U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

Federal Motor Vehicle Safety Standards;	**)**	
FMVSS No. 305a Electric-Powered	**)**	**Docket No.**
Vehicles: Electric Powertrain Integrity	**)**	**NHTSA-2024-0012**
Global Technical Regulation No. 20,	**)**	
Incorporated by Reference	**)**	

COMMENTS OF THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

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TRUCK AND ENGINE MANUFACTURERS ASSOCIATON

The Truck and Engine Manufacturers Association (EMA) hereby submits its comments on the notice of proposed rulemaking (NPRM or Proposed Rule) titled *Federal Motor Vehicle Safety Standards; FMVSS No. 305a Electric-Powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20, Incorporated by Reference* that the National Highway Traffic Safety Administration (NHTSA) recently had published in the Federal Register. See, 89 Fed. Reg. 26,704 (April 15, 2024).

EMA is a trade association representing the leading manufacturers of commercial vehicles, internal combustion engines, and zero-emission powertrains. EMA member companies design and produce on-highway vehicles with a gross vehicle weight rating (GVWR) greater than 10,000 pounds. Those medium- and heavy-duty vehicles are highly customized to perform a wide variety of commercial functions including, but not limited to, interstate trucking, regional freight shipping, intracity pickup and delivery, parcel delivery, refuse hauling, construction, emergency services, and pupil transportation. Importantly, EMA member companies are investing massive amounts of human and capital resources to develop, manufacture, and successfully deploy medium- and heavy-duty zero-emission vehicles (ZEVs). EMA and its member companies are in the forefront of transitioning the commercial vehicle industry to ZEVs.

NHTSA proposes to establish Federal Motor Vehicle Safety Standard (FMVSS) No. 305a, *Electric-Powered Vehicles: Electric Powertrain Integrity*, with requirements for protection from harmful electric shock, fire, explosion, and gas venting during normal vehicle operation and during and after a crash. The proposed standard includes performance and risk mitigation requirements for the vehicle propulsion battery, or Rechargeable Electrical Energy Storage System (REESS). The new safety standard would apply to passenger cars, multipurpose passenger vehicles, trucks, and buses that use electrical propulsion systems. Since zero-emission medium- and heavy-duty trucks and school buses will use electric propulsion batteries, EMA and its member companies have a direct and significant stake in the subject rulemaking.

NHTSA proposes to harmonize FMVSS No. 305a with Global Technical Regulation (GTR) No. 20, *Electric Vehicle Safety*. GTR No. 20 was established under the 1998 Global Agreement that is administered by the United Nations Economic Commission for Europe's World Forum for the Harmonization of Vehicle Regulations (WP.29). EMA and its member companies fully support and endorse the goals of the 1998 Global Agreement, the efforts of WP.29, and NHTSA's objective to harmonize FMVSS No. 305a with GTR No. 20. EMA's member companies support harmonized standards that minimize overall certification and compliance burdens while maximizing safety.

Following are comments on specific aspects of the NPRM to enhance the effectiveness of FMVSS No. 305a, and better align the standard with GTR No. 20, while improving the safety of electric-powered heavy vehicles (*i.e.,* greater than 10,000 pounds GVWR).

The compliance date for heavy vehicles should be at least five years after publication of the final rule in the Federal Register.

The NPRM states:

> NHTSA has tentatively determined that a 2-year compliance period is in the public interest because all vehicle manufacturers need to gain familiarity with the proposed REESS requirements. There is already widespread conformance to the requirements so the 2-year period ought to provide sufficient time, but some manufacturers may need time to assess fleet performance, review their risk management procedures and document their mitigation strategies. Further, heavy vehicle manufacturers would be newly subject to electric system integrity requirements having not been subject to existing FMVSS No. 305. They will need time to assess their vehicles' conformance to FMVSS No. 305a requirements, implement appropriate design and production changes, and assess and document risk mitigation strategies.
>
> *Id.* at 26,730-31

We agree with NHTSA that all manufacturers need time to gain familiarity with the proposed REESS requirements and assess their current vehicles and near-term future vehicles. Also, heavy vehicle manufacturers will be subject to the electric system integrity requirements in the current FMVSS No. 305 that currently only apply to light-duty vehicles. As such, heavy vehicle manufacturers will need to perform validation testing and make the appropriate design and production changes if necessary.

Additionally, NHTSA added some new or more stringent requirements that currently are not in GTR No. 20, *Electric Vehicle Safety*, such as the school bus crash test and additional risk mitigation requirements.

Given the complexities and limited resources of the heavy vehicle industry, we believe that NHTSA underestimated the time needed to complete these tasks and request a five-year leadtime for the heavy vehicle manufacturers.

Developing the proper component level tests is appropriate to evaluate the crashworthiness of heavy vehicles rather than full-scale vehicle crash tests.

The NPRM states:

> Heavy vehicles other than heavy school buses would be subject to the requirements for normal vehicle operations described above and the requirements for the REESS. They would not be subject to crash testing requirements because the agency does not know of a crash test that would be appropriate for the vehicles at this time. However, while NHTSA does not have a sufficient basis to

> proceed currently with dynamic or quasi-static requirements for heavy vehicles other than school buses, this NPRM requests comment on this issue. NHTSA is interested in the merits of component-level tests that are representative of impact loads in heavy vehicle crashes and the appropriateness of applying the tests to different weight classes of heavy vehicles.
>
> *Id.* at 26,708

Additionally, the NPRM states:

> There are currently no heavy vehicle crash tests in FMVSS. Heavy vehicles are typically made to order with different configurations based on the operational needs of the purchaser and are produced in low volume. Conducting crash tests of various design configurations from a small volume of representative vehicles would be cost prohibitive. There could also be practicability constraints for conducting crash tests on higher weight classes of heavy vehicles.
>
> . . .
>
> Because there are no full vehicle crash tests currently in FMVSSs for heavy vehicles (other than heavy school buses), NHTSA seeks comment on a mechanical integrity test for REESS on heavy vehicles to evaluate post-crash safety at a component-level. As noted above, the current quasi-static loads of the integrity test specified in GTR No. 20 are specific to light vehicles. NHTSA seeks comment on the parameters for a possible quasi-static crush test for the REESS on heavy vehicles.
>
> *Id.* at 26,709-10

As NHTSA stated, there are currently no full vehicle crash tests requirements for heavy vehicles, other than heavy duty school buses, currently in the FMVSSs.

NHTSA also correctly noted the difficulties and concerns with performing full scale crash test on heavy vehicles, other than school buses. As noted, GTR No. 20 and ECE 100 have component level tests such as the mechanical shock requirement. We believe that developing the proper component level tests to evaluate their crashworthiness is most appropriate for those heavy vehicles rather than full scale vehicle crash tests.

The proposed documentation requirements are not consistent with the current NHTSA regulatory framework.

We do not support NHTSA's proposal to include documentation requirements for the following proposed FMVSS No. 305a sections that primarily address specific vehicle and equipment performance requirements rather than general documentation matters:

- S12.7 *Documentation for low temperature operation safety,*
- S12.8 *Documentation and visual warning in the event of operational failure of vehicle controls,*
- S15 *Rescue Sheets and Emergency Response Guides,* and, if applicable,
- S13.1 *Thermal runaway due to internal short in a single cell of the REESS.*

The proposed requirement would result in the elevation of documentation such that even in the absence of issues with an actual vehicle or equipment's performance or safety, a concern over documentation could create the same end-result as (for example) a noncompliant seat belt or brake system. Specifically, Part 571 regulations contain substantive vehicle requirements (*i.e.,* FMVSSs), while NHTSA's procedural requirements are mostly found in parts such as 551, 566, 567, 568, and 579.

While it might seem irrelevant where the requirement is codified, there is a significant distinction: the National Traffic and Motor Vehicle Safety Act prohibits selling a vehicle noncompliant with a motor vehicle safety standard. See, 49 USC § 30112. According to the Act, a motor vehicle safety standard is defined as "a minimum standard for motor vehicle or motor vehicle equipment performance." See, *Id.* at § 30102. It is generally understood that this refers to the FMVSSs: noncompliance with an FMVSS constitutes a performance standard violation, requiring a manufacturer to halt the sale of the vehicle, even if an inconsequentiality petition is pending or granted.

Under the subject proposal, documentation requirements would become part of the FMVSSs, although inadequate documentation does not necessarily affect vehicle performance. Consequently, a manufacturer might be forced to stop selling a vehicle solely due to NHTSA's determination of inadequate documentation, even if no other issues exist. We would not object to a stop-sale for vehicle or equipment performance deficiencies, as Congress and NHTSA have the authority to prohibit the sale of vehicles with performance issues. However, the present proposal would allow NHTSA to bar vehicle sales due to documentation issues alone, even in the absence of actual performance or safety issues. Also, a NHTSA deemed noncompliance would open the vehicle manufacturer up to a potential recall of vehicles already sold. It's uncertain if or how a recall based on a documentation requirement rather than a performance or safety issue would be enforced.

We propose that it would be not only more appropriate but also more consistent to keep documentation requirements with other procedural requirements, allowing the agency to review or collect such documentation (as in Part 579) without equating documentation concerns to substantive safety problems. A safety issue should indeed prevent a vehicle's sale, but a documentation issue alone, without a substantive safety problem, should not create such a barrier.

Standardizing the Emergency Response Guide and Rescue Sheets is essential.

Standardizing the Emergency Response Guide (ERG) and Rescue Sheets are essential for effectively communicating the potential risks to first responders so that vehicle-specific rescue information during crash or fire incidents. This allows for a prompt, effective, and safe emergency response. We support standardizing to ISO-17840-2:2019(e), as the standard provides structured information for rescuers about vehicle rescue sheets and emergency response guides, which are critical in effectively handling incidents involving vehicles.

Adjust the testing methods in section 12 to follow the provisions in GTR No. 20.

a) Consider that S12.1 *Overcharge test* simply refer to GTR No. 20 section 6.2.6. If the FMVSS cannot refer to the test procedure of GTR No. 20, then we recommend the text in this section be amended as follows to allow for either vehicle or component REESS testing:

    i. "S12.1 Overcharge test. The overcharge test is conducted at ambient temperatures between 10 °C and 30 °C, **either with a complete vehicle or with the complete REESS** initially set between 90 to 95 percent State-of-Charge (SOC). **Ancillary systems that do not influence the test results may be omitted from the Tested-Device. The test may be performed with a modified Tested-Device provided these modifications shall not influence the test results**. The following steps are conducted to evaluate the overcharge protection controls:"

b) Consider that S12.2 *Over-discharge test* simply refer to GTR No. 20 section 6.2.7. If the FMVSS cannot refer to the test procedure of GTR No. 20, then we recommend the text in this section be amended as follows to allow for either vehicle or component REESS testing:

    i. "S12.2 Over-discharge test. The overdischarge test is conducted at ambient temperatures between 10 °C and 30 °C, **either with a complete vehicle or with the complete REESS** initially set between 10 and 15 percent SOC. **Ancillary systems that do not influence the test results may be omitted from the Tested-Device. The test may be performed with a modified Tested-Device provided these modifications shall not influence the test results**. For a vehicle with on-board energy conversion systems such as an internal combustion engine or a fuel cell, the fuel supply is set to the minimum level where active driving possible mode is permitted. The following steps are conducted to evaluate the over-discharge protection controls:"

c) Consider that S12.4 *Over-temperature test* simply refer to GTR No. 20 section 6.2.8. If the FMVSS cannot refer to the test procedure of GTR No. 20, then we recommend the text in this section be amended as follows to allow for either vehicle or component REESS testing:

i. "S12.4 Over-temperature test. The overtemperature test is conducted at ambient temperatures between 10 °C and 30 °C, **either with a complete vehicle or with the complete REESS** initially set between 90 to 95 percent SOC. **Ancillary systems that do not influence the test results may be omitted from the Tested-Device. The test may be performed with a modified Tested-Device provided these modifications shall not influence the test results**. For a vehicle with on-board energy conversion systems such as an internal combustion engine or a fuel cell, the fuel supply is set to allow operation for about one hour of driving. The following steps are conducted to evaluate the high temperature protection controls:"

d) Consider that S12.5 *External Shout circuit test* simply refer to GTR20 section 6.2.5. If the FMVSS cannot refer to the test procedure of GTR 20, then we recommend the text in this section be amended as follows to allow for either vehicle or component REESS testing:

i. "S12.5 External Short circuit test. The short circuit test is conducted at ambient **temperatures between 10 °C and 30 °C, either with a complete vehicle or with the complete REESS or with the REESS subsystem(s)** initially set between 90 to 95 percent SOC. **If the manufacturer chooses to test with REESS subsystem(s), the Tested-Device shall be able to deliver the nominal voltage of the complete REESS and the manufacturer shall demonstrate that the test result can reasonably represent the performance of the complete REESS with respect to its safety performance under the same conditions. If the electronic management unit for the REESS is not integrated in the casing enclosing the cells, then the electronic management unit may be omitted from installation on the Tested-Device at the request of the manufacturer.** The following steps are conducted to evaluate the *overcharge protection controls:"*

e) Add to S4, *Definitions*, the following definition of "Tested-Device":

Tested-Device means either complete REESS or REESS subsystem that is subjected to the tests prescribed by this regulation.

The test procedure for evaluating the warning for a thermal event in REESS should align with the documentation requirement described in GTR No. 20.

NHTSA seeks comment on the merits of the proposed performance test to evaluate the thermal event warning system instead of the documentation requirement in GTR No. 20. In addition, NHTSA seeks input on the type of heater, the heater characteristics (*i.e.,* power, peak temperature) and possible locations of the heater within the REESS to simulate a thermal event to trigger the warning.

a) **Response**: To further NHTSA's goal of aligning with GTR No. 20, we recommend that the test procedure for evaluating warning for a thermal event in REESS align with the documentation requirement as described in GTR No. 20 section 7.2.3.

    i. "7.2.3. Warning in the case of a thermal event within the REESS. The vehicle shall provide a warning to the driver in the case of a thermal event in the REESS (as specified by the manufacturer) when the vehicle is in active driving possible mode. Vehicle manufacturers shall make available, at the request of the regulatory or testing entity as applicable with its necessity, the following documentation explaining safety performance of the system level or sub-system level of the vehicle:

        7.2.3.1. The parameters and associated threshold levels that are used to indicate a thermal event (e.g. temperature, temperature rise rate, SOC level, voltage drop, electrical current, etc.) to trigger the warning.
        7.2.3.2. A system diagram and written explanation describing the sensors and operation of the vehicle controls to manage the REESS in the event of a thermal event. In case of optical warning, the tell-tale shall, when illuminated, be sufficiently bright to be visible to the driver under both daylight and night-time driving conditions, when the driver has adapted to the ambient roadway light conditions. This warning tell-tale shall be activated as a check of lamp function either when the propulsion system is turned to the "On" position, or when the propulsion system is in a position between "On" and "Start" that is designated by the manufacturer as a check position. This requirement does not apply to the optical signal or text shown in a common space."

b) While industry strongly recommends FMVSS No. 305a maintain alignment with GTR No. 20 documentation requirements for warning in the case of a thermal event in the REESS, if NHTSA choses to *not* align with GTR 20 on this item, industry recommends that the performance test for warning of a thermal event should be performed as a REESS component test (not a vehicle test). NHTSA's stated intent for the requirement to confirm that the warning activates if the temperature within the REESS reaches a threshold that is significantly higher than the normal operating temperature that could be inferred as a safety critical situation. See, 89 Fed. Reg. 26,732. NHTSA's proposal in S13.2 and S13.3 involves removing a battery pack from the vehicle, opening it, installing a heater to a cell, reinstalling the battery pack to the vehicle, and then heating the cell to the point of a cell thermal runaway. This proposed procedure can potentially initiate cell thermal propagation and an associated catastrophic thermal event which could potentially destroy the tested vehicle and introduce an unsafe situation. Testing that the warning is triggered for a thermal event can be done on a REESS as a component with the same certainty, more flexibility, and a much higher degree of safety.

i. "S13.3 Test procedure for evaluating warning for thermal event in REESS. The thermal event warning test is conducted at ambient temperatures between 10 °C and 30 °C, **with the complete REESS subsystem(s)** initially set between 90 to 95 percent SOC."
ii. In the case of a component test with the complete REESS, the remaining test procedures in S13.3 (parts a-i) should be revised to follow a component level test sequence to test the activation of the warning system. The test criteria should focus on the intent of the evaluation which is to verify the sensing system and event warning systems are performing correctly, for example, this could be accomplished via fault injection into the Battery Management System (BMS) device or via offline testing of the thermal sensors.

S10.2.3 is missing the loading requirements for heavy duty school buses.

We recommend adding the following section (c) to S10.2.3:

> S10.2.3 The vehicle, including test devices and instrumentation, is loaded as follows:
> (a) A passenger car is loaded to its unloaded vehicle weight plus its rated cargo and luggage capacity weight, secured in the luggage compartment, plus the necessary test dummies as specified in S9, restrained only by means that are installed in the vehicle for protection at its seating position.
> (b) A multipurpose passenger vehicle, truck, or bus, with a GVWR of 4,536 kg (10,000 lb) or less, is loaded to its unloaded vehicle weight plus the necessary dummies, as specified in S9, plus 136 kg or its rated GVWR, whichever is less, secured in the load carrying area and distributed as nearly as possible in proportion to its GVWR. For the purpose of this standard, unloaded vehicle weight does not include the weight of work-performing accessories. Each dummy is restrained only by means that are installed in the vehicle for protection at its seating position.
> (c) **A school bus with a GVWR greater than 10,000 pounds is loaded to its unloaded vehicle weight, plus 54.4 kg of unsecured weight at each designated seating position.**

S7.1.2 Working Voltage should be changed to Nominal Voltage.

We request changing "working voltage" to "nominal voltage" in section S7.1.2, as follows:

7.1.2 Voltage Vb is measured across the two terminals of the voltage source. Before a vehicle crash test, Vb is equal to or greater than the ~~working~~ **nominal** voltage as specified by the vehicle manufacturer.

Working Voltage is the maximum or highest voltage and usually occurs when the vehicle is connected to a charger and fully charged and is not appropriate when performing the crash test. FMVSS No 305a and GTR No. 20 "Working Voltage" definition:

3.51. W*orking voltage* means the highest value of an electrical circuit voltage root-mean-square (rms), specified by the manufacturer, which may occur between any conductive parts in open circuit conditions or under normal operating condition. If the electrical circuit is divided by galvanic isolation, the working voltage is defined for each divided circuit, respectively.

GTR No. 20

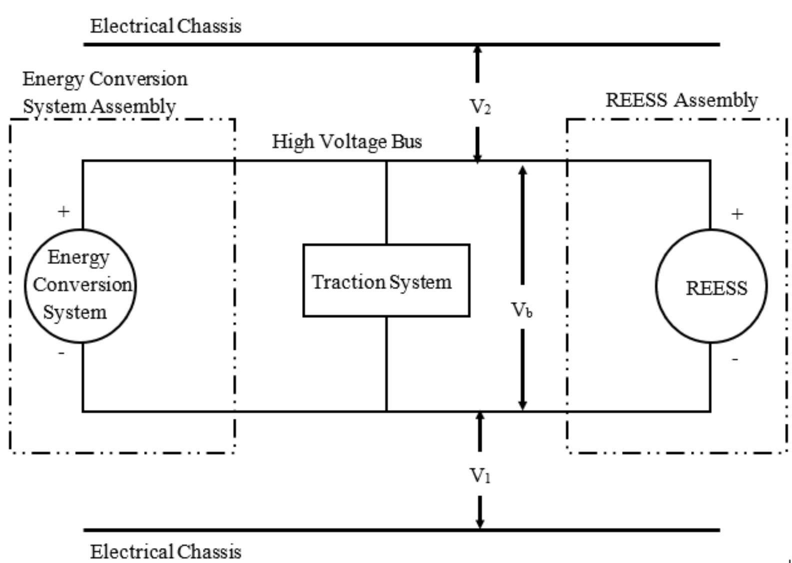
Changing Working Voltage to Nominal Voltage would align with GTR No. 20:

8.1.1.2.2. Measurement method using the vehicle's own REESS as DC voltage source.

8.1.1.2.2.3.1. First step.

The voltage is measured as shown in Figure 18 and the high voltage bus voltage (V_b) is recorded. V_b shall be equal to or greater than the nominal operating voltage of the REESS and/or energy conversion system as specified by the vehicle manufacturer.

Figure 18
Measurement of V_b, V_1, V_2



While FMVSS No. 305a and GTR No. 20 do not define "Nominal Voltage," we propose the following definition for "Nominal Voltage":

> *Nominal voltage* is a value that represents the typical or midpoint of a battery's maximum operating voltage and the minimum operating voltage over its charge and discharge cycle.

The regulation should specify a maximum time allowed to activate the visual display warning after fault detection.

We recommend that the regulation specify a maximum time allowed to activate the visual display warning after fault detection, as follows:

> 6.4 *Electrical isolation monitoring.* DC high voltage sources of vehicles with a fuel cell system shall be monitored by an electrical isolation monitoring system that displays a warning for loss of isolation when tested according to S7.4. The system must monitor its own readiness and the visual warning display must be provided to the driver. For a vehicle with autonomous driving systems and without manually-operated driving controls, the visual warning must be provided to all the front row occupants. **The maximum time allowed to activate visual warning lamp shall be <1 minute when tested per S7.4**

FMVSS No. 305a should allow rooftop charging.

NHTSA describes the requirements for direct contact protection for the vehicle charge inlet in S6.1.6 of the proposed requirements. These requirements are nearly identical to section 5.1.1.1 of GTR No. 20 for light vehicles. However, the S6.1.6 requirements have omitted an important provision for charging in some heavy vehicle applications found in section 7.1.1.1 of GTR No. 20. This section is relevant for heavy vehicles and exempts conductive connection devices not energized except during charging of the REESS if located on the roof of the vehicle out of reach for a person standing outside of the vehicle. This exemption allows for rooftop pantograph charging systems that are currently used in some heavy vehicle battery electric operations like transit buses.

The GTR No. 20 exemption applies to all heavy vehicles, but there is an added requirement for buses capable of carrying eight or more passengers that the rooftop charge interface is located at least 3.0 m from the bottom of the vehicle as measured around the outline of the vehicle.

NHTSA provides no discussion on the omission in the NPRM preamble, so it is difficult to understand NHTSA's rationale for doing so. Pantograph rooftop charging is an existing charging solution in which battery electric users have made significant infrastructure investments, and as noted in GTR No. 20, there are no associated risks for contact if the charging interface is located out of reach of vehicle operators and users. Additionally, another existing industry standard and recommended practice that is used by most manufacturers, SAE J3105, promotes the safe implementation of mechanized conductive power transfer systems for recharging heavy vehicles from the roof. The approach ensures safer and more reliable usage of heave electric vehicles.

The omission of the exemption for rooftop charging in the proposed requirements may render existing pantograph and rooftop charging facilities useless and will nullify the associated investment. Because of this, and because NHTSA's stated intent is to harmonize with GTR No. 20, we request including the exemption for rooftop charging in FMVSS No. 305a.

Remove the redundant and unnecessary "Driving through standing water" test.

GTR No. 20 provides requirements for vehicle washing and driving through standing water in sections 6.1.5 for light vehicles and 8.1.5 for heavy vehicles. The two sections are identical. Sub-sections 6.1.5.1 for light vehicles and 8.1.5.1 for heavy vehicles both state the washing test is *"intended to simulate the normal washing of vehicles, but not specific cleaning using high water pressure or underbody washing"* (emphasis added). These sections prescribe to apply a stream of water at "border lines, i.e. a seal of two parts such as flaps, glass seals, outline of opening parts, outline of front grille and seals of lamps", using an IPX5 nozzle. Sections 6.1.5.2 and 8.1.5.2 then give the requirements for the "Driving through standing water" test, where a vehicle is driven through a 10 cm pool of water for 500 m at 20 kph, which primarily directs water at the underside of the vehicle.

In the FMVSS No. 305a NPRM, NHTSA adds the vehicle underbody to the vehicle washing test in S14.1 and gives the rationale that the vehicle underbody is often exposed to water when the vehicle is washed. See, 89 Fed Reg. 26,725. We agree with this assertion. NHTSA also adopts the GTR No. 20 test for "driving through standing water" in S14.2 with essentially the same test requirements of driving the vehicle through a 10 cm pool of water at 20 kph for 500 m.

The addition of the IPX5 spray nozzle to the vehicle washing test renders the "driving through standing water" test is needless and duplicative because the spray nozzle will already apply water to all surfaces of the underside of the vehicle with more aggressive water coverage. There is no need to mandate a test for a second coverage of water to the underside of the vehicle. Since we know of no facility in which this test could be successfully conducted with a heavy vehicle, manufacturers would have to make significant capital investments to construct suitable new test facilities. Accordingly. NHTSA should remove the redundant, unnecessary, and prohibitively expensive S14.2 "Driving through standing water" test for heavy vehicles.

The S12.3 overcurrent test should not be applicable to heavy vehicles.

GTR No. 20 provides the overcurrent test requirements in sections 5.4.9 and 6.2.9. These sections apply to light vehicles only (GVWR less than or equal to 3.5 tonnes (7,716 pounds)). There are no overcurrent test requirements in the corresponding heavy vehicle sections of GTR

No. 20 (sections 7 and 8). NHTSA has included test requirements similar to the GTR No. 20 overcurrent test requirements in S12.3 of the FMVSS No. 305a NPRM; however, NHTSA has incorrectly applied this requirement to all vehicles regardless of vehicle weight class.

GTR No. 20 provides the following justification for excluding heavy vehicles from the overcurrent test requirements:

> The current test proposal is vehicle based and was deemed inappropriate for heavy vehicles as it is unclear how to apply on vehicles that have different charging technologies. More discussion is needed in phase 2 to address different charging methodologies.
>
> GTR No. 20

At this point there is no overcurrent test for heavy vehicles in the GTR No. 20 phase 2 draft. NHTSA provides significant discussion on the overcurrent test in section iii on page 26,716 of the NPRM. However, there is no discussion for applying the requirement to heavy vehicles, so it is difficult to understand NHTSA's rationale for doing so. We request that NHTSA fully harmonize with GTR No. 20 on this requirement and revise FMVSS No. 305a to reflect that the S12.3 Overcurrent test only apply to light duty vehicles.

Allow the use of manufacturer-supplier drive cycles during dynamometer tests.

S12.4 (d) requires using an appropriate manufacturers supplied drive profile and (h) should follow the same drive profile or allow for the option to follow the same manufactured supplied drive profile. We request revising S12.4(h) to add the language as shown:

> (d) The vehicle is driven on the dynamometer using an appropriate vehicle manufacturer supplied drive profile and charging information for discharge and charge of the REESS to raise the REESS temperature to its upper boundary safe operating temperature within one hour. If an appropriate manufacturer supplied drive profile is not available, the vehicle is repeatedly accelerated to 80 mph and then decelerated to 15 mph within 40 seconds. If the manufacturer does not supply a charge profile, then a charge rate greater than 1⁄3C current is used.
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> . . .
>
> (h) After the completion of the standard cycle, **<u>or the manufacturer supplied drive profile</u>**, or if the standard cycle, **<u>or the manufacturer supplied drive profile</u>** is not performed, after the discharge and charge procedure is terminated, the vehicle is observed for 1 hour for evidence of electrolyte leakage, rupture, venting, fire, or explosion of the REESS.

Flexibility is appropriate for thermal propagation warnings.

We agree with the proposal in the NPRM to present warning of potential safety hazards to the vehicle operator via visual and auditory modalities. See sections 6.4, 11.3, and 13.2. We appreciate the flexibility NHTSA has proposed allowing incorporation of these safety hazard alerts into vehicle human-machine interface (HMI) strategies.

We have a long history of developing vehicle HMI strategies which provide hundreds of visual and auditory alerts to the operator for a broad range of functionalities (including but not limited to brake air supply, battery state of charge, regenerative braking, steering assist, exterior lighting, parking brakes, automatic emergency braking, adaptive cruise control, lane departure, lane keeping assist, internal combustion engine (ICE) diesel particulate filter (DPF) regeneration, ICE diesel exhaust fluid (DEF) levels, ICE derate, ICE shut down, ICE no idle, tire pressure monitor system (TPMS), fluid temperatures, axle differential and cross-lock status, power take off (PTO) status, and body builder functions). These alerts work in coordination to provide the operator distinguishable indicators that build separation of both function and urgency level. The flexibility to incorporate said safety hazard alerts into vehicle HMI strategies will continue to protect the integrity of clear and concise communication.

Define "suitable lamp" for use in S7.3.1(c).

The NPRM states:

> S7.3.1 *Test to evaluate protection from direct contact with high voltage sources*
>
> (a) Any parts surrounding the high voltage components are opened, disassembled, or removed without the use of tools.
>
> (b) The selected access probe is inserted into any gaps or openings of the electrical protection barrier with a test force between 9 Newton to 11 Newton with the IPXXB probe or 1 Newton to 2 Newton with the IPXXD probe. If the probe partly or fully penetrates into the electrical protection barrier, it is placed in every possible position to evaluate contact with high voltage live parts. If partial or full penetration into the electrical protection barrier occurs with the IPXXB probe, the IPXXB probe shall be placed as follows: starting from the straight position, both joints of the test finger are rotated progressively through an angle of up to 90 degrees with respect to the axis of the adjoining section of the test finger and are placed in every possible position.
>
> (c) A low voltage supply (of not less than 40 V and not more than 50 V) in series with ***a suitable lamp*** may be connected between the access probe and any high voltage live parts inside the

> electrical protection barrier to indicate whether high voltage live parts were contacted.
>
> 89 Fed. Reg. 26,742-43 (*emphasis added)*

We have concerns that the specific type and requirement for the "suitable lamp" is not defined adequately. While this appears to align with GTR No. 20, such vagueness could influence the test results and makes it difficult for a vehicle manufacturere to ensure compliance. NHTSA should more clearly define the type or requirements for the "suitable lamp." For reference this tool is used in S9 *Crash Test Specifications* S9.1(c). Accordingly, we recommend that the following definition for "Suitable Lamp" be added to S4 *Definitions:*

> *Suitable Lamp* means a circuit tester with an input Voltage range of 50 VDC minimum, that is one of the following types": an incandescent lamp, LED indicator, buzzer, or Voltmeter.

Also related to S7.3.1(c), EMA members do not understand the rational for the low voltage supply requirement (*i.e.,* of not less than 40 V and not more than 50 V) when most vehicles have a standard voltage of 12 or 24 volts. EMA recommends that a voltage supply of ≤ 50V be connected for this check and that way the vehicles standard voltage of 12 or 24 volts can be used for this check.

There are two typographical errors in the proposed regulation.

Figure 7b. Access Probe Jointed Test Finger IPXXB Access Probe Dimensions states Chamber all edges. It should state **Chamfer** all edges.

S7.1 Voltage Measurement states 10 MW. It should state **MΩ.**

We look forward to working with NHTSA and other stakeholders to continue enhancing the safety of medium- and heavy-heavy ZEVs. If there are any questions about these comments, or if we could provide any additional information, please do not hesitate to contact Timothy Blubaugh at (312) 929-1972, or tblubaugh@emamail.org.

Respectfully submitted,

TRUCK AND ENGINE
MANUFACTURERS ASSOCIATION

136452.5