Preparation and Issuance of Test Reports

Prepared by

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1.0 Objective
The objective of this procedure is to identify the proper methods for the preparation of reports during and subsequent to testing activities. These methods are not meant to supersede those of the testing facility, nor of any regulatory agency who may have or exercise control over the covered activities.

2.0 Purpose
This procedure identifies acceptable methods for the development, use, completion and retention of reports prepared in support of performance testing of electric vehicles provided to Electric Transportation Applications for testing to the technical requirements of NEV America.

3.0 Documentation
Documentation addressed by this procedure shall be consistent, easy to understand, easy to read, and readily reproducible. Reports shall contain enough information to "stand alone;" that is, they shall be self-contained to the extent that all individuals expected to review it could be reasonably expected to reach a common conclusion, without the need to review additional documentation. Review and approval of test documentation shall be in accordance with ETA-NAC004, "Review and Approval of Test Results." Storage and retention of records during and following testing activities shall be completed as described in Procedure ETA-NAC001, "Control, Close-out and Storage of Documentation."

4.0 Initial Conditions And Prerequisites
4.1 All relevant testing activities for the subject vehicle have been completed (as described in ETA-NAC002, “Control of Test Conduct”) prior to the report being formally issued.

4.2 All necessary test documentation has been completed, reviewed and approved per the requirements of ETA-NAC004, “Review of Test Results,” prior to the report being issued.

4.3 The method for distribution of the subject Report(s) shall be agreed upon prior to any report being formally issued.

4.4 Personnel who prepare Test Report(s) shall be familiar with the contents of this procedure as required by procedure ETA-NAC005, “Training and Certification Requirements for Personnel Utilizing ETA Procedures.”
5.0 Activity Requirements

A Test Report shall be issued for any vehicle submitted to Electric Transportation Applications for testing, regardless of whether the vehicle is actually tested. Test Reports should be issued within 30 days of the completion of testing. In no case shall any report be issued more than 90 days after the completion of that vehicle’s testing. This section provides additional requirements for the formal Test Report.

5.1 Test Reports shall be the preferred mechanism for the objective reporting of data collected during the NEV America Performance Test Program.

5.2 These reports may utilize a variety of media and formats, including text, data file, graphical depiction, film/video tape and oral presentation.

5.3 The material for each vehicle shall be presented in a stand-alone format.

5.4 Data/test results shall not be provided in a comparative format. That is, each vehicle's data shall be presented independent of the data of other tested vehicles.

5.5 The Test Report shall include the following:

5.5.1 A Table of Contents
5.5.2 An Executive Summary
  5.5.2.1 Vehicle description
  5.5.2.2 Test summary
  5.5.2.3 Summary Data Sheet (Appendix A)
5.5.3 Test Program Summary
  5.5.3.1 Objectives
  5.5.3.2 Guidelines
  5.5.3.3 Administrative Controls
  5.5.3.4 Test Procedures
  5.5.3.5 Test Facilities
  5.5.3.6 Test Instrumentation
  5.5.3.7 Quality Assurance
  5.5.3.8 Test Sequence
  5.5.3.9 Test Exception Reports (ETA-NAC002 Appendix A)
  5.5.3.10 Non-Conformance Reprots
5.5.4 Vehicle Description

5.5.4.1 Vehicle inspections sheets
- ETA-NAC06 Appendix B
- ETA-NTP011 Appendix A

5.5.4.2 Vehicle supplier submittals required by Vehicle Technical Specification Appendix A

5.5.4.3 Appendices/Submittals
- Vehicle Technical Specification Appendix A
- Vehicle Technical Specification Appendix B

5.5.5 Test Results (one section for each Test Procedure) containing:

5.5.5.1 Test summary
5.5.5.2 All test procedure data sheets
5.5.5.3 Test Results Review check-sheet
5.5.5.4 Graphical results presentation (charts, graphs, plots, etc.)

5.5.6 Appendices

5.5.6.1 Appendix 1 - Vehicle photographs
5.5.6.2 Appendix 2 - Supplier’s correspondence
5.5.6.3 Appendix 3 - Test Manager’s Log
5.5.6.4 Appendix 4 - Charge Log (ETA-NTP008 Appendix A)

5.5.7 Exhibits

5.5.7.1 NEV America Vehicle Technical Specifications applicable to the testing activities.

5.6 The Test Report shall include any exceptions or deviations from the NEV America Vehicle Technical Specification taken by the vehicle supplier.

5.7 The Test Report shall not be provided/made available to the vehicle supplier for comment, prior to it’s issuance except as noted in 5.9.

5.8 Test Reports should not contain raw data sheets.

5.9 Test Reports shall include a Summary Data Sheet in the format shown in Appendix A. The Summary Data Sheet shall be provided to the vehicle supplier prior to issuance of the Test Report.
5.10 At least one representative of each organization involved in testing activities shall sign the Test Report(s). This signature indicates their organization’s concurrence with the data contained in the Test Report. At a minimum, the Test Report for each vehicle shall be signed by the Test Manager.

5.11 Following completion, the Test Report shall be provided to the vehicle supplier, the U.S. Department of Energy (if co-funding the testing) and to the manufacturer of the vehicle (if different than the vehicle supplier and authorized by the vehicle supplier).

5.12 All original test documents, including data sheets and files, shall be incorporated into the Test Report maintained by Electric Transportation Applications in accordance with ETA-NAC001, “Control, Close-out and Storage of Documentation.”

6.0 Glossary

6.1 Comment Sheet - A form used to record the comments of test personnel during the conduct of performance tests.

6.2 Effective Date - The first date that a procedure may be used to formally direct an activity or collect data. This date shall always be subsequent to the dated approval signature.

6.3 ETA - Electric Transportation Applications

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

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

6.6 Should - Items which require adherence if at all possible. Should statements identify preferred conditions.

6.7 Summary Data Sheet - A stylized presentation of test results in the form shown in ETTA-NTP003 Revision 1, Appendix A.

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.

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6.9 **Test Director** - The individual within Electric Transportation Applications responsible for all testing activities associated with the NEV America Performance Test Program.

6.10 **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.]

6.11 **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 NEV America Performance Test Program. [Subcontract organizations may have similarly titled individuals, but they are not addressed by this procedure.]

6.12 **Test Report** - Final documentation of the results of testing prepared in accordance with ETA-NAC003.

### 7.0 References

- **7.1** ETA-NAC001 - "Control, Close-out and Storage of Documentation"
- **7.2** ETA-NAC002 - "Procedure for the Control of Test Conduct"
- **7.3** ETA-NAC004 - "Procedure for the Review of Test Results"
- **7.4** ETA-NAC005 - "Training and Certification Requirements for Personnel Utilizing ETA Procedures"
- **7.5** ETA-NAC006 - “Vehicle Verification”
- **7.6** ETA-NTP011 - “Receipt Inspection”
- **7.7** NEV America Vehicle Technical Specifications
- **7.8** Code of Federal Regulations, Title 10, Part 571, “Federal Motor Vehicle Safety Standards”
APPENDIX-A
Summary Data Sheet

![NEVAmerica US DOE Advanced Vehicle Testing Activity](image)

### 2005 Global Electric Motorcars e2 2-Passenger

#### VEHICLE SPECIFICATIONS

**PURPOSE-BUILT VEHICLE**
- Base Vehicle: 2005 Global Electric Motorcars e2 2-Passenger
- VIN: 5A5AG2745FM05003
- Seatbelt Positions: Two Standard Features:
  - Front Wheel Drive
  - Four-Wheel Hydraulic Brakes
  - Regenerative Braking with Coast Down and Over Speed Control
  - Three-Point Safety Belts
  - Speedometer
  - Clock
  - State-Of-Charge Meter
  - Back-up Alarm
  - Traction Control
  - On Board Battery Charger

**BATTERY**
- Manufacturer: EMD/Enka
- Number of Modules: 8
- Weight of Modules: 32.5 kg
- Weight of Pack(s): 195.0 kg
- Pack(s) Location: Under Seat
- Nominal Module Voltage: 12V
- Nominal System Voltage: 72V
- Nominal Capacity (C/20): 80 Ah

**WEIGHTS**
- Design Curb Weight: 1078 lbs
- Delivered Curb Weight: 1303 lbs
- Distribution F/I: 49/51 %
- GVWR: 1850 lbs
- GAWR F/I: 1023/1317 lbs
- Payload: 547 lbs
- Performance Goal: ≥ 400 lbs

**DIMENSIONS**
- Wheelbase: 72.2 inches
- Track F/R: 48.7/45.3 inches
- Length: 99.6 inches
- Width: 57.3 inches
- Height: 70.0 inches
- Ground Clearance: ≥ 5.0 inches
- Performance Goal: ≥ 5.0 inches

**CHARGER**
- Location: On-board
- Type: Conductive
- Input Voltages: 115/230 VAC

**TIRES**
- Tire Mfg: Nankang
- Tire Model: NY931
- Tire Size: 165/70R12
- Tire Pressure: 35 psi
- Spare Installed: No

**TEST NOTES:**
1. Vehicle was tested at maximum achievable speed until 18 mph could no longer be maintained.
2. SCC Meter accuracy did not meet NEVAmerica performance goal. When the charger is unplugged momentarily, the SCC meter meets is 100%. Production modifications were incorporated by the manufacturer to resolve the issue (NCHP 2006-2006).
3. As delivered payload was reduced to 144 lbs due to the optional equipment installed. The 165/70R12 tire is offered as an optional upgrade for the e2. The standard tire size is a 10.00/10-16.5 10.00/16.5.
4. Rough road testing showed rear battery shifting, causing battery lugs to overlap. This issue was resolved in the production assembly process.
5. Average handling time was determined by comparing 14 NEVS that have been tested in the NEVAmerica Program. This vehicle meets all NEV America Minimum Requirements listed on back. Values are not indicative of Performance Goal was not met. "All Power and Energy Values on DC index otherwise specified."

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**PERFORMANCE STATISTICS**

- **Acceleration (0-20 mph) @ 332 lbs**
  - Payload:
    - At 100% SOC: 4.9 seconds
    - At 50% SOC: 5.6 seconds
    - Performance Goal: 6.0 seconds
- **Maximum Speed @ 170 lbs Payload**
  - (FMVSS 49 CFR 571.505-55.5)
  - At 100% SOC: 23.2 mph
  - Performance Goal: ≤ 25 mph
- **Maximum Speed @ 332 lbs Payload**
  - At 100% SOC: 23.8 mph
  - At 50% SOC: 24.0 mph
- **At Maximum Speed Range**
  - Range: 44.3 miles
  - Energy Used: 4.22 kWh
  - Efficiency: 95.2 Wh/mile
  - Specific Energy: 21.6 Wh/kg
- **Braking From 20 mph**
  - Controlled Dry: 34 feet
  - Controlled Wet: 33.4 feet
  - Panic Wet: 27.7 feet
  - Course Deviation: 0.0 feet
- **Handling**
  - Average time: 80.6 seconds
  - Average NEV Time: 79.4 seconds
- **Gradability (Calculated)**
  - Maximum Speed @ 3%: 21.8 mph
  - Maximum Speed @ 6%: 19.6 mph
  - Maximum Grade: 30 %
- **Charging Efficiency**
  - Efficiency: 184 Wh/AC/mi
  - Energy Cost: $0.0144/kWh

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APPENDIX-A
Summary Data Sheet

This vehicle complies with mandatory requirements of NEV America Vehicle Technical Specification, Revision 1 as follows.

1. Vehicles shall comply with Federal Motor Vehicle Safety Standard 100 as promulgated on the date of manufacture. Such compliance shall be established by the Supplier in a certificate with 49 CFR 567.
2. Supplier shall provide a completed copy of Appendix A and Appendix B with their proposal providing vehicle specifications and the methods of compliance, if any, with each listed edition of 49 CFR, 571, 600.
3. Vehicles shall be testifiable under current California Air Resources Board (CARB) regulations or vehicles that meet ZEV emission requirements and qualify for ZEV credits. If the vehicle is equipped with a lead-acid battery, it shall comply with the provisions of 49 CFR 571.110.
4. Supplier shall provide a completed copy of the recommended practice of the national electric vehicle makers' association with 49 CFR, 571, 110, and 111, as applicable.
5. Supplier shall specify manufacturer, model, and size of the lead-acid battery for the vehicle and the time period the vehicle is to be driven without recharge.
6. The price of the vehicle shall include the battery and accessories needed to ensure the vehicle complies.
7. The Supplier shall provide a standard lead-acid battery of 80 AH. A secondary battery shall not be required unless the vehicle is to be driven without recharge.

For conventional vehicles, Supplier shall specify the OBD II diagnostic system (OBD) that shall be included with the vehicle at the time of sale. The OBD system shall include at least the following:

- The Supplier shall start the vehicle using a standard lead-acid battery.
- The vehicle shall be driven for at least 50 miles without recharge.
- The Supplier shall provide a standard lead-acid battery of 80 AH. A secondary battery shall not be required unless the vehicle is to be driven without recharge.

For conventional vehicles, the OBD diagnostic system shall include at least the following:

- The Supplier shall start the vehicle using a standard lead-acid battery.
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