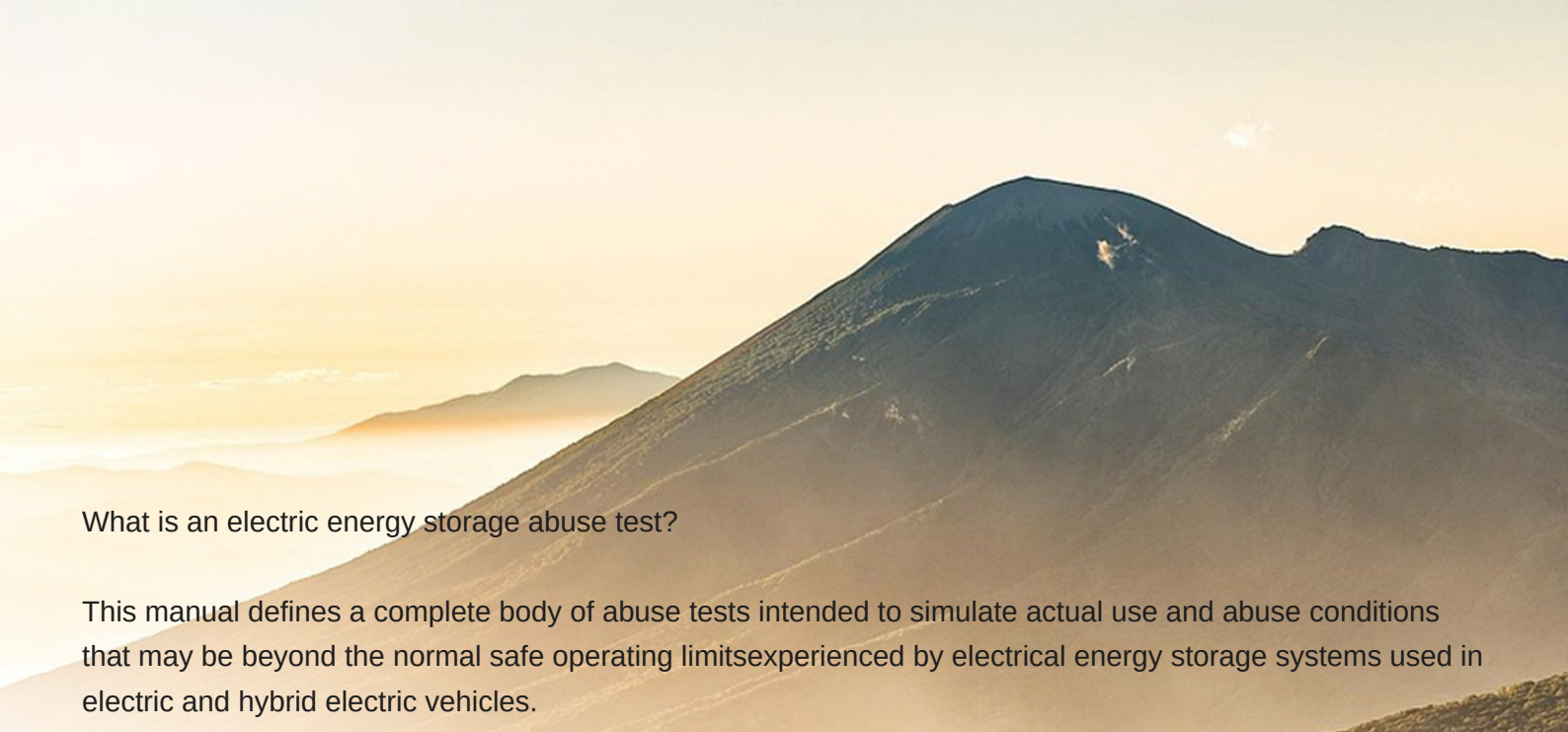


What is an electric energy storage abuse test?

This manual defines a complete body of abuse tests intended to simulate actual use and abuse conditions that may be beyond the normal safe operating limitsexperienced by electrical energy storage systems used in electric and hybrid electric vehicles.

What is the FreedomCAR energy storage manual?

This manual was prepared by and for the FreedomCAR Program Electrochemical Energy Storage Team. It is based on the goals established for FreedomCAR energy storage development and is similar (with some important changes) to an earlier manual for the former Partnership for a New Generation of Vehicles (PNGV) program.

What is an electric energy storage test?

The tests described are intended for abuse testing any electrical energy storage system designed for use in electric or hybrid electric vehicle applications whether it is composed of batteries, capacitors, or a combination of the two.

What are the goals of the FreedomCAR program?

The FreedomCAR program defines a number of goals for battery performance over life. (See Table 1 in the body of this manual.) Power and energy capability are evaluated using the HPPC test,while round-trip efficiency and cycle life are evaluated using special pulse profile tests for either Minimum Power Assist or Maximum Power Assist operation.

What is an electric vehicle (EV) abuse test?

A road vehicle that uses stored electrical energy as its source of energy for motive (traction) power. EVs are generally charged with AC power provided by an electric utility and are on stationary charge between uses. A type of abuse test that would, in general, be considered highly unlikely to occur during 'normal' vehicle operation.

What is a FreedomCAR cycle life test?

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

FreedomCAR cycle life test procedures in this manual are intended for cycling at fixed values of state-of-charge(SOC),defined on the basis of a fractional depth-of-discharge (DOD,i.e.,percent of rated capacity in Ah) from a fully charged state.

Tests are defined based on the FreedomCAR program goals for power-assist hybrid electric vehicles, though it is anticipated these tests may be generally useful for testing energy storage devices for hybrid vehicles. The test procedures in this manual are directly applicable to complete battery systems.

This battery test procedure manual was prepared for the United States Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Vehicle Technologies Program. It is based on technical targets established for energy storage development projects aimed at meeting system level

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

This manual defines a complete body of abuse tests intended to simulate actual use and abuse conditions that may be beyond the normal safe operating limits experienced by electrical energy storage systems used in electric and hybrid electric vehicles. The tests are designed to provide a common framework for abuse testing various electrical energy storage systems used in both ???

3/4 Electrical Abuse ??? Overcharge/Overvoltage ??? Short Circuit ??? Overdischarge/Voltage Reversal ??? Partial Short Circuit Ref.: Sandia Report SAND 2005-3123, "FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications", Daniel H. Doughty and Chris C. Crafts, May 2005

This manual defines a complete body of abuse tests intended to simulate actual use and abuse conditions that may be beyond the normal safe operating limits experienced by electrical energy storage systems used in electric and hybrid electric vehicles. The tests are designed to provide a common framework for abuse testing various electrical energy storage systems used in both ???

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

SAE J2464, "Electric and Hybrid Electric Vehicle Rechargeable Energy Storage System (RESS) Safety and Abuse Testing" is one of the premier testing manuals for vehicle battery abuse in North

DOE/ID-11069 (2003), "FreedomCAR Battery Test Manual for Power-Assist Hybrid Electric Vehicles," FreedomCAR Program for the U.S. Department of Energy. Electrical Energy Storage System, Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications," Sandia National Laboratories for the U.S. Department of Energy.

3/4 Electrical Abuse ??? Overcharge/Overvoltage ??? Short Circuit ??? Overdischarge/Voltage Reversal ??? Partial Short Circuit Ref.: Sandia Report SAND 2005-3123, "FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicl e Applications", Daniel H. D oughty and Chris C. Crafts, May 2005

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

technical targets for commercial viability established for energy storage development projects aimed at meeting system level DOE goals for Electric Vehicles (EVs). The specific procedures defined in this manual support the performance and life characterization of advanced battery devices under development for EV applications.

This report describes recommended abuse testing procedures for rechargeable energy storage systems (RESSs) for electric vehicles. This report serves as a revision to the USABC Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications (SAND99-0497).

goals, though it is anticipated these tests may be generally useful for other similar applications. The test procedures in this manual are defined for complete 42V energy storage systems; application of the procedures to cells, modules or sub-units of such 42V systems is not discussed in detail. b 1.1 42V Energy Storage Goals Table 1.

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

Both Sandia National Laboratories (SNL) and the Society of Automotive Engineers (SAE) have previously defined a body of tests for evaluating the safety aspects of electrochemical storage systems ??? most specifically, batteries ??? to be used in electric vehicle applications. This manual includes improvements and refinements to those tests based on experience gained ???

This report describes recommended abuse testing procedures for rechargeable energy storage systems (RESSs) for electric vehicles. This report serves as a revision to the FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications (SAND2005-3123).

FreedomCAR :electrical energy storage system abuse test manual for electric and hybrid electric vehicle applications. Technical Report ? Tue Aug 01 00:00:00 EDT 2006 ? OSTI ID: 9463

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

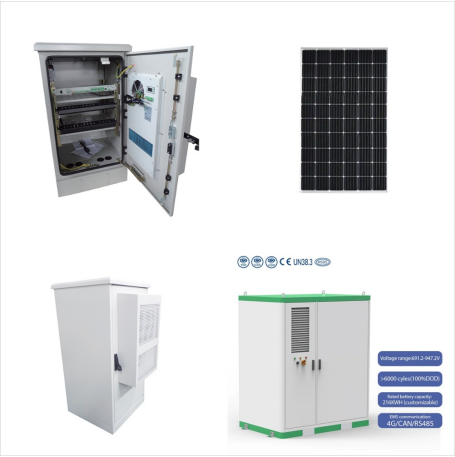
One of the standards developed under DoE with guidance by Sandia National Laboratories for the United States Department of Energy's National Nuclear Security Administration is FreedomCAR:2006 Electrical Energy Storage System (EESS) Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications . The scope of this standard is to

FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications Daniel H. Doughty and Chris C. Crafts Prepared by Sandia National Laboratories Albuquerque, New Mexico 87185 and Livermore, California 94550 Sandia is a multiprogram laboratory operated by Sandia Corporation,

This report describes recommended abuse testing procedures for rechargeable energy storage systems (RESSs) for electric vehicles. This report serves as a revision to the FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications (SAND2005-3123).

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

Electrochemical Energy Storage ??? 42V Battery Test Manual Issued 7 This report contains brief summaries of key accomplishments of the FreedomCAR program for 2003. FreedomCAR is a Partnership between the U.S. Department of (primarily for operation of electrical accessories) to a 450 volt system design that



This report describes recommended abuse testing procedures for rechargeable energy storage systems (RESSs) for electric vehicles. This report serves as a revision to the FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications (SAND2005-3123).

For example, at a cell level the FreedomCAR Abuse Test Manual for Electric and Hybrid Vehicles Applications requires the cell to be fully penetrated by a conductive pointed rod with a diameter of 3 mm and at a speed of 8 cm/s [10]. The Society of Automotive Engineers" (SAE) J2464 abuse test standards also specify the same test parameters [11

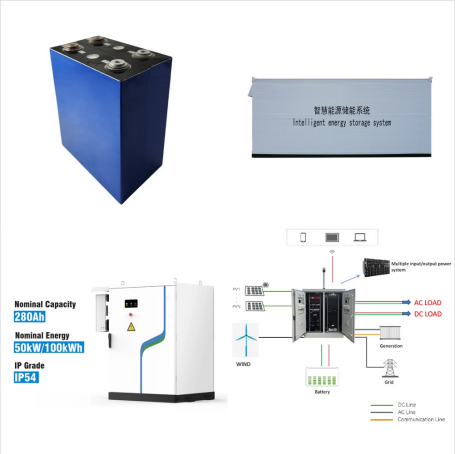
FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL

FreedomCAR Power Assist Battery Test Manual ??? Electric Vehicle Battery Test Procedures Manual ??? FreedomCAR 42 Volt Battery Test Manual ??? FreedomCAR Ultracapacitor Test Manual ??? Battery Technology Life Verification Test Manual ??? Energy Storage Abuse Test Manual for HEV Applications ??? USABC Abuse Test Procedures Manual (EVs) Many have

SANDIA REPORT. SAND2005-3123 Unlimited Release Printed August 2006. FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications Daniel H. Doughty and Chris C. Crafts. Prepared by Sandia National Laboratories Albuquerque, New Mexico 87185 and Livermore, California 94550. Sandia is a multiprogram ???

FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications N.A. Scope: This manual defines a complete body of abuse tests intended to simulate actual use and abuse conditions that may be beyond the normal safe operating limits experienced by electrical energy storage systems used in

FREEDOMCAR ELECTRICAL ENERGY STORAGE SYSTEM ABUSE TEST MANUAL



Electrical Abuse ??? Overcharge/Overvoltage ??? Short Circuit ??? Overdischarge/Voltage Reversal ??? Partial Short Circuit Ref.: Sandia Report SAND 2005-3123, "FreedomCAR Electrical Energy Storage System Abuse Test Manual for Electric and Hybrid Electric Vehicle Applications", Daniel H. Doughty and Chris C. Crafts, May 2005 5