



June 14, 2024

Ms. Sophie Shulman,
Deputy Administrator
National Highway Traffic Safety Administration
West Building, Ground Floor, Rm. W12-140,
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Re: Notice of Proposed Rulemaking (NPRM) Docket No. 2024-0012; FMVSS No. 305a Electric Powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20, Incorporation by Reference (Issued: April 15, 2024)

Ms. Shulman,

I am writing on behalf of New Flyer of America, Inc. (NFA) to submit our comprehensive comments regarding the Notice of Proposed Rulemaking (NPRM) Docket No. 2024-0012, which pertains to the Federal Motor Vehicle Safety Standards (FMVSS) No. 305a, specifically focusing on electric powered vehicles and the integrity of their electric powertrain.

As a prominent manufacturer in the heavy vehicle sector, NFA is dedicated to upholding the highest standards of safety and reliability in our vehicles. We understand the significance of establishing stringent safety standards that are in step with technological progress and industry best practices. In this spirit, we have thoroughly examined the proposed regulations and are presenting our insights and recommendations to refine the proposed rule. In general, we are supportive of leveraging existing standards and test procedures used in the industry to minimize the amount of additional testing needed to comply with the new standards.

Our comments are organized to address the following critical areas:

- I) The relevance of mechanical integrity test methods for heavy vehicles at a component level and our endorsement of the current regulation that exempts crush testing on batteries for heavy vehicles.
- II) The congruence of the proposed mechanical shock test methods with UNECE Reg No. 100 r3 and the advantages of a unified regulation between North America and Europe for REESS manufacturers and OEM's alike.



III) Our proposition for alternative test methods to manage vehicle controls and ensure the safe operation of REESS in heavy buses and motor coaches.

IV) The documentation requirements for SCTR risk assessment and mitigation and our request for additional clarification from NHTSA on the level of detail required.

V) Our viewpoint on the test procedure to evaluate warnings for thermal events in REESS and the necessity for uniformity in regulatory requirements.

VI) Our proposal for vehicle wash tests at a component level and an exemption for vehicle standing water tests, advocating for component-level water exposure safety tests instead of full vehicle tests for heavy buses and motor coaches.

VII) Our comments on Rescue Sheets and Emergency Response Guides (ERGs) requirements and our inquiry about the acceptability of combining the Rescue Sheet and ERG into a single document as per our existing practice.

We value the opportunity to contribute to the development of these pivotal safety standards and anticipate a collaborative relationship with the NHTSA in advancing the safety of electric powered vehicles.

I) Comments on the relevance of the mechanical integrity test methods for heavy vehicles at a component level

We support the regulation as it is currently written, which does not require crush testing of batteries for heavy vehicles. Given the infrequent involvement of our vehicles in crashes, coupled with the minimal full vehicle testing mandated by existing regulations, NFA lacks sufficient data to establish parameters for potential future testing at this time. If, in the future, sufficient data is available to establish a performance requirement, we agree that this be permitted to be performed in a standardized manner at the REESS component (battery pack) level, in lieu of full vehicle testing.

II) Comments on the relevance of the mechanical shock test methods for heavy vehicles at a component level

Similar to above comments on mechanical integrity, NFA lacks sufficient data to establish specific heavy vehicle mechanical shock test parameters at this time. NFA and our battery manufacturers currently



adhere to the mechanical shock requirements of the UNECE Regulation No. 100 r3 regulation as part of our due diligence given the current lack of comparable requirements in North America. Furthermore, the harmonization of regulations between North America and Europe benefits REESS manufacturers by allowing for uniformity in components and testing requirements across both regions.

Although the NFA has conducted some crash testing on our vehicles, the data collected is insufficient to form definitive conclusions or to propose modifications to the proposed testing parameters. Nonetheless, we endorse the regulation as it stands, advocating for tests to be conducted at the component level, inclusive of the mounting system to the vehicle. This approach ensures the tests accurately reflect the component's actual installation in the vehicle and establishes a baseline performance standard applicable to all vehicle types, irrespective of the availability of data.

Additionally, NFA would like to highlight analogous standards for CNG vehicles, such as NFPA 52, ANSI/CSA NGV 6.1, and CSA B109. These standards mandate that the CNG storage system be engineered to endure an 8G inertial load in longitudinal, lateral, and vertical directions, confirming a minimum strength requirement for the mounting system. It is noteworthy that the 8G load specified by these standards falls within the inertial load range stipulated in the proposed FMVSS 305a test procedure.

III) Proposal for the alternative test methods to manage vehicle controls ensuing REESS safe operations in heavy buses and motor coaches

The tests stipulated in Section 12 of FMVSS 305a, which apply to heavy vehicles—including overcharge, over-discharge, overcurrent, over-temperature, and external short circuit scenarios for REESS—are, according to our interpretation, intended to be conducted exclusively at the vehicle level.

NFA suggests that these tests should be allowed at the REESS component level (battery pack) rather than at the vehicle level. This approach is in line with GTR 20, which states, “The tests may be conducted at the vehicle level or with a complete REESS or REESS subsystem, as appropriate.” As the component level (battery pack) is considered a REESS subsystem, we propose testing at the pack level for the following reasons:

1. In our specific use case, multiple identical battery packs, each housed in a fully environmentally sealed enclosure, are installed in various locations on the vehicle. These battery packs each provide the full system voltage, with a varying number of packs, connected in parallel, to meet customer requirements and to achieve the desired total REESS capacity.
2. Typically, the battery packs undergo testing by the manufacturer prior to sale, and theoretically, the same pack could be utilized across various heavy vehicle types by multiple OEMs. The packs comprise multiple battery modules, including the BMS (Battery Management System), which



operates independently of vehicle controls, meaning the safety systems under test are contained within the pack itself.

3. NFA's buses and coaches are manufactured in smaller production volumes and feature a higher product mix compared to the automotive industry. We are concerned that the proposed regulations as written would necessitate testing based on each unique vehicle configuration, which would be excessively burdensome and redundant, as the same fundamental pack would be tested multiple times.

IV) Comments on documentation requirements for SCTR risk assessment and mitigation

NFA endorses the documentation requirements outlined in this proposal, which aim to demonstrate risk mitigation for thermal propagation events and, consequently, mitigate risks arising from Single Cell Thermal Runaway (SCTR) due to internal short circuits.

We express concern regarding our current ability to ascertain if the SCTR risk assessment and mitigation documentation, as prescribed in the proposed rule, would meet NHTSA's standards and expectations, considering that FMVSS compliance is based on a self-certification system by the vehicle manufacturer there would be no formal review process. Hence, NFA requests additional clarification from NHTSA on the requisite detail level within the SCTR Risk Assessment and Mitigation documentation of the Proposal, with the expectation that it aligns with established best practices and industrial standards, such as ISO 26262 or SAE J1739.

It is crucial to acknowledge that a substantial portion of the risk analysis and test data related to the Rechargeable Energy Storage System (REESS) is proprietary to the REESS manufacturer. Consequently, as the Original Equipment Manufacturer (OEM), NFA would depend on the REESS manufacturer to supply a significant amount of the necessary documentation, and we may not be granted full access to this information from our REESS suppliers. Our understanding of the certification process in Europe is that the REESS certification is provided directly to the REESS manufacturer, therefore certification is done at the component and not the vehicle level. In any case, we propose that any documentation submission requested by NHTSA should adhere to the Confidential Document Treatment Procedure under 49 CFR Part 512 to safeguard this proprietary information.

We also believe that the proposed documentation requirement would be more appropriately situated within other agency regulations. This would (1) provide clearer directives for manufacturers and REESS suppliers, ensuring uniform interpretation and application across various vehicle types; (2) offer the flexibility needed to adapt to emerging technologies and evolving industry best practices; and (3) uphold



the current FMVSS standard practice of having explicit requirements with pass/fail criteria, thereby enabling us to maintain our compliance documentation to the highest standard.

V) Comments on test procedure to evaluate warning for thermal event in REESS

NFA acknowledges that a thermal event within a battery pack can be a safety-critical event, potentially leading to smoke, fire, and/or explosion. However, the likelihood of such an event is highly dependent on the specific architecture and technology of the battery and vehicle. As battery and vehicle technologies rapidly evolve, particularly with a focus on thermal event safety, NFA recognizes the importance of scrutinizing whether existing Short Circuit Thermal Runaway (SCTR) testing and associated warning requirements adequately address safety needs. Nevertheless, there appears to be a discrepancy between the following two statements:

- **“This NPRM does not propose to require a warning to occupants or documentation pertaining to a warning, as such requirements would not sufficiently address a safety need. NHTSA believes the documentation requirements in GTR No. 20 for a warning to the driver are not relevant to the field-observed electric vehicle fires likely resulting from SCTR.” [emphasis added]**
- **“As part of a risk-mitigation approach addressing multiple aspects of electrical system safety, NHTSA proposes requiring: (a) a thermal event warning; and (b) a vehicle control malfunction warning for drivers. The thermal event warning would be assessed by a performance requirement, while the vehicle control malfunction warning would be a documentation requirement.” [emphasis added]**

In the transit bus industry, there is a significant interest in thermal event warnings, and NFA prioritizes occupant safety and egress requirements. NFA employs various sensor types within the REESS to detect thermal anomalies and promptly notify operators.

NFA is also at the forefront of advancing vehicle and battery technology to mitigate the severity of SCTR, aiming for a future where warnings play a reduced role in cabin safety. The goal is for batteries to exhibit an improved thermal event safety profile, not only in operational modes with occupants but also in non-occupied vehicle modes, where SCTR thermal activity could be fully contained within the REESS pack enclosures.

NFA has not conducted testing as outlined in the proposed rule using a heater element with the specified performance requirements. Consequently, we cannot confirm whether the three-minute interval between the activation of the prescribed heater element and the triggering of a warning is feasible. Depending on the chemistry of the cells, it may take longer than three minutes for a thermal



event to progress to a detectable stage using current sensor technology. The three-minute timeframe seems arbitrary and uncorrelated with the actual timing of occupant hazard exposure. It is important to note that battery technology optimized for thermal event warnings may not align with other safety considerations, such as smoke in the cabin, venting, or external flames. For instance, in the NPRM Table B-2, a vehicle without a warning observed had no smoke in the cabin or external flame, whereas all vehicles that triggered warnings experienced smoke in the cabin and external flames.

Therefore, NFA proposes that the newly prescribed three-minute thermal warning requirement at the vehicle level be replaced with the established SCTR thermal propagation criteria of UN ECE R100. This standard offers the option of either providing a warning at least five minutes before hazard exposure to occupants or demonstrating that thermal propagation does not result in a hazardous situation for the occupants.

VI) Proposal for vehicle wash test at a component level and exemption for vehicle standing water test

For the reasons outlined in Paragraph III, NFA suggests that the water exposure safety tests be consolidated into a component-level test of the battery packs, rather than conducting full vehicle tests for heavy buses and motor coaches. The Rechargeable Energy Storage System (REESS) enclosures are installed in locations such as rooftops, inside sealed baggage compartments, or within the propulsion compartment (traditional bus engine bay). In these configurations, the high-voltage cables and components within the REESS enclosures are positioned well above the 15-centimeter water depth threshold specified in S14.2. In NFA's applications, the S14.2 test would subject the battery pack enclosures to less water exposure than a component-level IPx5 test. Consequently, NFA proposes that water spray testing be applied directly to the battery pack enclosures. We are also open to considering such battery pack component-level tests at the more rigorous IPx6 standard.

VII) Comments on Rescue Sheets and Emergency Response Guides requirements

NFA endorses the requirements for Rescue Sheets and Emergency Response Guides (ERGs) as per ISO-17840-2:2019 and ISO-17840-3 standards, respectively. These standards are applicable to heavy vehicles as detailed in S15.1(b) and S15.2 of this proposal. Our organization has revised our Rescue Sheets and ERGs to align with these ISO standards. We request clarification from the National Highway Traffic Safety Administration (NHTSA) on whether it would be permissible to consolidate the Rescue Sheet and ERG into a single document, in accordance with our established practice.



In closing, NFA appreciates the opportunity to provide feedback on the proposed regulations. We are committed to advancing vehicle safety and environmental sustainability in the heavy vehicle industry. We believe that a collaborative approach with NHTSA will lead to the most effective and practical safety standards. We look forward to further dialogue and are ready to assist in any capacity to refine these regulations for the betterment of the industry and public safety.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "I Macpherson", with a long, sweeping underline.

Ian Macpherson
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