



June 14, 2024

Sophie Shulman
Acting Administrator, National Highway Traffic Safety Association
U.S. Department of Transportation

Re: Comments of Lucid Group, Inc. on NHTSA-2024-0012

Dear Acting Administrator Shulman,

Please find below the comments of Lucid Group, Inc. (Lucid) in response to the request for information, “Federal Motor Vehicle Safety Standards; FMVSS No. 305a Electric-Powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20, Incorporation by Reference” issued by the Department of Transportation’s (DOT’s) National Highway Traffic Safety Administration (NHTSA).

Summary: Lucid is grateful for the opportunity to provide comments on the proposal to update FMVSS No. 305a in support of Rechargeable Electrical Energy Storage System (REESS) safety. For your consideration, Lucid is submitting comments on:

1. inclusion of component-level testing for REESS safety,
2. clarity on thermal propagation risk assessments,
3. properly preparing emergency responders; and
4. thermal event testing.

Our Mission and Technology

Lucid is an American, all-electric automaker based in Newark, California that manufactures vehicles in Casa Grande, Arizona and abroad. Lucid was founded in 2016 with a clear vision to advance the state-of-the-art of electric vehicles and electric propulsion systems to a whole new level in order to truly accelerate the transition to sustainable mobility. We strongly support the Biden Administration’s ambitious goal that 50 percent of all new cars and trucks sold in the country be EVs or PHEVs by 2030. We are dedicated to working with DOT and its partner agencies to create jobs, advance vehicle electrification, reduce tailpipe emissions, improve public health, and demonstrate American technological leadership.

Our flagship vehicle, the Lucid Air sedan, is a prime example of technological leadership in zero tailpipe emission transportation. In addition to an EPA-estimated range of up to 516 miles for the Lucid Air Grand Touring, Lucid vehicles offer game-changing charging technology. With efficiency at its core, the Lucid Air Grand Touring can travel 4.6 miles per kilowatt hour (m/kWh)—a remarkable achievement for a vehicle with a full-size interior space in a mid-size exterior footprint. That same technology has led to the production of our Air Pure RWD, which

can charge up to 150 miles in 12 minutes, has an EPA-estimated range of 419 miles, and the capability to travel 4.74 m/kWh. Air Pure RWD demonstrates the application of the underpinning efficiency technology in lower priced models. And just this week, our CEO and CTO Peter Rawlinson announced that Lucid has achieved an EPA-certified *five miles per kilowatt hour* with one of our products.

Our technology is scalable and increasingly accessible. A focus on efficiency, or doing more with less, is a crucial element of achieving the decarbonization and sustainability goals that will reduce emissions to protect public health and welfare and combat the climate crisis.

Lucid believes automakers have a duty to prioritize safety in the pursuit of innovation. As we strive to deliver an unparalleled customer experience, it's not at the expense of safety. Safety should permeate the planning, development, testing, and deployment stages of the product lifecycle. In addition to partnering with policymakers, regulators, and legislators, there exists a responsibility to consumers and the public. Technologies, especially when emerging, must be marketed ethically and responsibly. Additionally, education on the safe use and capabilities of technologies is necessary.

Comments on the Proposed Rule

Lucid applauds NHTSA's actions to modernize the Federal Motor Vehicle Safety Standards (FMVSS) to keep pace with innovations in transportation. The transportation sector has been in a state of evolution since the inception of FMVSS in 1967. FMVSS No. 305, "Electric-powered vehicles: Electrolyte spillage and electrical shock protection" has been a critical pathway element of safety standards for battery-powered vehicles. As industry continues to innovate, Lucid recognizes the role of NHTSA to assess and enforce safety through an iterative and involved process.

Lucid commends NHTSA for largely aligning FMVSS No. 305 with Global Technical Regulation (GTR) No. 20, "Electric Vehicle Safety," and continuing to do so in the proposed FMVSS No. 305a, "Electric-powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20, Incorporation by Reference." Alignment of new regulations with existing regulations eases compliance and cost burdens on the regulated industry and ultimately reduces costs for consumers. As a scaling EV manufacturer exporting to foreign markets, consistency in regulations such as GTR No. 20 and FMVSS No. 305a provides efficiency in the planning, development, production, and export of vehicles. Streamlined compliance is crucial to our growth.

General Specification Relating to Crash Testing

Lucid supports NHTSA aligning FMVSS No. 305a with GTR No. 20 requiring that for one hour after a crash test, there shall be no evidence of fire or explosion of the rechargeable electrical energy storage system (REESS). Passengers should not be exposed to fires or explosions post-

crash. Lucid supports further aligning the proposed standards with GTR No. 20 by way of proposing post-crash voltage measurements in FMVSS No. 305a be made between 10 and 60 seconds after the impact. This testing requirement provides an added safety benefit to vehicle occupants by adding another layer of safety, further aligning with GTR No. 20.

REESS Requirements Applicable to All Vehicles

Lucid Urges NHTSA to Allow Component-Level Testing

Including requirements for the safe operation of the REESS and for mitigating fire and other safety risks in FMVSS No. 305a would be a positive step for US standards, as they aren't currently included in FMVSS No. 305. Lucid views this form of iterative regulation as necessary. However, while understanding REESSs must safely operate in a variety of conditions such as overcharge, over-discharge, overcurrent, over-temperature, external short-circuit, and low temperature, testing frameworks of these conditions should align with GTR No. 20.

NHTSA proposed conducting vehicle-level testing using a breakout harness connected to a battery tester/cycler to evaluate vehicle controls for safe REESS operation in place of REESS component-level testing. Lucid suggests allowing automakers to test at the component-level consistent with GTR No. 20. Vehicle-level testing creates burdens for automakers while bypassing the advantages of component-level testing. Lucid anticipates challenges and additional costs pertaining to test sample logistics (i.e., transporting vehicles in place of battery packs), and testing equipment capacity. From a test performance perspective, testing at the component level (REESS) provides the benefit of recreating the worst-case scenario, ideal for safety testing, due to its smaller thermal mass. Vehicle-level testing would also require larger thermal shock chambers than currently used at the REESS-level. Maintaining flexibility in testing types provides regulatory consistency on the international level.

Clarity on Thermal Propagation Risk Assessments is Needed

In alignment with GTR No. 20, NHTSA concluded the rapidly evolving REESS technology and control systems to manage the performance of the REESS provide sufficient rationale for documentation requirements for risk mitigation of thermal propagation events. As proposed, automakers would be required to provide documentation including all known risks to occupants and bystanders, risk assessment, risk management and risk mitigation strategies in three vehicle operational modes. The documentation would be required in four parts including a system analysis, safety risk assessment and mitigation process, verification and validation of strategies, and overall evaluation of risk mitigation.

If finalized, these requirements would be a significant increase in requirements from GTR No. 20 and, and NHTSA should refine the scope of the requested documentation. Under Part I, system analysis, more details are needed to clearly define what would be included or omitted in the diagrams as well as the various required descriptions. Additionally, Parts II and III, pertaining to

risk mitigation strategies and verification and validation of effective risk mitigation strategies, should be further defined to allow for full compliance. As proposed, the requirements could lead to either over- or under-reporting. Lucid stresses the importance of delineating the requirement under Part IV, overall evaluation of risk mitigation, to avoid conflation with risk mitigation itself.

Lucid Supports Preparing Emergency Responders

Lucid agrees with NHTSA that easy access to pertinent vehicle specific and emergency response information is critical for first and second responders when encountering electric vehicles. In addition to fire risks, emergency responders must account for high voltage components which will vary from vehicle to vehicle. Lucid has developed emergency response guides (ERG) covering the U.S. and certain other markets and intends to expand the resource into all operational markets. These guides diagram critical components such as low-voltage battery, high-voltage battery, capacitors, high-voltage disconnect and high-voltage cables along with their location in the vehicle. To support the ERG, Lucid created training content to better prepare personnel and responders in the event of an emergency.

In further alignment with NHTSA, Lucid views standardization of information provided in ERGs as a benefit to emergency responders and collective safety. Lucid supports NHTSA's proposal that ERGs for vehicles with a GVWR less than or equal to 10,000lbs follow the ISO-17840-1:2022(E) format and those over 10,000lbs GVWR follow ISO-17840-2:2019(E). In addition to alignment with existing standards, Lucid supports further ensuring the safety of emergency and first responders by requiring ERGs provide high-voltage warnings and identify proper personal protective equipment (PPE) for dealing with high-voltage systems. Extending the standard template to high-voltage warnings and PPE brings an added layer of preparedness for emergency and first responders.

Under this proposal, NHTSA would require ERGs be submitted to the agency for each vehicle make and model for each model year. ERGs would be available in a centralized location on the agency's website before vehicle certification. Lucid supports this approach to localizing ERGs and further urges NHTSA to include ERGs currently on the National Fire Protection Association (NFPA) website be posted on the NHTSA website, as vehicles predating the final rule associated with this Docket will remain on roadways for years to come. Emergency responders should have centralized access to information pertaining to EVs predating the compliance date of the final rule.

Other Considerations

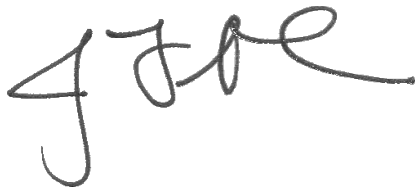
Lucid brings attention to the thermal event warning requirement. Lucid agrees a thermal event within a battery pack can be a safety critical event and a warning would reduce the likelihood of occupant exposure to smoke, fire, and/or explosion. Lucid supports the proposed audio-visual warning communicating safety critical information to vehicle occupants. In the absence of a thermal event warning test requirement under GTR No. 20, NHTSA proposes a test where

automakers initiate a thermal event in the REESS by inserting a heater within the REESS that achieves a peak temperature of 600°C within 30 seconds. In lieu of creating a thermal event in the REESS by way of a heater achieving 600°C within 30 seconds, Lucid recommends testing via heating input and removing the 30 second requirement as the proposed heating rate may prove difficult to prove or meet.

Lucid continues to support the Agency's collaborative posture when assessing, proposing, and enforcing standards. Industry and public participation in the rulemaking process yields a well-informed result. We continue to support futureproofing by avoiding the stifling of innovation through rigid and premature standards, and instead providing industry the flexibility to work with regulators as technology evolves.

Lucid appreciates your consideration of our comments and looks to continually engage with the agency on this topic. If you have questions or seek more information about the company or these comments, please contact me.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'J Nigro', with a stylized, cursive script.

Jessica Nigro
Vice President of External Affairs
Lucid Group, Inc.