



Cell Coolant Exposure for Rechargeable Energy Storage Systems

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard specifies the test procedure for evaluating the performance for Hybrid Electric Vehicle (HEV), Plug-in Hybrid Electric Vehicle (PHEV), Extended Range Electric Vehicle (EREV) and Electric Vehicle (EV) batteries that are used in a vehicle environment.

1.1.1 Cell Coolant Exposure. This test shall be used to evaluate the ability to meet vehicle rechargeable energy storage systems (RESS) performance metrics. The cell coolant exposure test insures that contact with coolant will not damage the cell.

1.2 Foreword. This document provides the standard technical requirements for HEV, PHEV, EREV and EV batteries. A program-specific technical specification that is used in conjunction with this document may include additional program-specific requirements that are not referenced in this document and may supercede any requirements included in this document. In the case of any conflicts between this document and the program-specific technical specification, the program-specific technical specification takes precedence.

1.3 Applicability. This standard applies to all liquid cooled RESS systems for passenger or commercial vehicles and trucks. General Motors shall approve all changes to the format and/or content of this test standard.

Hybrid controllers, battery disconnect units (BDU), and other internal electrical/electronic components are required to meet GMW3172.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3172

2.3 Additional References.

CG2762 Default Test Parameters

3 Resources

3.1 Facilities. The test facilities and equipment shall be in good working order and shall have valid calibration. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment. Appropriate equipment is required to complete the test procedure defined in Section 4 to acquire and store all necessary data. Data sources will include data measured by any external process indicators, i.e., flow meters. There may be additional data sources.

3.2.1 Equipment Parameters. Unless stated otherwise, the information in Table 1 defines the minimum test equipment parameters and tolerances to be used for all testing.

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February 2012

Originating Department: North American Engineering Standards

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Table 1: Equipment Parameters and Tolerances

Parameter	Range	Tolerance
Direct Current (DC) Voltage: Cell Level – Measure	0 V to 20 V	± 0.1% of Full Scale

3.3 Test Vehicle/Test Piece. All cell level RESS.

3.4 Test Time. See CG2762.

3.5 Test Required Information. All limits imposed by the battery manufacturer shall be observed over the course of testing. Power, current, voltage and temperature restrictions provided in written documentation by the manufacturer take precedence over any instructions given in this document.

3.6 Personnel/Skills. All personnel performing tests must have up to date training records in a high voltage training program.

3.7 Personal Protection Equipment (PPE). PPE, such as high voltage gloves, face shields, fire extinguishers, etc., shall be in good working order and available in the immediate area used in the execution of the testing.

4 Procedure

4.1 Preparation.

4.1.1 Cells should be either fully discharged (i.e., near zero volts) or be constructed without their active internal components.

4.1.2 Cells are preferred to be tested without constraint. If a fixture is requested to be used, all sealing areas must be exposed to the fluid and the diffusion of the fluid should not be restricted.

4.1.3 Additional customer requests or requirements must be provided in writing prior to start of test.

4.1.4 All devices under test (DUT) should be subjected to an initial inspection as defined by the requestor.

4.1.5 The DUT and fluid should be placed in a covered container to minimize the fluid concentration change. The container material must be compatible with the test fluid. Fluid temperature should be monitored and recorded. The DUT temperature could also be monitored (optional).

4.1.6 It is recommended to place a baseline cell into the chamber, but not in the fluid, for the same duration (for temperature exposure).

4.2 Conditions.

4.2.1 Environmental Conditions. Unless stated otherwise, the information in Table 2 defines the minimum test environment parameters and tolerances to be used for all testing.

Table 2: Environmental Parameters and Tolerances

Parameter	Range	Tolerance
Temperature Sensor – Measure	-40 °C to 85 °C	± 3 °C
Chamber Temperature – Generate and Measure	-40 °C to 85 °C	± 3 °C
Lab Environment Temperature – Measure	25 °C	± 10 °C
Lab Environment Humidity – Measure	10% to 85% relative humidity (RH)	± 5% RH
Coolant Conditioner	-30 °C to 90 °C	± 1.5 °C

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