ESSES Consortium

Energy Storage System Evaluation and Safety

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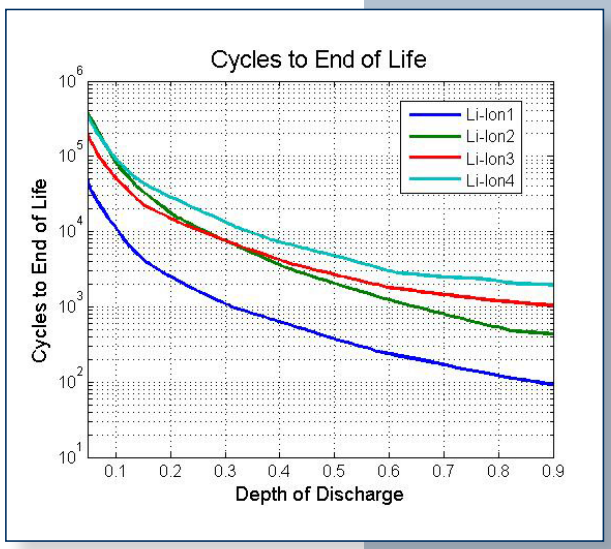
Southwest Research Institute® (SwRI®) announces the formation of the Energy Storage System Evaluation and Safety (ESSES) Consortium beginning in May 2011.



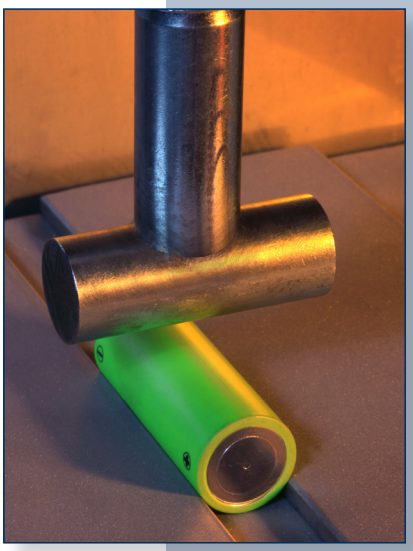
Background

On April 1, 2010, the Environmental Protection Agency and the National Highway Traffic Safety Administration announced legislation establishing a historic national program that will dramatically reduce greenhouse gas emissions and stimulate fuel economy improvements. The legislation is intended to expedite the implementation of hybrid electric vehicles and plug-in hybrid electric vehicles in the US market. The key component to the success and acceptance of these technologies is the production of safe, reliable and cost-effective energy storage systems.

The Economic Recovery Act has provided funding for electrochemical storage system research and development which has led to a proliferation of battery manufacturers and chemistries. It can be cost-prohibitive to continually assess the available technologies and choose the best one for a given set of product requirements.

Consortium Goals

The mission of the Southwest Research Institute (SwRI) ESSES Consortium is to provide transparency in the automotive battery market as a means to advance the development of energy storage systems. This mission will be met by (1) developing precompetitive detailed cell-level test data on currently available electrochemical storage systems across a diverse number of manufacturers and products, and (2) performing research to advance the testing methodologies used to benchmark batteries, making tests faster, cheaper and more significant.



Proposed Content

The program will provide data on performance, abuse, life cycle and consistency of manufacturing tests for member-selected sets of battery cells in a private, independent third-party laboratory format. SwRI will conduct testing based on the recommended practices of SAE J2464, UN 38.3, DOT battery testing standards, USABC and the US DOE Battery Test Manual for plug-in hybrid electric vehicles. The tests will be selected based on their pre-competitiveness, applicability to cell-level tests, and usefulness in comparing different technologies.

The proposed test sets are categorized into four main groups:

Performance and Characterization

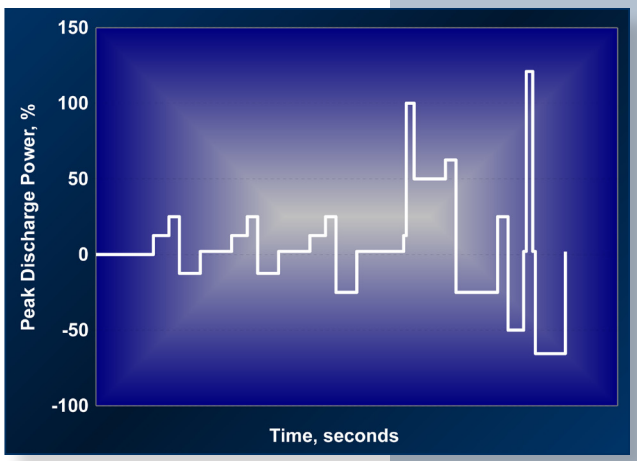
- Static capacity
- Hybrid pulse power (low and high current levels)
- Charge sustaining energy efficiency
- Charge depleting energy efficiency
- Constant power discharge
- Self-discharge
- Cold cranking

Life Cycle

- Combined life cycle test (charge depleting + charge sustaining)
- Reference performance testing (every 500 cycles)

Abuse

- Thermal stability
- Over-discharge
- Hard short circuit
- Crush
- Electrolyte vapor analysis
- Overcharge
- Soft short circuit
- Separator shutdown integrity
- Penetration
- Forced vent with thermal runaway



cd-life cycle

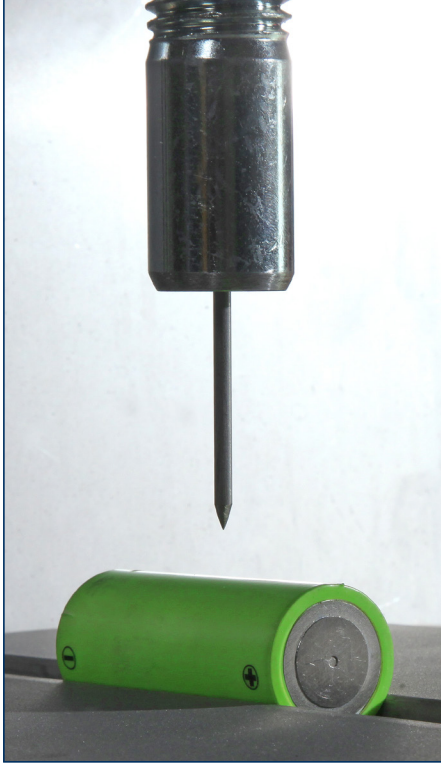
Quality Accomplishments

The Office of Automotive Engineering (OAE) at SwRI is certified to ISO 9001:2008, "Quality Management Systems – Requirements," accredited to ISO/IEC 17025:2005, "General Requirements for the Competence of Testing and Calibration Laboratories," and certified to ISO 14001:2004, "Environmental Management Systems." The OAE has also achieved Ford Tier 1 status for providing engineering services and the Engine, Emissions and Vehicle Research Division has received the Ford Q1 Quality Award. In addition, the Petroleum Products Research Department is a Nuclear Procurement Issues Committee (NUPIC)-approved laboratory and the Fuels and Lubricants Research Division has maintained its status as an American Chemistry Council (ACC)-approved laboratory.

Manufacturing

- Mass variance
- Initial internal resistance
- Open circuit voltage after extended storage

The test schedule is designed to accommodate eight different battery type sets for life and abuse and 16 cell types for characterization per year. The testing includes multiple cells under different configurations and repeated testing for each cell type. Life cycle and performance environmental test conditions, including temperature, and specific cell configurations will be recommended, but will be determined by consortium members.



Participants

The SwRI ESSES Consortium will consist of commercial participants and will run for a period of three years. The consortium format allows for cost-sharing to a level equal to the number of participants, with the benefit of proprietary data to be shared only among participants.

Deliverables and Pricing

Program deliverables include:

- Semi-annual progress review meetings
- FTP secure server database access to test data
- Monthly progress reports
- Annual reports
- Full test results for eight (or number proportional to membership level) battery types per year

The price to join the consortium will be $65,000 per year.

If you would like to register, have a personalized introduction meeting, or receive updates, please log on to ***www.esses.swri.org***.

Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multidisciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops and offices for more than 3,200 employees who perform contract work for industry and government clients.

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