

ETA-TP011

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Receipt Inspection

Prepared by

Electric Transportation Applications

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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 Electric Vehicle Market Development Group

2.0 Purpose

This procedure identifies the minimum vehicle requirements to be verified and recorded as part of the performance testing of electric vehicles, provided in the EV America Technical Specifications. Vehicles submitted for testing under the Performance Test Program shall meet these requirements, as codified. 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 this 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-AC001, "Control, Close-out and Storage of Documentation."

4.0 Prerequisites

- 4.1 Individuals assigned to complete this procedure will be knowledgeable of the EV America Technical Requirements.
- 4.2 Individuals assigned to complete this activity will have received the appropriate training in accordance with ETA-AC005, "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
- 4.4 The verification of data may be completed at any time prior to use or publication of that data (e.g., the battery charging information is not needed until it becomes necessary to charge a vehicle's battery).
- 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 EV America Technical Specifications. All vehicles submitted for testing under this program shall meet these requirements, as codified. Vehicles which cannot meet the requirements of Production Vehicle as defined by EV America can be accepted for testing, but only as a Prototype, as that term is defined by EV America.

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 reverify all items, in accordance with the applicable Administrative Control Procedures (ETA-AC001 through ETA-AC007).

Each step number (5.1.1 through 5.1.33) corresponds to the similarly numbered section of the Minimum Vehicle Requirements in the EV America 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

- 5.1.1 Vehicles shall have a minimum payload of 400 pounds. [T/S 2.1] See Step 5.2.1 for specific directions.
- 5.1.2 For Conversion vehicles, OEM GVWR shall not be increased. Suppliers shall provide the OEMs Gross Vehicle Weight Rating (GVWR). [T/S 2.2] See Step 5.2.2 for specific directions.
- 5.1.3 For conversion vehicles, OEM Gross Vehicle Axle Weight Ratings (GAWR) shall not be increased. Suppliers shall provide axle weights for the vehicle as delivered, and at full rated payload. [T/S 2.3]
- 5.1.4 Seating capacity shall be a minimum of 2, (one driver and at least one passenger). Suppliers shall provide seating capacity (available seat belt positions) for their vehicle. [T/S 3.1]
- 5.1.5 Suppliers shall provide information on their selected battery manufacturer's recycling plan, including how it has been implemented. [T/S 1.5]
- 5.1.6 For conversion vehicles, the OEM passenger space shall not be intruded upon by the battery, battery box or other conversion materials. [T/S 3.2] See Section 5.2.3 for specific directions.
- 5.1.7 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. [T/S 4.6]

- 5.1.8 Vehicles shall have a minimum range between charges of at least 50 miles when loaded with two 166-pound occupants and operated at a constant 45 mph. [T/S 5.5] See Step 5.2.4 for specific directions.
- 5.1.9 Vehicles shall comply with Federal Motor Vehicle Safety Standards applicable on the date of manufacture and such compliance shall be certified by the manufacturer in accordance with 49 CFR 567. Suppliers shall provide a completed copy of Appendix B with their submittal, indicating the method of compliance with each section of 49 CFR 571. If certification includes exemption, the exemption number issued by the National Highway Transportation Safety Administration (NHTSA), the date of its publication in the Federal Register and the page number(s) of the Federal Register acknowledging issuance of the exemption shall be provided along with Appendix B. Only exemptions for non-applicable requirements shall be allowed. [T/S 1.1] See Section 5.2.5 for specific directions.
- 5.1.10 Batteries and/or battery enclosures shall be designed and constructed in accordance with the requirements of SAE J1766. Further, batteries and electrolyte will not intrude into the passenger compartment during or following FMVSS frontal barrier, rear barrier and side impact collisions, and roll-over requirements of 49 CFR 571.301. Suppliers shall provide verification of conformance to this requirement. [T/S 6.5]
- 5.1.11 Batteries shall comply with the requirements of SAE J1718, and at a minimum shall meet the requirements of NEC 625 for charging in enclosed spaces without a vent fan. [T/S 6.2]
- 5.1.12 Concentrations of explosive gases shall not be allowed to exceed 25% of the LEL (Lower Explosive Limit) in the battery box. Suppliers shall describe how battery boxes will be vented, to ensure any battery gases escape safely to atmosphere during and following normal or abnormal charging and operation of the vehicle. [T/S 6.6]
- 5.1.13 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, at temperatures noted in Section 5.6. [T/S 8.1] See Step 5.2.6 for specific directions.
- 5.1.14 Chargers shall have the capability of accepting input voltages of 208V and 240V single phase 60 Hertz alternating current service, with a tolerance of $\pm 10\%$ of rated voltage. Charger input current shall be compatible with the requirements for Level II chargers, and shall comply with the requirements of SAE J1772 or SAE J1773. Personnel protection systems shall be in accordance with the requirements of UL Standards (Proposed/Draft) 2231-1 and 2231-2. [T/S 8.2]

- 5.1.15 Chargers shall have a true power factor of .95 or greater and a harmonic distortion rated at $\leq 20\%$ (current at rated load). [T/S 8.3]
- 5.1.16 The charger shall be fully automatic, determining when “end of charge” conditions are met and transitioning into a mode that maintains the main propulsion battery at a full state of charge while not overcharging it, if continuously left on charge. [T/S 8.1]
- 5.1.17 Vehicles shall not contain exposed conductors, terminals, contact blocks or devices of any type that create the potential for personnel to be exposed to 50 volts or greater (the distinction between low-voltage and high voltage, as specified in SAE J1127, J1128, et al.). See Section 5.2.8 for specific directions. [T/S 7.1]
- 5.1.18 Vehicles being tested shall be accompanied by non-proprietary manuals for parts, service, operation and maintenance, interconnection wiring diagrams and schematics, (with pricing for optional manuals). These documents shall either be provided or available to the end user. [T/S 10.1]
- 5.1.19 The vehicle shall include a state of charge indicator for the main propulsion batteries. [T/S 7.6]
- 5.1.20 Propulsion power shall be isolated from the vehicle chassis such that battery leakage current is less than 0.5 MIU in accordance with UL Proposed Standards 2231-1 and 2231-2. [T/S 7.2]
- 5.1.21 Charging circuits shall be isolated from the vehicle chassis such that ground current from the grounded chassis at any time while the vehicle is on charge or the charger is connected to an off-board power supply does not exceed 5 mA, in accordance with UL Proposed Standards 2202, 2231-1 and 2231-2. [T/S 7.2]
- 5.1.22 Replacement tires shall be commercially available to the end user in sufficient quantities to support the purchaser’s needs. [T/S 2.6]
- 5.1.23 The vehicle shall be interlocked [T/S 7.4] such that:
- The controller shall not energize to move the vehicle when the gear selector is in any position other than “PARK” or “NEUTRAL”
 - The start key shall be removable only when the “ignition key” is in the “Off” position, with the drive selector in “Park”
 - The controller shall not initially energize or excite with a pre-existing accelerator input, such that the vehicle can be moved under its own power from this condition.
- 5.1.24 All vehicles shall comply with the FCC requirements for unintentional emitted electromagnetic radiation, as identified in 47 CFR 15, Subpart B, “Unintentional Radiators.” [T/S 1.6]
- 5.1.25 Failure of a battery or battery pack shall be determined through a discharge test. The discharge test shall be performed with the discharge current

regulated to achieve a C/1 discharge rate based on the ampere hour capacity of the battery specified by the Supplier as required in Section 6.1 and with a battery temperature of at least 77° F. Subsequent to receiving a full charge and equalization, the battery shall be discharged at such current and temperature until the terminal voltage of any cell in the battery drops below the voltage specified by the Supplier as required in Section 6.3. The ampere hours delivered by the battery to that point shall be calculated and shall become the actual battery capacity. Failure of the battery shall be deemed to have occurred if the actual battery capacity is not at least 80% of the nominal ampere hour capacity specified by the Supplier as required by Section 6.1. [T/S 6.9] See Step 5.2.16 for specific directions.

- 5.1.26 Vehicles shall be equipped with an automatic disconnect for the main propulsion batteries. They shall also have a manual service disconnect. These disconnects shall be clearly labeled. [T/S 7.3]
- 5.1.27 Any conductive or inductive type charging systems shall be compatible with the Personnel Protection requirements of SAE J1772 or J1773, as appropriate. [T/S 8.2]
- 5.1.28 Suppliers shall provide Material Safety Data Sheets (MSDS) for all batteries. [T/S 1.4]
- 5.1.29 Suppliers shall indicate the level of charge below which the batteries should not be discharged and how the controller automatically limits battery discharge below this level. [T/S 6.3]
- 5.1.30 Suppliers shall verify that the method(s) of charging the propulsion batteries and the charging algorithm have been reviewed and approved by the battery manufacturer. [T/S 6.10]
- 5.1.31 Regardless of the charger type used, the charger shall be capable of meeting the requirements of Section 625 of the National Electric Code (NEC). [T/S 8.4]
- 5.1.32 If the vehicle is equipped with fuel fired heaters, the vehicle shall comply with the requirements of 49 CFR 571.301. [T/S 9.5]
- 5.1.33 The vehicle shall have an on-board Battery Energy Management System (BEMS). [T/S 6.11]

5.2 Dynamic Verification Requirements

Performance of these steps may result in the vehicle's not meeting one or more of the minimum requirements. Should any minimum requirement not be met successfully, the testing authority shall record the non-compliance in detail, circle NO at the appropriate Step on Appendix A, and notify the manufacturer's representative no later than the close of business the day following the occurrence of the non-compliance.

- 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.
 - 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. Record this value.
- 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. Record these values.
 - 5.2.2.2 Locate the Converter's FMVSS label. Note the GVWR and the GAWR's. Record these values.
 - 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.
 - 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.
- 5.2.3 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 The vehicle shall have a minimum range between charges of at least 50 miles when operated at a constant speed of 45 mph with a payload of two 166-pound occupants. This range shall be verified by completing the 45 mph range portion (Section 5.1) of Procedure ETA-TP004. If the measured range is at least 50 miles, circle YES at Step 5.1.8 of Appendix A. Otherwise, circle NO at Step 5.1.8, and make the appropriate notifications.
- 5.2.5 Verify the compliance of the vehicle to the requirements of the FMVSS applicable on the date of manufacture by conducting the following:
- 5.2.5.1 Locate the FMVSS Certification Label(s) on the vehicle.
- 5.2.5.2 Verify that the label(s) indicate the vehicle is fully certified.
- 5.2.5.2 If the vehicle is a conversion, verify that both the OEM FMVSS label and the Converter's FMVSS label are present. The Converter's FMVSS label SHALL NOT be installed in a manner that precludes full view of the OEM label.
- 5.2.6 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, assuming the recharging occurs at 208V single phase 40A maximum. This shall be verified by completing Performance Test Procedure ETA-TP010. Testing shall be initiated following completion of a 45 mph Constant Speed Range Test conducted per Section 5.1 of procedure ETA-TP004. If the required time to recharge is less than 12 hours, circle YES at Step 5.1.13 of Appendix A. Otherwise, circle NO at Step 5.1.13, and make the appropriate notifications.
- 5.2.7 Chargers shall have a true power factor of .95 or greater. Chargers shall have a harmonic distortion of $\leq 20\%$ (current at rated load). This value shall be verified in conjunction with Step 5.2.2 above during completion of Performance Test Procedure ETA-TP010. If the measured value is acceptable, circle the appropriate YES at Step 5.1.15 of Appendix A. Otherwise, circle the appropriate NO at Step 5.1.15, and make the appropriate notifications.
- 5.2.8 Vehicles shall not contain exposed conductors, terminals, contact blocks or devices of any type that create the potential for personnel to be exposed to 50 volts or greater. This shall be verified as follows:
- 5.2.8.1 Each exposed conductor, terminal contact block and device shall have it's potential to ground measured with a Volt-Meter (Digital or analog) verifying that voltage present at the exposed area is less than 50 volts.

- 5.2.8.2 Any device exhibiting a non-compliance (a voltage of 50V or greater) shall be clearly identified on a comment sheet.
 - 5.2.8.3 Record the result on appendix A as a NO.
 - 5.2.8.4 A copy of that comment sheet which details the non-compliance shall be provided to the manufacturer's representative.
 - 5.2.8.5 If all measurements are less than 50V, circle YES at Step 5.1.17 on Appendix A.
- 5.2.9 Propulsion power shall be isolated from the vehicle chassis such that leakage current is less than 0.5 MIU under static conditions. This shall be verified as follows:
- 5.2.9.1 Connect a test circuit as described in UL 2231-1 between the most positive propulsion circuit cable and chassis.
 - 5.2.9.2 Using an voltmeter capable of accurately measuring low voltages (millivolts) measure the voltage across the circuit.
 - 5.2.9.3 If the reading is 0.5V or greater, record the value and the non-compliance on a comment sheet.
 - 5.2.9.4 Record the result on appendix A as a NO
 - 5.2.9.5 A copy of that comment sheet which details the non-compliance shall be provided to the manufacturer's representative within 24 hours of the discovery of the non-compliance.
 - 5.2.9.6 If the reading is less than 0.5V, circle YES at Step 5.1.22 on Appendix A.
- 5.2.10 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 during the conduct of Performance Test Procedure ETA-TP010, and shall be completed concurrent with Steps 5.2.6 and 5.2.7. If the measured value exceeds 5 mA, circle NO at Step 5.1.23 on Appendix A and make the appropriate notifications. Otherwise, circle YES at Step 5.1.23.
- 5.2.11 Verify that the tires supplied with the vehicle being inspected are commercially available by conducting the following:
- 5.2.11.1 Identify the manufacturer, type and size of the tire.
 - 5.2.11.2 Obtain the phone number of three dealers that are authorized dealers for the tire is question.
 - 5.2.11.3 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.

CAUTION

Verification of Step 5.2.12 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.

- 5.2.12 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:
- 5.2.12.1 Place the vehicle transmission in a position other than Park or Neutral.
 - 5.2.12.2 Turn the vehicle on using the key-switch.
 - 5.2.12.3 Attempt to energize the controller by depressing the accelerator.
 - 5.2.12.4 If the controller energizes (as evidenced by meter indication or vehicle motion) circle NO at Step 5.1.25.1 on Appendix A, and make the appropriate notifications.
 - 5.2.12.5 If the controller does not energize, circle YES at Step 5.1.25.1 on Appendix A.

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 start 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:
- 5.2.13.1 With the drive selector in the “Park” position, verify that the key can be inserted and removed without problem.
 - 5.2.13.2 Turn the key to the “On” position. Attempt to remove the key. If the key can be removed, circle NO at Step 5.1.25.2 on Appendix A.
 - 5.2.13.3 Repeat this for each available key position. If the key can be removed in any position other than “Off,” circle NO at Step 5.1.25.2 on Appendix A, and make the appropriate notifications.
 - 5.2.13.4 If the key cannot be removed except when in the “Off” position, circle YES at Step 5.1.25.2 on appendix A.

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 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:
- 5.2.14.1 Verify the vehicle drive selector is in the “Park” position.
 - 5.2.14.2 Verify the key switch is “Off.”
 - 5.2.14.3 Depress the accelerator.
 - 5.2.14.4 Turn the key switch to the “On” position. If the controller energizes, turn the Key Switch “Off”, circle NO at Step 5.1.25.3 and make the appropriate notifications.
 - 5.2.14.5 Place the vehicle drive selector in the “Neutral” position.
 - 5.2.14.6 Verify the key switch is “Off.”
 - 5.2.14.7 Depress the accelerator.
 - 5.2.14.8 Turn the key switch to the “On” position. If the controller energizes, turn the Key Switch to “Off”, circle NO at Step 5.1.25.3 and make the appropriate notifications.
 - 5.2.14.9 Place the vehicle drive selector in the “Drive” position.
 - 5.2.14.10 Verify the key switch is “Off.”
 - 5.2.14.11 Depress the accelerator.
 - 5.2.14.12 Turn the key switch to the “On” position. If the controller energizes, turn the Key Switch “Off”, circle NO at Step 5.1.25.3 and make the appropriate notifications.
 - 5.2.14.13 Place the drive selector in the “Reverse” position.
 - 5.2.14.14 Verify the key switch is “Off.”
 - 5.2.14.15 Depress the accelerator.
 - 5.2.14.16 Turn the key switch to the “On” position. If the controller energizes, turn the Key Switch to “Off”, circle NO at Step 5.1.25.3 and make the appropriate notifications.
 - 5.2.14.17 If the controller did not energize or excite with a pre-existing accelerator input, circle YES at Step 5.1.25.3 on Appendix A.
- 5.2.15 Compliance with section 5.1.26 shall be verified by inspection of the vehicle’s proposal package.
- 5.2.16 Failure of a battery or battery pack shall be determined by a discharge test. This item does not need to be validated upon vehicle receipt. It will only be used when a battery or battery pack failure is suspected. This validation shall be completed at that time in accordance with the appropriate instructions for the specific battery being tested.

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

- 7.1 EV America Technical Specifications
- 7.2 ETA-AC001, Revision 2 - "Control, Close-out and Storage of Documentation"
- 7.3 ETA-AC002, Revision 2 - "Control of Test Conduct."
- 7.4 ETA-AC004, Revision 2 - "Review of Test Results"
- 7.5 ETA-AC005, Revision 2 - "Training and Certification of Personnel Utilizing ETA Procedures"
- 7.6 ETA-AC006, Revision 2 - "Vehicle Verification"
- 7.7 ETA-AC007, Revision 1 - "Control of Measuring and Test Equipment"
- 7.8 ETA-TP004, Revision 3 - "Constant Speed Range Test"
- 7.9 ETA-TP010, Revision 2 - "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 4)**

Vehicle Number: _____

TP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
			Yes	No	N/A		
5.1.1	2.1	Vehicle Payload is at least 400 pounds (182 Kg)	Yes	No	N/A		
5.1.2	2.2	Vehicle GVWR is less than the OEM GVWR. OEM GVWR: _____	Yes	No	N/A		
5.1.3	2.3	GAWR is less than or equal to OEM GAWR. As delivered: F _____ R _____ Rated Payload: F _____ R _____	Yes	No	N/A		
5.1.4	3.1	Vehicle capacity is at least 2 passengers. Number of seat-belted positions 1-2-3-4-5-6-7 (Circle one)	Yes	No	N/A		
5.1.5	1.5	Battery Recycling Plan has been submitted.	Yes	No	N/A		
5.1.6	3.2	The battery, battery box or other conversion materials do not intrude into the Passenger compartment.	Yes	No	N/A		
5.1.7	4.6	Vehicle is equipped with a parking mechanism or brake per 49 CFR 571.105	Yes	No	N/A		
		This mechanism is engaged when the transmission shifter is placed in the "PARK" position.	Yes	No	N/A		
5.1.8	5.5	Vehicles minimum range between charges is at least fifty (50) miles.	Yes	No	N/A		
5.1.9	1.1	Vehicle complies with Federal Motor Vehicle Safety Standards applicable on the date of manufacture and such compliance has been certified to by the manufacturer in accordance with 49 CFR 567.	Yes	No	N/A		
		A completed copy of Appendix B has been provided.	Yes	No	N/A		
		Exemption numbers, if any, along with the date of publication in the Federal Register and the relevant page number(s) of the Federal Register acknowledging issuance have been provided.	Yes	No	N/A		
5.1.10	6.5	Batteries and electrolyte do not intrude into the passenger compartment during or following FMVSS event, and verification of conformance to this requirement has been provided.	Yes	No	N/A		
5.1.11	6.2	Batteries meet the requirements of SAE J1718 and NEC 625 (if applicable).	Yes	No	N/A		

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**APPENDIX-A
Vehicle Minimum Requirements
Review Check List (Page 2 of 4)**

TP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
5.1.12	6.6	Bidders have described how battery boxes will be vented, to allow any battery gases to escape safely to atmosphere during and following normal or abnormal charging and operation of the vehicle to prevent concentrations of explosive gases from exceeding 25% of the Lower Explosive Limit (LEL) in the battery box.	Yes	No	N/A		
5.1.13	8.1	The battery charger will recharge the main propulsion battery to a state of full charge from any state of discharge in less than 12 hours.	Yes	No	N/A		
5.1.14	8.2	Chargers will accept input voltages of 208V and 240V single phase 60 Hertz alternating current service, with a tolerance of $\pm 10\%$ of rated voltage.	Yes	No	N/A		
		Charger input current is compatible with the requirements for a Level II Charger.	Yes	No	N/A		
		Personnel protection systems are in accordance with the requirements of UL Proposed Standards 2231-1 and 2231.2	Yes	No	N/A		
		Charger complies with the requirements of SAE J1772 or 1773, as appropriate.	Yes	No	N/A		
5.1.15	8.3	Charger true power factor is .95 or greater.	Yes	No	N/A		
		Harmonic distortion is $\leq 20\%$ (current at rated load).	Yes	No	N/A		
5.1.16	8.1	The charger is fully automatic, and does not overcharge the battery when left on charge.	Yes	No	N/A		
5.1.17	7.1	Vehicle does not contain exposed conductors, terminals, contact blocks or devices of any type which create the potential for personnel exposure to 50 volts or greater	Yes	No	N/A		
5.1.19	7.6	Non-proprietary manuals for parts, service, operation and maintenance, interconnection wiring diagrams and schematics (with pricing for optional manuals) have been received.	Yes	No	N/A		
5.1.18	10.1	The vehicle has a State of Charge (SOC) indicator	Yes	No	N/A		

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**APPENDIX-A
Vehicle Minimum Requirements
Review Check List (Page 3 of 4)**

TP011 Ref:	T/S Ref:	Requirement:	Requirement Met:			Initials:	Date:
5.1.20	7.2	Battery leakage current to chassis is < 0.5 MIU.	Yes	No	N/A		
5.1.21	7.2	With the vehicle on charge, ground currents from the chassis to ground are less than 5.0 mA.	Yes	No	N/A		
5.1.22	2.6	Replacement tires are commercially available to the end user in sufficient quantities to support the purchaser's needs.	Yes	No	N/A		
5.1.23	7.4	The vehicle has the following interlocks: The controller does not energize to move the vehicle in any position other than 'Park' or 'Neutral.'	Yes	No	N/A		
		The start key is removable only when it is in the 'Off' position with the drive selector in "Park"	Yes	No	N/A		
		The controller does not energize or excite with a pre-existing accelerator input such that the vehicle can be moved under its own power.	Yes	No	N/A		
5.1.24	1.6	Vehicle complies the requirements of 47 CFR 15, Subpart B, "Unintentional Radiators."	Yes	No	N/A		
5.1.25	6.9	Discharge Testing - NOT APPLICABLE	Yes	No	N/A		
5.1.26	7.3	Vehicle has an automatic disconnect for the main propulsion batteries.	Yes	No	N/A		
		Automatic disconnect is clearly labeled.	Yes	No	N/A		
		Vehicle has a manual service disconnect.	Yes	No	N/A		
		Manual service disconnect is clearly labeled.	Yes	No	N/A		
5.1.27	8.2	Charging system is compatible with the Personnel Protection requirements of SAE J1772 or J1773.	Yes	No	N/A		
5.1.28	1.4	Material Safety Data Sheets (MSDS) for all batteries have been supplied.	Yes	No	N/A		
5.1.29	6.3	Level of charge below which the batteries should not be discharged has been provided.	Yes	No	N/A		
		Description of how the controller automatically limits battery discharge below this level has been provided.	Yes	No	N/A		
5.1.30	6.10	Method of charging and algorithm have been reviewed and approved by battery manufacturer	Yes	No	N/A		
5.1.31	8.4	The charger is capable of meeting the requirements of NEC 625 (1996)	Yes	No	N/A		
5.1.32	9.5	If equipped with fuel fired heaters, the vehicle complies with 49 CFR 571.301.	Yes	No	N/A		
5.1.33	6.11	The vehicle has an on-board Battery Management System (BMS)	Yes	No	N/A		

