ETA-NTP011

Revision 4
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Vehicle Verification

Prepared by

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APPENDICES

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1.0 Objective

The objective of this procedure is to identify a common protocol for the completion of verification data collection for each vehicle delivered for testing. These activities shall be completed prior to commencement of testing activities performed in accordance with procedures prepared by Electric Transportation Applications for the NEV America Performance Test Program.

2.0 Purpose

This procedure identifies the minimum (shall) vehicle requirements to be verified and recorded as part of the performance testing of electric vehicles, provided in the NEV America Technical Specifications. Vehicles submitted for testing under the Performance Test Program shall meet these requirements. Although other procedures exist which collect data and verify system and vehicle performance, the requirements of those procedures are not required to be met for inclusion of the vehicle in the Performance Test Program.

3.0 Documentation

Documentation addressed by this procedure shall be consistent, easy to understand, easy to read and readily reproducible. Basis documents are referenced where appropriate. This documentation shall contain enough information to "stand alone"; that is, be self-contained to the extent that all individuals qualified to review it could be reasonably expected to reach a common conclusion, without the need to review additional documentation. Storage and retention of records shall be completed as described in Procedure ETA-NAC001, "Control, Close-out and Storage of Documentation."

4.0 Prerequisites

4.1 Individuals assigned to complete this procedure will be knowledgeable of the NEV America Technical Requirements.

4.2 Individuals assigned to complete this activity will have received the appropriate training in accordance with ETA-NAC005, "Training and Certification of Personnel Utilizing ETA Procedures."

4.3 Prior to commencing this activity, a meeting of the involved personnel will be held to discuss the following:

- 4.3.1 Data required
- 4.3.2 Data available
- 4.3.2 Data sources
- 4.3.4 Contingencies
- 4.3.5 Safety requirements

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4.4 Verification of all data shall be completed prior to testing to any procedure other than those required by procedure ETA-NTP011 to verify minimum (shall) requirements.

4.5 All documentation required to document the activities addressed by this procedure shall be completed, approved and issued prior to commencing the testing it addresses.

5.0 Verification Requirements

The requirements in Section 5.1 are derived from the NEV America Vehicle Technical Specification minimum (shall) requirements. All vehicles submitted for testing under this program shall meet these requirements. Vehicles which cannot meet these minimum requirements can be accepted for testing, but only as a Prototype (non-Production) vehicle.

Should a vehicle be presented to the test program more than once, a new check-sheet shall be completed each time it is presented. The testing authority may choose not to re-verify all items, in accordance with the applicable Administrative Control Procedures (ETA-NAC001 through ETA-NAC007).

Each step number (5.1.1 through 5.1.46) corresponds to the similarly numbered section of the Minimum Vehicle Requirements in the NEV America Vehicle Technical Specifications. Although most of the minimum requirements can be verified by a physical inspection or document review, some require a dynamic test for validation. For these items, the step in Section 5.1 will identify a step in Section 5.2 which will implement the test, either by specific direction, or by reference to a protocol developed specifically for that test.

On Appendix A, record whether or not each requirements has been met by circling the appropriate response (YES NO NA).

5.1 Minimum Vehicle Requirements

The minimum vehicle requirements listed in Appendix A shall be verified by inspection or by test as described in Section 5.2. Vehicle compliance with these minimum requirements shall be recorded in Appendix A. Any requirements not fully met shall be indicated on Appendix A by marking "No" and completing a Non-Conformance Report (ETA-NAC002 Appendix B). The Non-Conformance Report shall be transmitted to the vehicle supplier within two business days of issuance. Further verification of minimum vehicle requirements may continue while a Non-Conformance Report is unresolved. However, no testing (other than that required for verification of minimum vehicle requirements) shall proceed until all Non-Conformance Reports concerning this procedure and minimum vehicle requirements are resolved such that Appendix A can be marked "Yes" for all minimum vehicle requirements.

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5.2 Dynamic Verification Requirements

The following tests shall be conducted to verify minimum vehicle requirements that are not verifiable by simple inspection. The results of testing shall be recorded in Appendix A and on a Non-Conformance Report, if required.

5.2.1 The vehicle shall have a payload capability of at least 400 pounds. This shall be determined as follows:

5.2.1.1 Upon receipt, the vehicle shall be weighed to determine the vehicle's standard (as-delivered condition) curb weight.

5.2.1.2 Obtain the GVWR rating from the FMVSS label affixed to the vehicle. Verify such information against that provided in ETA-NAC006 Appendix A.

5.2.1.3 Subtract the curb weight determined in Step 5.2.1.1 from the GVWR determined in 5.2.1.2.

5.2.1.4 The calculated difference shall be considered the vehicle's payload capability.

5.2.1.5 Verify the calculated payload is at least as great as that shown on the FMVSS label and that provided by the vehicle supplier in Appendix A.

5.2.2 If the vehicle is a conversion, it shall not have a GVWR greater than the OEM GVWR, nor shall the GAWR have been increased. This shall be verified as follows:

5.2.2.1 Locate the OEM FMVSS label. Note the GVWR and GAWR's. Verify such information against that provided in ETA-NAC006 Appendix A.

5.2.2.2 Locate the Converter's FMVSS label. Note the GVWR and the GAWR's. Verify such information against that provided in ETA-NAC006 Appendix A.

5.2.2.3 Compare the two GVWR's and verify that the GVWR listed on the converter's FMVSS label is not greater than the GVWR's. Verify such information against that provided in ETA-NAC006 Appendix A.

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5.2.2.4 Compare the two GAWR's and verify that the GAWR's listed on the converter's FMVSS label are not greater than the OEMs listed GAWR's. Verify such information against that provided in ETA-NAC006 Appendix A.

5.2.3 For conversion vehicles, verify that the passenger space is not intruded upon by the battery, battery box or other conversion materials, as follows:

5.2.3.1 The battery cannot be accessed by a vehicle occupant;

5.2.3.2 The battery box cannot be opened from inside the passenger compartment;

5.2.3.3 The battery or battery box do not intrude into the space normally occupied by an individual while that individual is occupying a seat formally defined as such.

5.2.3.4 Conversion materials do not intrude into the space normally occupied by an individual while that individual is occupying a seat formally defined as such.

5.2.4 Verify the compliance of the vehicle to the requirements of the FMVSS applicable on the date of manufacture by conducting the following:

5.2.4.1 Locate the FMVSS Certification Label(s) on the vehicle.

5.2.4.2 Verify that the label(s) indicate the vehicle is fully certified.

5.2.4.3 If the vehicle is a conversion, verify that both the OEM FMVSS label <u>and</u> the Converter's FMVSS label are present. The Converter's FMVSS label <u>SHALL NOT</u> be installed in a manner that precludes full view of the OEM label.

5.2.5 The battery charger shall be capable of recharging the main propulsion battery to a state of full charge from any possible state of discharge in less than 12 hours. This shall be verified by completing Section 6 of ETA-NTP010. Testing shall be initiated following completion of a Range Test conducted per Section 5.1 of procedure ETA-NTP004.

5.2.6 The charger shall be fully automatic, determining when "end of charge" conditions are met and transitioning into a mode that maintains the propulsion battery at a full state of charge while not overcharging it, if continuously left on charge This shall be verified by completing Section 6 of ETA-NTP010. Testing shall be initiated following completion of a Range Test conducted per Section 5.1 of procedure ETA-NTP004.

5.2.7 On-board and off board chargers shall have the capability of accepting input voltages of 120V (Level 1), 208V or 240V (Level 2) single phase 60 Hertz alternating current service, with a tolerance of ±10% of rated. This shall be verified by completing Section 6 of ETA-NTP010. Testing shall be initiated following completion of a Range Test conducted per Section 5.1 of procedure ETA-NTP004.

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5.2.8 On-board charger personnel protection systems, which may include ground fault circuit interrupters (GFCI), shall be in accordance with the provisions of UL Standards 2202. This shall be verified by assuring that a Ground Fault Circuit Interrupter equipped charge cord is provided with the vehicle or the Owner's Manual specifies that the vehicle shall only be charged using a Ground Fault circuit Interrupter protected receptacle.

5.2.9 Vehicles shall not contain exposed conductors, terminals, contact blocks or devices of any type that create the potential for personnel to be exposed to 60 volts or greater. This shall be verified as follows:

5.2.9.1 Each exposed conductor, terminal contact block and device shall have it's potential to ground and to battery positive and negative measured with a Volt-Meter verifying that voltage present at the exposed area is less than 60 volts.

5.2.9.2 Any device exhibiting a non-compliance (a voltage of 60V or greater) shall be clearly identified on a Non-Conformance Report.

5.2.10 Propulsion power, for vehicles operating at greater than 60 volts, shall be isolated from the vehicle chassis such that leakage current is less than 0.5 MIU under static conditions. This shall be verified in conjunction with conduct of ETA-NTP005 Section 5.38.

5.2.11 Charging circuits shall be isolated from the vehicle chassis such that ground current from the grounded chassis does not exceed 5 mA. This measurement shall be taken both during the conduct of ETA-TP010 Section 5.7 (charger testing) and ETA-NTP005 Section 5.38 (rough road water bath test).

5.2.12 Verify that the tires supplied with the vehicle correspond to the requirements of the placard installed in accordance with 49 CFR 571.109, and 110, as applicable.:

5.2.12.1 Identify the manufacturer, type and size of the tire from the tire sidewall.

5.2.12.2 Compare the data obtained in 5.2.11.1 with the placard installed on the vehicle per 49CFR571.109 & 110, ensuring that the size is the same and the tire pressure specified is equal to or less than the maximum inflation pressure specified on the tire sidewall.

Verify that the tires supplied with the vehicle being inspected are commercially available by conducting the following examinations.

5.2.12.3 Identify the manufacturer, type and size of the tire.

5.2.12.4 Obtain the phone number of three dealers that are authorized dealers for the tire is question.

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5.2.12.5 Call those dealers and verify that the tires are available for purchase. Make this verification for quantities of one, four and 20 tires. If available, attempt to obtain the price of the tire, excluding amounts for taxes, mounting, balancing, road hazard insurance and all other fees and costs.

Verify the load rating of the tire is adequate by conducting the following examinations.

5.2.12.6 Divide the greatest GVAWR obtained in Section 5.2.2 by two. This value must be equal to or greater than the load rating of the tire shown on the tire sidewall.

CAUTION

Verification of Step 5.2.13 may result in movement of the vehicle. Personnel must anticipate vehicle movement due to inadvertent energization of the controller. Personnel shall exercise extreme caution when performing the following steps.

5.2.13 The controller shall not energize in any position other than "Park" or "Neutral" as defined by 49 CFR 571. This shall be verified as follows:

5.2.13.1 Place the vehicle transmission in a position other than Park or Neutral.

5.2.13.2 Turn the vehicle on using the key-switch.

5.2.13.3 Attempt to energize the controller by depressing the accelerator.

5.2.13.4 If the controller energizes (as evidenced by meter indication or vehicle motion) requirements have not been met.

CAUTION

Verification of Step 5.2.14 may result in movement of the vehicle. Personnel must anticipate vehicle movement due to inadvertent energization of the controller. Personnel shall exercise extreme caution when performing the following steps.

5.2.14 The key shall be removable only in the "Off" position, with the drive selector in "Park." These positions are defined as the labeled detent position. This shall be verified as follows:

5.2.14.1 With the drive selector in the "Park" position, verify that the key can be inserted and removed without problem.

5.2.14.2 Turn the key to the "On" position. Attempt to remove the key. If the key can be removed requirements have not been met..

5.2.14.3 Repeat Section 5.2.14.2 for each available key position.

CAUTION

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Verification of Step 5.2.15 may result in movement of the vehicle. Personnel must anticipate vehicle movement due to inadvertent energization of the controller. Personnel shall exercise extreme caution when performing the following steps.

5.2.15 The controller shall not initially energize or excite with a pre-existing accelerator input. These positions are defined as the labeled detent position. This shall be verified as follows:

- 5.2.15.1 Verify the vehicle drive selector is in the "Park" or "Neutral" position.
- 5.2.15.2 Verify the key switch is “Off.”
- 5.2.15.3 Depress the accelerator.
- 5.2.15.4 Turn the key switch to the “On” position. If the controller energizes, requirements have not been met.
- 5.2.15.5 Place the vehicle drive selector in the “Neutral” position.
- 5.2.15.6 Verify the key switch is “Off.”
- 5.2.15.7 Depress the accelerator.
- 5.2.15.8 Turn the key switch to the “On” position. If the controller energizes, requirements have not been met..
- 5.2.15.9 Place the vehicle drive selector in the “Drive” position.
- 5.2.15.10 Verify the key switch is “Off.”
- 5.2.15.11 Depress the accelerator.
- 5.2.15.12 Turn the key switch to the “On” position. If the controller energizes, requirements have not been met.
- 5.2.15.13 Place the drive selector in the “Reverse” position.
- 5.2.15.14 Verify the key switch is “Off.”
- 5.2.15.15 Depress the accelerator.
- 5.2.15.16 Turn the key switch to the “On” position. If the controller energizes, requirements have not been met.

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CAUTION

Verification of Step 5.2.16 may result in movement of the vehicle. Personnel must anticipate vehicle movement due to inadvertent energization of the controller. Personnel shall exercise extreme caution when performing the following steps.

5.2.16 The vehicle shall be prevented from being driven with the master switch key turned on and the drive selector in the drive or reverse position while the vehicle's charge cord is attached. This requirement shall be verified as follows.

5.2.16.1 Verify the vehicle drive selector is in the "Park" or "Neutral" position.

5.2.16.2 Verify the key switch is "Off."

5.2.16.3 Turn the key switch to the "On" position. If the controller energizes, requirements have not been met.

5.2.16.4 Place the vehicle drive selector in the "Neutral" position.

5.2.16.5 Verify the key switch is "Off."

5.2.16.6 Turn the key switch to the "On" position. If the controller energizes, requirements have not been met..

5.2.16.7 Place the vehicle drive selector in the "Drive" position.

5.2.17.8 Verify the key switch is "Off."

5.2.16.9 Turn the key switch to the "On" position. If the controller energizes, requirements have not been met.

5.2.16.10 Place the drive selector in the "Reverse" position.

5.2.16.11 Verify the key switch is "Off."

5.2.17 Regenerative braking shall not adversely impact the vehicle's service brake capability on varying road surfaces. This requirement shall be verified as during conduct of ETA-NTP006 Section 5.5.8.5.

5.2.18 Vehicles shall be capable of completing the NEV America Rough Road Test NTP-005 Revision 1 including (1) driving through two (2) inches of standing water at a speed of 20 mph without damage and without battery to chassis leakage current exceeding 0.5 MIU per UL Standard 2202, and (2) standing for extended periods in extreme temperatures without damage to or failure of the vehicle or its systems. This shall be verified by conduct of ETA-NTP005 Section 5,

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5.2.18 Vehicle shall be capable of completing all NEV America tests without repairs exceeding a cumulative total of 72 hours. This shall be verified by maintaining the cumulative total repair time during testing based on repair times noted on Non-Conformance Reports (ETA-NAC002 Appendix B)

5.2.19 The controller/inverter shall limit the maximum battery discharge to prevent degradation of battery life and loss of vehicle operability or shall indicate to the vehicle operator that the battery will be damaged by continued vehicle operation. Such limit and/or indication shall be repeatable and accurate to at least 10% battery state of charge. This shall be verified as follows.

5.2.19.1 Verify the depth of discharge reached during ETA-NTP004 Section 5.1.7 testing is within 10% (actual battery SOC) of the value provided by the vehicle supplier in NEV America Vehicle Technical Specification Appendix A, and is within 10% (indicated battery SOC) of the indicated Vehicle Display SOC

5.2.19.2 Verify the depth of discharge reached during ETA-NTP010 Section 6.1 testing is within 10% (actual battery SOC) of the value provided by the vehicle supplier in NEV America Vehicle Technical Specification Appendix A, is within 10% (indicated battery SOC) of the indicated Vehicle Display SOC and is within 10% of the indicated Vehicle Display SOC in Section 5.2.19.1.

5.2.19.2 If ETA-NTP004 Section 5.1.7 testing was terminated because of battery loss of power, the requirements have not been met.

5.2.20 Compliance with the 25 mile per hour limit shall be determined by averaging vehicle speed using a 10 second rolling average, the value of which shall at no time exceed 25.99 mph.

5.2.21 Confirm compliance with 49 CFR 571.105.S5.2.1 or .2 by parking on a 30% grade and ensure that the vehicle does not move for at least 5 minutes. The vehicle should be loaded to GVWR including the driver. Perform test facing both forward and backward on the slope.

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6.0 Glossary

6.1 Effective Date – The date, after which a procedure has been reviewed and approved, that the procedure can be utilized in the field for official testing.

6.2 Program Manager – As used in this procedure, the individual within Electric Transportation Applications responsible for oversight of the EV America Performance Test Program. [Subcontract organizations may have similarly titled individuals, but they are not addressed by this procedure.]

6.3 Shall – Items which require adherence without deviation. Shall statements identify binding requirements. A go, no-go criterion.

6.4 Should – Items which require adherence if at all possible. Should statements identify preferred conditions.

6.5 Test Director – The individual within Electric Transportation Applications responsible for all testing activities associated with the EV America Performance Test Program.

6.8 Test Director's Log – A daily diary kept by the Test Director, Program Manager, Test Manager or Test Engineer to document major activities and decisions that occur during the conduct of a Performance Test Evaluation Program. This log is normally a running commentary, utilizing timed and dated entries to document the days activities. This log is edited to develop the Daily Test Log published with the final report for each vehicle.

6.9 Test Engineer – The individual(s) assigned responsibility for the conduct of any given test. [Each contractor/subcontractor should have at least one individual filling this position. If so, they shall be responsible for adhering to the requirements of this procedure.]

6.10 Test Manager – The individual within Electric Transportation Applications responsible for the implementation of the test program for any given vehicle(s) being evaluated to the requirements of the EV America Performance Test Program. [Subcontract organizations may have similarly titled individuals, but they are not addressed by this procedure.]

7.0 References

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7.1 NEV America Vehicle Technical Specification
Revision 1, April 15, 2002

7.2 ETA-NAC001, Revision 1 – Control, Close-out and Storage of Documentation

7.3 ETA-NAC002, Revision 1 – Control of Test Conduct.

7.4 ETA-NAC004, Revision 1 – Review of Test Results

7.5 ETA-NAC005, Revision 1 – Training and Certification of Personnel Utilizing ETA Procedures"

7.6 ETA-NAC006, Revision 1 – Receipt Inspection

7.7 ETA-NAC007, Revision 1 – Control of Measuring and Test Equipment

7.8 ETA-NTP004, Revision 1 – Constant Speed Range Test

7.9 ETA-NTP010, Revision 1 – Measurement and Evaluation of Electric Vehicle Charger Performance.

7.5 ANSI Standard C101.1, 1986

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APPENDIX-A
Vehicle Minimum Requirements Review Check List (Page 1 of 7)

Vehicle Number: _____

NTP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
5.2.4	1.1	Vehicles shall comply with Federal Motor Vehicle Safety Standard 500 as promulgated on the date of manufacture. Such compliance shall be certified by the Supplier in accordance with 49 CFR 567.	Yes	No	N/A		
5.1		Suppliers shall provide a completed copy of Appendix A and Appendix B with their proposal, providing vehicle specifications and the method of compliance, if any, with each listed section of 49 CFR 571.100.	Yes	No	N/A		
5.1	1.2	Vehicles shall be certifiable under current California Air Resources Board (CARB) regulations as vehicles that meet ZEV emission requirements and qualify for ZEV credits.	Yes	No	N/A		
5.1		If the vehicle is equipped with a fuel-fired heater, the heater shall also comply with this requirement.	Yes	No	N/A		
5.1	1.4	Suppliers shall provide Material Safety Data Sheets (MSDS) for all unique hazardous materials supplied with the vehicle.	Yes	No	N/A		
5.1	1.5	Suppliers shall provide recycling plans for batteries and other vehicle hazardous materials including how the plan has been implemented.	Yes	No	N/A		
5.1	1.6	All vehicles shall comply with the FCC requirements for unintentional emitted electromagnetic radiation, as identified in 47 CFR 15, Subpart B, "Unintentional Radiators."	Yes	No	N/A		
5.2.1	2.1	Vehicles shall have a minimum payload of at least 400 pounds.	Yes	No	N/A		
5.2.1	2.2	Suppliers shall provide the curb weight and rated payloads of their vehicles.	Yes	No	N/A		
5.2.2		For conversion vehicles, Suppliers shall specify the OEMs gross vehicle weight rating (GVWR) and shall not exceed such rating.	Yes	No	N/A		
5.2.2	2.3	For conversions, OEM Gross Vehicle Axle Weight Ratings (GAWR) shall not be increased.	Yes	No	N/A		
5.2.2		Suppliers shall provide axle weights for the vehicle as delivered, and at full rated payload.	Yes	No	N/A		
5.1	2.4	Odometers shall be provided as standard equipment or as an option and shall have an accuracy of at least ± 5%.	Yes	No	N/A		

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Vehicle Minimum Requirements Review Check List (Page 2 of 7)

NTP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
5.2.12	2.6	The Supplier shall offer a standard or an optional tire conforming to the following requirements:					
		• Tires provided shall correspond to the requirements of the placard installed in accordance with 49 CFR 571.109, and 110, as applicable.	Yes	No	N/A		
		• Suppliers shall specify manufacturer, model and size of the standard tire for the vehicle and for the tire provided.	Yes	No	N/A		
		• Tire size and inflation pressure for the tire provided shall be in accordance with the requirements of the placard.	Yes	No	N/A		
		• At no time shall the tire's inflation pressure exceed the maximum pressure molded into that tire's sidewall.	Yes	No	N/A		
		• The tire provided shall be operable across the entire operation/load range of that vehicle.	Yes	No	N/A		
		• Replacements for the tire provided shall be commercially available to the end user in sufficient quantities to support the purchaser's needs.	Yes	No	N/A		
		• Tires provided as original equipment by the Supplier shall not have warranty restrictions in excess of those of the tire's manufacturer, unless the Supplier provides the warranty for the tires.	Yes	No	N/A		
5.1	3.1	Seating capacity shall be a minimum of 1 driver	Yes	No	N/A		
		If a conversion vehicle's seating capacity is changed from that specified by the OEM on their FMVSS placard, the seat(s) being added or abandoned shall be modified as required by 49 CFR 571.207, et al, and a new FMVSS placard installed as required by 49 CFR 567, 568 or 571, as applicable.	Yes	No	N/A		
5.2.3	3.2	For conversion vehicles, the OEM passenger space shall not be intruded upon by the batteries or other conversion materials.	Yes	No	N/A		
5.2.17	4.2	Regenerative braking shall not adversely impact the vehicle's service brake capability on varying road surfaces.	Yes	No	N/A		

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Vehicle Minimum Requirements Review Check List (Page 3 of 7)

NTP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
5.2.19	4.4	The controller/inverter shall limit the maximum battery discharge to prevent degradation of battery life (see Section 6.3) and loss of vehicle operability or shall indicate to the vehicle operator that the battery will be damaged by continued vehicle operation.	Yes	No	N/A		
		Such limit and/or indication shall be repeatable and accurate to at least 10% battery state of charge.	Yes	No	N/A		
5.1	4.6	Vehicles shall comply with the requirements of 49 CFR 571.105.S5.2.1, or alternatively, 49 CFR 571.105.S5.2.2 for parking mechanisms.	Yes	No	N/A		
5.2.20	5.2	Compliance with the 25 mile per hour limit shall be determined by averaging vehicle speed using a 10 second rolling average, the value of which shall at no time exceed 25.99 mph.	Yes	No	N/A		
5.18	5.6	Vehicles shall be capable of completing the NEV America Rough Road Test NTP-005 Revision 1 including (1) driving through two (2) inches of standing water at a speed of 20 mph without damage and without battery to chassis leakage current exceeding 0.5 MIU per UL Standard 2202, and (2) standing for extended periods in extreme temperatures without damage to or failure of the vehicle or its systems.	Yes	No	N/A		
5.2.18		Vehicle shall be capable of completing all NEV America tests without repairs exceeding a cumulative total of 72 hours.	Yes	No	N/A		
5.1	6.2	If vehicle batteries require active ventilation for charging, the vehicle shall be so marked.	Yes	No	N/A		
5.1	6.3	Suppliers shall indicate the depth of discharge below which the batteries should not be discharged.	Yes	No	N/A		
5.1	6.5	Suppliers shall provide a description of areas of non-compliance (if any) with the requirements of this Section 6.5.	Yes	No	N/A		

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Vehicle Minimum Requirements Review Check List (Page 4 of 7)

NTP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
	6.7	Concentrations of explosive gases in the battery box shall not be allowed to exceed 25% of the LEL (Lower Explosive Limit).	Yes	No	N/A		
5.1		Suppliers shall describe how battery boxes will be vented, to prevent battery gas accumulation during and following normal charging, abnormal charging and operation of the vehicle.	Yes	No	N/A		
5.1		Suppliers shall provide a description of areas of non-compliance (if any) with the requirements of SAE J1718 on Battery Gas Evolution.	Yes	No	N/A		
5.1	6.9	Maintenance requirements for the batteries shall be described.	Yes	No	N/A		
5.2.9	7.1	Vehicles shall not contain exposed conductors, terminals, contact blocks or devices of any type that create the potential for personnel to be exposed to 60 volts (nominal battery voltage) or greater (the distinction between low-voltage and high voltage, as specified in SAE J1127, J1128, et al.).	Yes	No	N/A		
5.1		Access to any high voltage components shall require the removal of at least one bolt, screw, cover, or latch.	Yes	No	N/A		
5.1		Devices considered to be high voltage components shall be clearly marked as HIGH VOLTAGE. These markings should be installed at any point the voltage can be accessed by the end user.	Yes	No	N/A		
5.1		Cable and wire marking shall consist of orange wire and/or orange sleeves as identified in SAE-J1127.	Yes	No	N/A		
5.2.10	7.2	Propulsion power system operating at greater than 60 volts shall be isolated from the vehicle chassis such that leakage current does not exceed 0.5 MIU.	Yes	No	N/A		
5.2.11		Charging circuits shall be isolated from the vehicle chassis such that ground current from the grounded chassis does not exceed 5 mA at any time the vehicle is connected to an off-board power supply and shall be compatible with operation using a 5 mA GFCI.	Yes	No	N/A		

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Vehicle Minimum Requirements Review Check List (Page 5 of 7)

NTP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
5.1	7.3	Vehicles using HIGH VOLTAGE traction systems shall be equipped with a key operated "master" switch that shall interlock controller propulsion functions and battery contactor(s), if any, to render the propulsion system inoperative. Contactor(s) used in conjunction with the master switch shall be capable of interrupting maximum rated controller/inverter current.	Yes	No	N/A		
5.1		A manual service disconnect for vehicles using a HIGH VOLTAGE traction system shall also be required. It shall have the following characteristics: • Manual action is required to break the connection, • The disconnection is physically verifiable, • The disconnection does not create exposed conductors capable of becoming energized while exposed, and • The service disconnect is marked so as to be visible from outside the vehicle with the doors (if so equipped) open and is accessible without the use of tools.	Yes	No	N/A		
	7.4	The following controller/inverter interlocks shall be present:					
5.2.13		• The controller shall not initially energize to move the vehicle with the direction selector in any position other than "PARK" or "NEUTRAL;"	Yes	No	N/A		
5.2.14		• The master switch key shall be removable only when the switch is in the "OFF" position,	Yes	No	N/A		
5.2.15		• With a pre-existing accelerator input, the controller shall not energize such that the vehicle can move under its own power in this condition.	Yes	No	N/A		
5.2.16		The vehicle shall be prevented from being driven with the master switch key turned on and the drive selector in the drive or reverse position while the vehicle's charge cord is attached.	Yes	No	N/A		

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5.1	7.8	Electrically powered windshield wipers shall be provided as standard or optional equipment.	Yes	No	N/A		
5.1	7.9	An electrically powered warning horn operable by the vehicle driver shall be provided as standard or optional equipment.	Yes	No	N/A		
5.2.5	8.1	Vehicles shall be equipped with an on-board or off board battery charger capable of recharging the propulsion battery to a state of full charge from any possible state of discharge in less than 12 hours.	Yes	No	N/A		
5.2.6		The charger shall be fully automatic, determining when "end of charge" conditions are met and transitioning into a mode that maintains the propulsion battery at a full state of charge while not overcharging it, if continuously left on charge	Yes	No	N/A		
5.2.7	8.2	On-board and off board chargers shall have the capability of accepting input voltages of 120V (Level 1), 208V or 240V (Level 2) single phase 60 Hertz alternating current service, with a tolerance of ±10% of rated.	Yes	No	N/A		
5.2.8		On-board charger personnel protection systems, which may include ground fault circuit interrupters (GFCI), shall be in accordance with the provisions of UL Standards 2202.	Yes	No	N/A		
5.1	8.3	If so equipped, the fast charge connection shall allow the use of a fast charge connector listed by UL for electric vehicle service.	Yes	No	N/A		
5.1	8.4	Level 2 charge connector shall comply with the requirements of UL Proposed Standard 2251.	Yes	No	N/A		
5.1	9.0	Suppliers shall specify all optional equipment required to meet the requirements of this Vehicle Specification.	Yes	No	N/A		
		The installation of options shall not relieve Suppliers of complying with other "shall" requirements (except for range).	Yes	No	N/A		
5.1	10.1	Vehicles shall be accompanied by non-proprietary manuals for parts, service, operation and maintenance, interconnection wiring diagrams and schematics.	Yes	No	N/A		

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General Comments (initials/date):

Completed By:
(Printed Name) (Signature) (Date)

Reviewed By:
(Printed Name) (Signature) (Date)

Approved By:
(Printed Name) (Signature) (Date)

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