

ETA-AC004

Revision 2

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Review of Test Results

Prepared by

Electric Transportation Applications

Prepared by: _____ Date: _____

Jude M. Clark

Approved by: _____ Date: _____

Donald B. Karner

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1.0 Objective

The objective of this procedure is to identify a common protocol for the review of test data obtained during conduct of test activities for which Electric Transportation Applications is responsible, either as the Program Manager or Test Manager.

2.0 Purpose

This procedure establishes acceptable methods for the development, implementation and completion of test results processes used in conjunction with the performance testing of electric vehicles provided to Electric Transportation Applications for testing to the technical requirements of EV America.

3.0 Documentation

Documentation addressed by this procedure shall be consistent, easy to understand, easy to read, and readily reproducible. 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 Initial Conditions and Prerequisites

- 4.1 All documentation associated with the test under review shall have been completed by the test personnel, and signed by the applicable Test Manager or Test Engineer.
- 4.2 Individuals assigned to review test results shall be familiar with all phases and portions of the tests they are reviewing.
- 4.3 Prior to commencing test results review, a meeting of the personnel signing for the test completion shall be held to discuss the following:
 - 4.3.1 Test requirements;
 - 4.3.2 Expected test results;
 - 4.3.2 Actual test results;
 - 4.3.3 Actual test methodologies;
 - 4.3.4 Test Exceptions, including:
 - 4.3.4.1 Reasons
 - 4.3.4.2 Justifications
 - 4.3.5 Safety requirements
- 4.4 A Team Leader with overall responsibility for test results review shall be assigned.

5.0 Personnel Qualifications

- 5.1 All individuals involved in covered test activities shall be trained and certified in accordance with the requirements of ETA-AC005, "Training and Certification Requirements for Personnel Utilizing ETA Procedures."
- 5.2 All individuals involved in review of test results shall be cognizant of the tests being reviewed, the methodologies involved, and shall be familiar with normal and accepted test conduct practices.
- 5.3 All individuals involved in the review of test results shall have a basic understanding of the metrology used in that testing.
- 5.4 For all test results review activities, assigned personnel shall be familiar with the following:
 - 5.4.1 The test conducted;
 - 5.4.2 The parameters which were being measured;
 - 5.4.3 The anticipated results of the test;
 - 5.4.4 Allowable exceptions, and their bases.

6.0 Activity Requirements

NOTE

Test results documentation is controlled by this and other procedures. If a conflict arises between this and other procedures, this procedure shall take precedence for issues relating to test results. For conflicts in other areas, procedures which control those specific activities shall take precedence. Should the conflict not be clearly definable, the Program Manager shall be responsible for final resolution.

Activities related to specific Performance Testing will be addressed by procedures specific to those test activities (e.g., ETA-TP001 is the specific procedure for controlling the requirements and methodologies necessary to implement testing per SAE J1263). Additional requirements include the following:

- 6.1 Data sheets shall be completely filled out. If a Data Acquisition System (DAS) was used to record part of the data, the data shall be down-loaded and charted, graphed, etc., prior to review.
- 6.2 Data sheets may have been filled out by any member of the test team; however, the Test Manager or Test Director shall have signed the completed data sheet attesting to the validity of the data collected in accordance with procedure ETA-AC002, "Control of Test Conduct."
- 6.3 Deviations from approved test methods, requirements and/or procedures shall not be permitted unless approved by the Test Manager or Test Director, as appropriate. All exceptions shall be noted in the comments section of the applicable test data sheet. For each exception taken, at a minimum, the following information must be present:
 - 6.3.1 The specific step excepted;
 - 6.3.2 Why the exception was necessary;
 - 6.3.3 The justification for the exception;
 - 6.3.4 The date and time of the exception;
 - 6.3.5 The printed name of the person who requested the exception, and their signature;
 - 6.3.6 The printed name of the person who approved the exception and their signature, and the date of the approval.
- 6.4 If a deviation was taken and then subsequently disallowed by the Program Manager or Test Manager, the original step shall have been re-performed, within the requirements of the applicable Test Procedure, and documented as such.
- 6.5 A Test Results Review Team (TRRT), comprised of at least one representative of each test organization shall review the test results.

- 6.6 One member of the TRRT shall be assigned as the Team Leader. This should normally be the Program Manager or the Test Manager.
- 6.7 The TRRT shall review test data for each test of each vehicle. The following reviews shall be completed:
 - 6.7.1 Do the data collected appear reasonable to the requirements of the test conducted?
 - 6.7.2 Are comparative data available?
 - 6.7.3 Do the data correlate?
 - 6.7.4 Do any test exceptions impact the validity of data?
- 6.8 When the test results review is complete, each member of the TRRT shall sign and date the Test Results Approval Form (Appendix A).
- 6.9 If any member of the review team takes exception to the results, those exceptions shall be noted. Every attempt to resolve the exceptions shall be taken.
- 6.10 If the exceptions noted in Step 6.9 cannot be resolved, then one of two actions shall be taken:
 - 6.10.1 If, in the opinion of the Team Leader, the results in question do not materially affect the test results, the exception shall be noted, and the test results approved.
 - 6.10.2 If, in the opinion of the Team Leader, the test results in question materially or adversely affect the outcome of the test or the test results, then the results shall not be approved until the exception has been resolved. This may require re-performance of the test in question.

7.0 Supplemental Activity Requirements

- 7.1 Distribution of documents will be in accordance with the applicable revision of procedure ETA-AC001, "Control, Close-out and Storage of Documentation."
 - 7.1.1 Distribution of the original documents or copies of the documents shall be controlled to ensure that only appropriate individuals receive them.
 - 7.1.2 Subsequent to a document's completion (review and approval, and signatures as required), the document shall be transmitted in accordance with ETA-AC001.
- 7.2 Destruction of Documents

Destruction of original documents is not allowed. All test documents, including those for tests which were either suspended or failed, shall be retained as part of the test record. Retention of documents shall be in accordance with the Procedure ETA-AC001, "Control, Close-out and Storage of Documentation." Any exceptions shall be approved per the requirements of that procedure.

8.0 GLOSSARY

- 8.1 Data Acquisition System (DAS) - A data recording system, nominally analog or digital, used to collect data for further processing. Usually a strip-chart recorder, a computer, tape recorded, etc. Also known as a DAQ.
- 8.2 Effective Date - The date, after which the procedure has been reviewed and approved, that the procedure can be utilized in the field for official testing.
- 8.3 Program Manager - As used in this procedure, the individual within Electric Transportation Applications responsible for completing EV America Performance Testing. [Subcontract organizations may have similarly titled individuals, but they are not addressed by this procedure.]
- 8.4 Shall - Items which require adherence without deviation. Shall statements identify binding requirements. A go, no-go criterion.
- 8.5 Should - Items which require adherence if at all possible. Should statements identify preferred conditions.
- 8.6 TP - Abbreviation for Test Procedure
- 8.7 Team Leader - The individual responsible for the approving the review of the test results.
- 8.8 Test Director - The individual within Electric Transportation Applications responsible for all testing activities associated with the EV America Performance Test Program.
- 8.9 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.]
- 8.10 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.]
- 8.11 Test Results Review Team - The team individuals assembled to review and approve the data collected during the test process(es).

9.0 REFERENCES

- 9.1 EV America Technical Requirements
- 9.2 ETA-AC001, Revision 2- "Control, Close-out and Storage of Documentation."
- 9.3 ETA-AC002, Revision 2 - "Control of Test Conduct."
- 9.4 ETA-AC005, Revision 2 - "Training and Certification of Personnel Utilizing ETA Procedures."

Electric Transportation Applications

APPENDIX-A
Test Results Review and Approval Form
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Procedure Reference:	Requirement:	Requirement Met:		Initials:	Date:
		Yes	No		
4.0	Initial Condition / Prerequisites have been met?				
5.0	Personnel meet the minimum qualifications?				
6.1	Data sheets are completely filled out?				
6.2	Test Manager / Test Engineer signatures are present?				
6.3	Were there any deviations from approved test methods?				
6.3.1	Which specific step was excepted: _____				
6.3.2	Was the explanation for the exception noted?				
6.3.3	Was the justification for the exception noted?				
6.3.4	Were the date and time of the exception noted?				
6.3.5	Is the name of the person who requested the exception noted?				
6.3.6	Is the name of the person who approved the exception noted?				
6.4	Was the original step re-performed within test protocol requirements?				
6.7.1	Does the data collected appear reasonable to the requirements of the test conducted?				
6.7.2	Is comparative data available?				
6.7.3	Does the data correlate?				
6.7.4	Do any test exceptions impact the validity of the data?				
6.8	Test Results Review Team (TRRT) signatures are present?				
6.9	Does each member of the TRRT concur with the test results?				
6.9	Are the TRRT exceptions noted?				
6.10	Did any TRRT exceptions materially affect test results?				
6.10.2	Did any TRRT exceptions result in test re-performance?				

