



SURFACE VEHICLE INFORMATION REPORT

J2289™

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Electric-Drive Battery Pack System: Functional Guidelines

RATIONALE

The using community is moving towards more detailed battery pack guidelines derived from OEM requirements or industry standards based on multiple chemistries, system voltages, regulatory requirements, and vehicle propulsion applications. The users should follow more detailed design requirements for consideration for each application. The common basic design elements and reference SAE documents identified in this document are still valid allowing stabilization of this SAE Information Report.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE Battery Standards Testing Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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FOREWORD

The mission of this document is to provide guidance in designing vehicle level battery systems for Electric Vehicles and Hybrid Electric Vehicles using electrically rechargeable battery modules. Items addressed include battery system content, component and system safety and reliability, improving system performance of the battery, and optimizing battery life.

The term battery used throughout this document implies the complete energy storage system and its auxiliaries, which are used to deliver power and energy to an electric vehicle traction system.

Design of aqueous electrolyte battery modules and cells as to electrochemical performance and design are defined in SAE J1797, and referenced here. An electric drive battery system as described here may be designed to meet the safety and crash requirements of SAE J1766 and SAE J2344. The requirements outlined in this document are intended to guide the vehicle manufacturers in understanding the environmental conditions that a well designed battery pack should be able to withstand. It is at the manufacturer's discretion as to what tests and test limits to implement.

1. SCOPE

This SAE Information Report describes common practices for design of battery systems for vehicles that utilize a rechargeable battery to provide or recover all or some traction energy for an electric drive system. It includes product description, physical requirements, electrical requirements, environmental requirements, safety requirements, storage and shipment characteristics, and labeling requirements. It also covers termination, retention, venting system, thermal management, and other features. This document does describe guidelines in proper packaging of the battery to meet the crash performance criteria detailed in SAE J1766. Also described are the normal and abnormal conditions that may be encountered in operation of a battery pack system

1.1 Purpose

This document provides the guidelines for designing a battery system to package into manufacturer's electric drive vehicles. It lays the foundation for electric vehicle battery systems and provides information to assist in developing a robust battery system.

1.2 Field of Application

This document applies to vehicles using electrically rechargeable storage traction batteries that provide energy and power to an electric drive system for propulsion, namely Electric Vehicles and some Hybrid Electric Vehicles.

This document does not fully address all guidelines for mechanically rechargeable battery systems. Users of mechanically recharged batteries should evaluate applicability of individual sections of this document.

1.3 Product Classification

The battery system is a vehicle subsystem that provides all or some of the traction power and energy for vehicles using electric drive systems.

This document does not apply to low voltage non-traction battery supply systems.

1.4 Product Description

A battery system is the complete set of assemblies required to supply traction power and energy to an electric vehicle drive system. A battery pack is a single assembly with batteries that is part of a Battery System. In some cases a single pack may comprise the complete Battery System.

Electric Drive vehicles may require an electrically rechargeable secondary battery to provide motive traction power and energy as well as power and energy for incidental loads like power steering, heating and air conditioning, FMVSS mandated exterior lighting, controls, customer convenience features, etc. The battery can also represent a significant physical load to the vehicle in terms of mass, volume, and controls complexity. Consequently, the battery exerts a significant factor in vehicle design.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 5096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J551	Performance Levels of Methods of Measurement of Electromagnetic Radiation from Vehicles and Devices
SAE J1211	Recommended Environmental Practices for Electronic Equipment Design
SAE J1555	Recommended Practice for Optimizing Automotive Damagability
SAE J1654	High Voltage Primary Cable
SAE J1673	High Voltage Automotive Wiring Assembly Design
SAE J1715	Electric Vehicle Terminology