June 14, 2024

Sophie Shulman
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Submitted electronically to https://www.regulations.gov and via electronic mail
Docket No. NHTSA-2024-0012

Rivian Automotive, LLC Response to Notice of Proposed Rulemaking:
Federal Motor Vehicle Safety Standards; FMVSS No. 305a Electric-Powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20, Incorporation by Reference

Dear Deputy Administrator Shulman:

Rivian Automotive, LLC ("Rivian") appreciates the opportunity to respond to the U.S. Department of Transportation's ("USDOT") National Highway Traffic Safety Administration ("NHTSA") Notice of Proposed Rulemaking ("NPRM") to update Federal Motor Vehicle Safety Standard ("FMVSS") requirements for performance and risk mitigation requirements for the propulsion battery and also to standardize emergency response information.

We applaud USDOT and NHTSA's continued leadership in promoting electrical vehicle safety and to ensure first and second responders have access to vehicle-specific information about extinguishing Rechargeable Electrical Energy Storage System (REESS) fires and mitigating safety risks associated with stranded energy. With President Biden's Executive Order targeting half of all new vehicles sold in 2030 to be zero-emission vehicles, Rivian agrees with the agency that safety should be at the forefront of electric vehicle development.

Rivian

Founded in 2009, Rivian is an independent U.S.-based California company dedicated to the production and distribution of Electric Adventure Vehicles™ – namely trucks and SUVs. These zero emission vehicles encourage consumers to enjoy the outdoors and seek adventure in environmentally friendly ways. In addition, we have a commitment with our investment partner, Amazon, to develop and produce

100,000 all-electric trucks by 2030 for last-mile delivery. With headquarters in California and presence in several states, and a manufacturing facility in Normal, IL, the R1T truck, R1S SUV, and delivery van are in production in the U.S.

Rivian's line of vehicles supports our mission to Keep The World Adventurous Forever™, by offering compelling and clean all-electric alternatives to internal combustion engine technology. Rivian exists to create products and services that help our planet transition to carbon neutral energy and transportation. Rivian designs, develops, and manufactures category-defining electric vehicles and accessories, and sells them directly to customers in the consumer and commercial markets.

The R1 line of vehicles was designed to be among the safest on the road today through clean-sheet structural design, optimized materials, and fully integrated software. Further, Rivian Autonomy Platform+, a SAE Level 2 technology, is standard on every vehicle we build. The system delivers true hands-free driving assistance, along with our full set of safety features, and it continually adds functionality through over-the-air updates. By making Rivian Autonomy Platform+ standard, our goal is to make driving safer for everyone.

In 2023, Rivian, along with the Insurance Institute for Highway Safety ("IIHS"), announced the Rivian R1S SUV as an IIHS *TOP SAFETY PICK+* for the 2023 model year.[1] R1S joined the Rivian R1T pickup in receiving this designation, meaning both of our flagship consumer vehicles hold the independent nonprofit's highest safety award for 2023. Earlier this year, the Insurance Institute for Highway Safety ("IIHS"), announced the Rivian R1T pickup as an IIHS *TOP SAFETY PICK+* for the 2024 model year, following an update to the IIHS moderate overlap front test. As of May 2024, R1T is the only large pickup to be awarded *TOP SAFETY PICK+*. The 2024 Rivian R1S has not yet been evaluated by IIHS on the updated moderate overlap test, but we expect to see R1S join the R1T in receiving the *TOP SAFETY PICK+* award.

Our electric delivery vans for Amazon are more sophisticated and equipped with more innovative safety features than commercial vehicles before it. A suite of highway and traffic assist technologies to help protect drivers and the community, including state-of-the-art sensor detection, a 360-degree surround view camera and Alexa integration for hands-free access to route information and the latest weather updates. These advanced safety features will lessen the cognitive load on drivers and help improve safety for all road-users.

For the R1, EDV and future models such as the R2/R3, Rivian takes a multi-pronged approach to battery safety during the design phases. Rivian's battery pack system looks beyond the industry standards and established practices and takes a holistic approach to assess and mitigate hazards that a customer could experience. The design aims to focus first on prevention of hazardous scenarios and then augments with robust detection capabilities when it comes to HV battery management and safe HV battery

[1] This award applies to models built after January 2023.

operation. Rivian can leverage real-time monitoring of battery health and operational status to pre-emptively mitigate potential battery safety concerns.

Rivian generally supports NHTSA's proposal and the agency's intent to largely harmonize with global protocols. We believe, however, that there are certain instances in which the proposed requirements should be modified to allow innovation, continuous improvement, and future-proofing of battery chemistry to better enhance motor vehicle safety for all occupants, including future generations. These instances are highlighted below with our recommendations.

Rivian appreciates the opportunity to engage with USDOT and NHTSA through this comment process and as we work with other stakeholders throughout the ecosystem to enhance vehicle occupant and emergency responder protection through the adoption of updated requirements for electrical vehicle safety. Rivian will continue to make safety a key priority for our customers as they take on their next adventure.

Thank you for your consideration of our feedback. If you have any questions or require follow-up information, please contact me at nbell@rivian.com.

Sincerely,

Nancy Bell

Nancy Bell
Senior Legal Director, Regulatory Affairs & Policy

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Future Innovation & Regulatory Text

Under c. REESS Requirements Applicable to All Vehicles, NHTSA notes that "[t]he REESS requirements would apply to all vehicles subject to FMVSS No. 305a." In this section, NHTSA also notes "[w]hile REESS is a general term to represent any rechargeable electrical energy storage system, currently all electric powered vehicles use REESS with lithium-ion chemistry. Therefore, the current safety hazards associated with REESS identified in literature and in the field are those specific to lithium-ion chemistry REESS. However, the proposed requirements in this NPRM will apply regardless of REESS chemistry."

Rivian urges NHTSA to consider future battery chemistry as it adopts these new performance requirements. The current requirements address one normative chemistry – lithium-ion – and only allow one pathway to comply with the updated FMVSS. It is important for the agency to recognize that the current industry standard for technology will evolve and what is normative today may not be normative in the future. If the FMVSS's performance requirements and test procedures cannot encompass future chemistry or quickly evolve to allow future chemistry, regulation will limit innovation and the advancement of technology.

For instance, NHTSA could incorporate a provision for special test procedures into the regulatory text to address new chemistries into the FMVSS. This would allow manufacturers to propose a procedure for NHTSA's review and advanced approval for testing and certifying vehicles equipped with new battery technologies, including requiring sufficient documentation and data for NHTSA to fully evaluate the request. There is regulatory precedence for this approach. EPA has adopted similar provisions in its regulations, e.g., 40 CFR part 86, such as the following:

> **§ 86.1840-01 Special test procedures.**
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> **(a)** The Administrator may, on the basis of written application by a manufacturer, prescribe test procedures, other than those set forth in this part, for any light-duty vehicle, light-duty truck, or complete heavy-duty vehicle which the Administrator determines is not susceptible to satisfactory testing by the procedures set forth in this part.
> **(b)** If the manufacturer does not submit a written application for use of special test procedures but the Administrator determines that a light-duty vehicle, light-duty truck, or complete heavy-duty vehicle is not susceptible to satisfactory testing by the procedures set forth in this part, the Administrator shall notify the manufacturer in writing and set forth the reasons for such rejection in accordance with the provisions of 86.1848(a)(2).

Phase 2 GTR No. 20 Approaches Under Consideration by the IWG

Electrolyte Release and Venting From the REESS

How these detection methods (chemosensors and gas detection methods) may be best utilized in a vehicle level test procedure for both normal operating conditions and post-crash scenarios?

Rivian recommends that the detection method should depend on whether the area of concern is the gas venting within the REESS or if the concern is the risk of occupant/bystander exposure to vent gases. In the former's case, a gas detection system in the pack is appropriate. In the case of the latter, the gas detection method will depend on the individual pack design and the detection system will be subject to external variables (e.g., air currents) surrounding the vehicle under test. Specific detection test details are difficult to define as the test procedure should vary with pack design. Further, large format LFP cells are relevant for gas detection compared to other cell chemistries for which gas venting is not the dominant hazard case. Finally, it is important that the test procedure ensures that the test environment for all methods is controlled to limit breeze and wind which could affect the detection results.

With regards to chemosensors and the fact that there are no commercially available units, it is necessary to understand if the chemosensors would be used as a test apparatus or if they are intended for use on vehicle as part of the safety system. Also, it is important to recognize that every detection event is not necessarily a hazard as it is expected that some cells may vent over life due to ageing.

How to best manage gases and particulates emitted from the REESS for both normal operating conditions and post-crash scenarios?

The mechanism for managing gases and particulates emitted from the REESS should be at the discretion of the REESS manufacturer. A “one-size fits all” or “bespoke” solution should not be imposed on manufacturers but rather they should be permitted to use best engineering judgement to develop these mechanisms.

Which gases generated in and vented from Li-ion batteries should be focused on for all types of REESS chemistries and are anticipated to remain relevant as REESS chemistry and technology changes in the future?

Rivian recommends that the gases to focus on will depend on whether the gases of interest are generated from venting without thermal runaway or generated from venting due to thermal runaway. Non thermal runaway venting components may include: Lithium Hexaphlorophosphate (LiPF6) and organic solvents - ethylene carbonate (EC), diethyl carbonate (DEC), dimethyl carbonate (DMC), ethyl methyl carbonate (EMC). Thermal runaway products may include: hydrogen (H2), cobalt (CO), carbon dioxide (CO2). Hafnium (HF) is also present though found in lower concentrations than the other gas species. In our experience, CO becomes the dominant inhalation hazard to the human body more rapidly than the other gas species and therefore we recommend that detection of CO is prioritized amongst the gas species considered.

Practicable methods to verify the occurrence of electrolyte release and venting and to quantify the vented gases and vapors.

In our experience, the most significant challenge is with the detection of gases outside of REESS. The detection of gases within the REESS is easier to reliably detect compared to the challenge of detecting a gas plume outside of the REESS. One approach to this challenge could be to detect the amount of gases inside the REESS and calculate the correlated amount that would leak outside of the pack.