



National Electrical Manufacturers Association
1300 17th Street North
Suite 900
Arlington, VA 22209
www.nema.org

BY ELECTRONIC FILING¹

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June 10, 2024

Shashi Kuppa, Ph.D.
Director, Office of Crashworthiness Standards
Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Ave., SE
Washington, DC 20590

**Re: Federal Register Notice of Proposed Rulemaking - FMVSS No. 305a, Electric-Powered Vehicles:
Electric Powertrain Integrity Global Technical Regulation No. 20, Incorporation by Reference-
Docket No. NHTSA-2024-0012**

Dear Director Kuppa:

The National Electrical Manufacturers Association (“NEMA”), on behalf of its members, respectfully submits the following comments in response to the *Federal Register notice of Proposed Rulemaking-FMVSS No. 305a, Electric-Powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20, Incorporation by Reference.*² We greatly appreciate the opportunity to provide these comments and look forward to working with the National Highway Traffic Safety Administration (“NHTSA”) as this rulemaking moves forward.

About NEMA

NEMA represents over 300 electrical equipment manufacturers that produce goods for the grid, industrial, built environment, and mobility sectors. NEMA members directly employ nearly 460,000 American workers in 6,100 facilities across all 50 states, and contribute more than \$240 billion to the U.S. economy annually. The electroindustry is leading the transition to an all-electric economy and is a key driver of infrastructure development and future economic growth. NEMA members are leading producers of equipment for the mobility market, including electric vehicle (“EV”) chargers and charging infrastructure, motors, inverters, and power control and distribution components.³

¹ [Docket NHTSA-2024-00012-0001](#).

² Federal Register notice [89 FR 26704](#), April 15, 2024.

³ Additional information about NEMA may be found at <https://www.nema.org/>.

Summary

NHTSA is issuing this Notice of Proposed Rulemaking (“NPRM”) to achieve two goals. First, NHTSA proposes to establish Federal Motor Vehicle Safety Standards (“FMVSS”) No. 305a, “Electric-powered Vehicles: Electric Powertrain Integrity,” to upgrade and replace existing FMVSS No. 305. Proposed FMVSS No. 305a would have all the requirements of FMVSS No. 305, but the proposed standard would expand its applicability to vehicles with a gross vehicle weight rating (“GVWR”) greater than 4,536 kilograms (10,000 pounds) and add requirements and test procedures covering new aspects of electric vehicle safety, such as the performance and risk mitigation requirements for the propulsion battery, referred to as the Rechargeable Electrical Energy Storage System (“REESS”). NHTSA is also proposing requirements to ensure first, and second responders have access to vehicle-specific information about extinguishing REESS fires and mitigating safety risks associated with stranded energy when responding to emergencies. The restructured and upgraded FMVSS No. 305a will facilitate future updates to the standard as battery technologies and charging systems continue to evolve. After FMVSS No. 305a is finalized, NHTSA intends to sunset FMVSS No. 305.

The second goal is to further NHTSA's effort to harmonize the FMVSS under the United Nations Economic Commission for Europe 1998 Global Agreement (“1998 Agreement”). The efforts of the U.S. and other contracting parties to the 1998 Agreement culminated in the establishment of Global Technical Regulation (“GTR”) No. 20, “Electric Vehicle Safety.” FMVSS No. 305 already incorporates a substantial portion of GTR No. 20's requirements due to a previous NHTSA rulemaking. In 2017, NHTSA amended FMVSS No. 305 to include electrical safety requirements from GTR No. 13, “Hydrogen and fuel cell vehicles,” pertaining to electric vehicle performance during normal vehicle operation and post-crash.

General Comments

NEMA is supportive of NHTSA in its proposed rulemaking as it considers adding new requirements and test procedures covering new aspects of electric vehicle safety with respect to the propulsion battery, and of its efforts to harmonize FMVSS under GTR No. 20. With the increasing penetration of Electric Vehicles into the North American market ensuring electrical vehicle safety is vitally important. NEMA and its member companies fully understand the importance of electrical equipment safety across all its primary markets: industrial, buildings, mobility, and the electric grid. NEMA looks forward to applying similar safety principles within the context of electric vehicle safety. As NHTSA works to finalize this NPRM, NEMA strongly encourages NHTSA to consider our recommendations for stronger overcurrent protection requirements and to reevaluate its decision to not impose a water submersion test.

Specific Comments

Justification for Strengthened Overcurrent Protection Requirements

Electric Vehicles present very different system safety challenges than traditional vehicles powered by an internal combustion engine. One of those in particular is protection from overcurrent. Electric Vehicle overcurrent conditions can commonly occur in the following scenarios: a short circuit while charging, in a vehicle collision, or due to an insulation breakdown over time. In each of these cases, the power

cannot be shut off and the vehicle body can become “live” creating a shock hazard for occupants and first responders alike. This may also lead to an increased risk of fire from the contacts themselves overheating. Within an EV, the contactor is the on-off switch for power engaged with both sides of the battery for connection and disconnection. As the power levels in EVs increase contactors can weld leading to a system protection failure and a safety issue. The GTR No. 20 does not offer adequate overcurrent protection in these cases.

Recommendations: NEMA offers the following recommendations to strengthen overcurrent protection requirements.

1. Isolate the battery in the event of an overcurrent failure. There are multiple architectures that achieve this function. As an example, this can be done by adding fuses and/or contactors that can sense overcurrent from the battery management system. Manufacturers can validate this recommendation via a lab test procedure.
2. In the case of an overcurrent event, a single point of failure architecture should be avoided. A single contactor system will make disconnect impossible in case of it being welded closed. Manufacturers can validate this recommendation via the design documentation.
3. Manufacturers should demonstrate that they can address conditions in the event that the contactors weld closed, leaving the battery permanently connected. Having contactors on both the negative and positive connections provide redundancy in this scenario. Manufacturers can validate this via the design documentation.

Justification for Re-Evaluation of Proposed Protection Against Water Exposure Standards

Recent flooding events in Florida revealed that current battery packs are not sufficiently protected against water ingress⁴. Leaks in any portion of the battery pack can allow liquids, dust, or other contaminants to enter the battery. This can cause a variety of problems, including short circuits and risk of fire. Proper ingress protection standards and testing are imperative to vehicle safety. The proposed rulemaking is to adopt GTR No. 20's Ingress Protection testing to level IPX5 in which water is sprayed on the battery pack. This meets the standards for normal driving conditions. However, it does not address flooding or submersion scenarios that put road users and first responders at risk. This could be addressed by Ingress Protection testing to level IPX7.

As battery packs become more powerful and create more heat, the vent valve plays a crucial role in maintaining the safety of the battery pack. Air-permeable membranes in battery vent valves create challenges to leak-test battery packs with assembled vent valves in production end of line tests. Most current leak check testing practices do not include testing of all sealing surfaces for water ingress and egress, allowing significant vulnerability in the battery. There are at least three different leak check

⁴ <https://inl.gov/feature-story/from-florida-floods-to-idaho-desert-understanding-impacts-of-flood-damage-on-vehicle-batteries/>

testing methods available for fully assembled battery packs that check all sealing surfaces, including the ones between the battery pack housing and battery vent valves. A testing standard should be developed that is driven by data, based on science, and ensures a level of safety consistent with state-of-the-art technological development. This will enable U.S. manufacturers to develop their own solutions from a consistent baseline, ensuring that high safety standards are met, and preventing lower-quality imports from potentially entering the market.

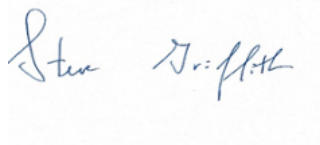
Recommendations: NEMA offers the following recommendations for re-evaluation of proposed protection against water exposure standards.

1. NHTSA should commit to a technical amendment for this proposed rulemaking and during this period convene a meeting with industry stakeholders to collect data, develop, and adopt a testing requirement that would address submersion scenarios.
2. Testing documentation requirements should include water ingress and water egress risks. Additionally, a leak check test should be required for each battery pack at the end of the assembly that includes leak check of all its sealing surfaces including all assembled components of the battery pack.

Conclusion

NEMA respectfully requests consideration of our comments and recommendations, and we look forward to working with NHTSA to ensure effective implementation this rulemaking. Should you have any questions or need any additional information, please contact me at (703) 307-7847 or steve.griffith@nema.org.

Sincerely,

A handwritten signature in blue ink that reads "Steve Griffith". The signature is written in a cursive style.

Steve Griffith
Executive Director, Regulatory & Industry Affairs, Mobility