be highest for monitoring purposes.
> 32.11.5 At no time during the 4-hour test period shall the reverse voltage be imposed on the cells.
> 32.11.6 If the electrical system of the eBike is operational after the test, it shall be subjected to a minimum of one charge/discharge cycle at the manufacturer's maximum specified values. The test shall be followed by a 1-hour observation time and temperatures are to be monitored during the test.
> (viii) 32.11.7 At the conclusion of the test, and after cooling to near ambient temperature, representative battery packs that contain a hazardous operating voltage shall be subjected to the test in section 30a of UL 2849-20, *Dielectric Voltage Withstand Test*, or the test in section 29 of UL 2849-20, *Isolation Resistance Test* (without humidity conditioning).

These new tests are intended to integrate controls within the eBike charging circuitry to monitor and prevent an incompatible charger from causing damage to the battery management system (BMS) and ultimately the cells.

- **Topic 10 – Revision to the Criteria of the Input Test from the Charger Ratings to the**

Product Ratings

Staff identified incidents in which a consumer charged an eBike battery immediately after use, which resulted in fires and deaths/injuries. Staff test results of eBike batteries indicated that some eBike BMSs failed to prevent post-discharge charging when cells exceeded the rated maximum temperature during charging. The following proposed revision to Clause 28.5 is intended to explicitly test for this condition:

> 28.5 ~~The charge and discharge cycles are then repeated for a total of 2 complete cycles of charge and discharge~~Immediately following the discharge cycle, initiate another charge cycle. The BMS shall prevent charging if the surface temperature of a cell within the battery pack is higher than the manufacturer's specified maximum cell surface temperature during charging. Complete the full charge followed by a full discharge. Repeat a charge and discharge cycle. The test is then repeated with the representative unit in a chamber set to the eBike system manufacturer's lowest specified operating ambient temperature for 2 complete cycles of charge and discharge. If the battery pack will not operate at the lowest ambient rating, then a temperature as close as possible to the lowest ambient rating that allows the battery pack to operate shall be used.

We look forward to working with UL and all interested stakeholders, including TC 2849 participants, on this topic.

Sincerely,

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