DOCKET
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From: Jonathan Wexler
To:Docket@energy.state.ca.us
Subject: Comments on Docket No. 08-AAER-1B
Attachments: BC_CEC_TP_Part2_Comments_2009.10.06.doc

Dear Chairman Pfannenstiel and Commissioner Rosenfeld:

I am a resident of the State of California, and a practicing electrical engineer with 42 years of experience in circuit design and product development, including working with battery chargers, power conversion equipment, and various test procedures and standards. I would therefore like to submit the attached comments regarding Part 2 of the Commission's proposed test method for battery chargers, Docket No. 08-AAER-1B.

The attached comments are organized by the section of the test method to which they pertain and include suggested revisions to make the test method clearer and less burdensome, as well as lead to more accurate and repeatable results. I thank the Commission for the opportunity to provide these comments and encourage the Commission to adopt the proposed revisions in future amendments to the test method.

Respectfully submitted,

Jonathan Wexler

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COMMENTS REGARDING THE PROPOSED CALIFORNIA TEST METHOD FOR BATTERY CHARGERS

Part 2 of the "Energy Efficiency Battery Charger System Test Procedure." Ecos Consulting. v. 2.1.4. August 1, 2008

Docket No. 08-AAER-1B

GENERAL STRUCTURE

#	Issue	Page/Sec.	Suggested Resolution
1.	Test procedure is difficult to follow.	p. 27 III.A	Provide outline of TP at the beginning of the preparation section rather than afterwards.
2.	Minimum "recommended" test data is in conflict with what is reported under section IV and what is actually required to be measured through inline instructions in section III.C, III.D, and III.E	p. 27 III.B	Remove section II.B, "Test Data" or revise section II.B using sections III.C, III.D, III.E, and IV as guides.
3.	Not always clear why optional items are not required, or how they help in the testing. Overall, too many optional clauses are included in the testing, giving the impression that much of the testing is optional. E.g., "the ambient environment <u>should</u> be maintained between 18oC and 27oC" (emphasis added).	p. 28 III.C.2	Clearly differentiate between <u>required</u> procedures, equipment, conditions, measurements and reported data and <u>recommended</u> procedures, equipment and measurements. Clearly indicate the value or function of the recommended additions.

MEASUREMENT EQUIPMENT

#	Issue	Page/Sec	Suggested Resolution
1.	List of measurement equipment is vague	p. 24 I.A	Provide minimum list of <u>required</u> equipment, not recommended equipment. If additional equipment is <u>recommended</u>, clearly indicate the function of the equipment.

2.	Unclear whether barometer and hygrometer are used.	p. 24 I.A.7–8	Include equipment in list only if explicitly used in test procedure. Test procedure requires measurement—but not reporting—of "ambient conditions", but does not specify how the results of these measurements are to be used. Furthermore, it is unclear what impact atmospheric conditions have on efficiency. It would be sufficient to record the altitude of the test site, which would determine the typical air density and the cooling effectiveness.
3.	What does "AC current measurement (for verification only)" mean?	p. 24 I.A.12	Remove from list of measurement equipment or replace with an associated measurement device. Clearly indicate in the test procedure when and where the measurement must be taken and how it is to be reported.
4.	"It is recommended that equipment be calibrated…"	p. 24 I.B	<u>Require</u> that equipment be calibrated.
5.	"…associated uncertainty less than or equal to 1%"	p. 24 I.B	Insert confidence level for uncertainty requirement (e.g., one or two std. dev.)
6.	"Total measurement uncertainty should be calculated according to standard methods."	p. 24 I.B	Explicitly list method (i.e., root sum square of uncertainty).
7.	Total uncertainty requirement is absent.	p. 24 I.B	Uncertainty requirement only applies to individual pieces of measurement equipment—add requirement for uncertainty of entire test setup (e.g., ≤ 2%, as on p. 11 of Part 1 of TP)
8.	Recommended ambient temperature for Part 1 differs from that for Part 2.	p. 11 I.C p.28 III.C.2	Consider harmonizing ambient temperature with that specified in Part 1.

TEST CONDITIONS AND SETUP

#	Issue	Page	Suggested Resolution
1.	Unclear where to measure AC source	p. 25	Require that these measurements be taken after the input (AC) power meter and before

	THD, voltage, and frequency.	I.D	the UUT.
2.	AC source voltage and frequency values disagree with Part 1 of TP.	p. 25 I.D	Harmonize with Part 1 of test procedure.
3.	Sampling requirements do not belong in TP	p. 25 II.A	Remove.
4.	Nameplate data collection requirement is repeated from section I.C.	p. 25 II.A	Remove.
5.	Depth of discharge is undefined.	p. 25 II.C	Define depth of discharge relative to start and end voltage or specific gravity of cell; repeat relevant rows of Table D (p. 19 of Part 1 of TP) for reference.
6.	Discharge rate for conditioning unspecified.	p. 25 II.C	Specify rate.
7.	Ambient conditions required for valid measurement are unspecified.	II	Harmonize ambient test conditions with Part 1 of TP

MEASUREMENT PROCEDURE

#	Issue	Page	Suggested Resolution
1.	Unclear how peak AC power is to be measured.	p. 27 III. B	Test procedure only specifies measuring AC power at 5 minutes and 1, 3, and 5 hours after start of recharge. Clarify that peak AC power is the maximum of those AC power measurements.
2.	Two battery discharge rates specified and manufacturer allowed to choose discharge rate, opening a potential loophole.	p. 28 III.C.1	Specify one battery discharge rate that all manufacturers would have to obey, as discharge rate influences the measured capacity of the battery.
3.	Battery can be discharged through driving, but a vehicle is not a controlled testing environment.	p. 28 III.C.1	Require that battery energy be measured during discharge at a precise rate under specified conditions.

4.	Battery recharge rate unspecified.	p. 28 III.C.2	Specify the rate at which the battery is to be recharged for chargers with multiple user-selectable charge rates.
5.	"For a valid test, the battery temperature during charging (as measured in Part 2, Section II. D.) must be . . . " However, section II.D deals with the discharge test, so it is unclear at which point during the charge test (III.C.2) the temperature measurement should be taken.	p.28 III.C.2	Specify exactly at what intervals the temperature of the battery needs to be measured to maintain the validity of the charge test.
6.	How to treat equalization.	p. 28 III.C.2	Clarify what to do if charger performs equalization procedure during testing. Indicate under which section results will be saved.
7.	Verification of full charge unclear. Four methods of verification provided: charger indicator, current measurement, temperature, specific gravity.	p. 29 III.C.2	Prioritize which verification method takes precedence if others disagree. Also, voltage was used previously in section II.D—add here in case of VRLA batteries. Finally, clarify language—can't directly compare charger DC current (in amperes) to battery capacity (in ampere-hours).
8.	Maintenance power test too long (72 hours).	p. 29 III.D	Shorten the maintenance test to < 1 hour and calculate the AC and DC average power. A 72 hour test conducted for maximum and minimum battery voltage and capacity will tie up valuable equipment for weeks, just to test one charger.
9.	Explanation of maintenance power in relation to no-battery losses is confusing.	p. 29 III.D	Remove sentence starting with " 'No Battery losses,' if any . . ."
10.	Unclear when no battery power is considered steady and what to do when it is not.	p. 29 III.E	Provide explicit instructions as to when measured power is steady and what to do if not (e.g., measure average power).

DATA REPORTING

#	Issue	Page	Suggested Resolution

1.	Certain parameters such as “charging profile”, “character of maintenance mode”, “full power, mid- and low-power levels” are undefined.	p. 29 IV	Define all parameters to be reported and specify how they are to be measured in the body of the TP, or calculated from other parameters measured in the TP.
2.	Optional data in reporting requirements.	p. 29 IV	Remove optional data from reporting requirement, e.g., the charge return factor at low, medium, and high starting state of charge
3.	24-hour calculated energy loss for no-load power unnecessary.	p. 29 IV.A	Reporting of this parameter is redundant since no-battery power is reported as well. Remove.
4.	Unclear exactly which parameters are to be reported.	p. 29 –30 IV	Certain items are simply definitions or explanations, e.g., “Battery Charging Profile” or “Power Factor”. Reorganize section so it is clear exactly which parameters are to be reported and how to obtain them from the numerous parameters measured in the body of the test procedure.
5.	Test procedure requires more measurements than are reported or necessary to ensure the repeatability of the test.		Remove all extraneous measurements from the body of the test procedure, e.g., DC power measured occasionally during recharge, ambient conditions.