



SURFACE VEHICLE RECOMMENDED PRACTICE

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(R) Power Quality Requirements for Plug-In Electric Vehicle Chargers

RATIONALE

This document has a high potential to be used by regulatory state agencies to become a basis for a regulation. Therefore, the document has been reviewed to have accurate power quality definitions and requirements. Some of the requirements were too strict for vehicle onboard charger design point of view. After discussions among vehicle OEMs and utilities, the requirements have been updated.

FOREWORD

Designers and the vehicle manufactures that implement PEV battery chargers must understand the characteristics of the AC service to which the equipment will be connected if they are to develop products that are sufficiently robust, reliable, and cost effective, to satisfy the needs of the PEV owner. The charger designer and vehicle manufacturer must also understand that the battery charger can have a significant impact on the quality of the AC service to which it is connected.

The information presented in this Recommended Practice may be used by charger power supply designers, managers of charger development programs, and an electric utility.

NOTE: This SAE Recommended Practice is intended as a standard practice and is subject to change to keep pace with experience and technical advances.

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1. SCOPE

The intent of this document is to develop a recommended practice for PEV chargers, whether on-board or off-board the vehicle, that will enable equipment manufacturers, vehicle manufacturers, electric utilities, and others to make reasonable design decisions regarding power quality. The three main purposes are as follows:

1. To identify those parameters of PEV battery charger that must be controlled in order to preserve the quality of the AC service.
2. To identify those characteristics of the AC service that may significantly impact the performance of the charger.
3. To identify values for power quality, susceptibility, and power control parameters which are based on current U.S. and international standards. These values should be technically feasible and cost effective to implement into PEV battery chargers.

SAE J2894/2 will describe the test methods for the parameters/requirements in this document.

2. REFERENCES

2.1 Applicable Documents

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

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

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|-------------|--|
| SAE J1772 | SAE Electric Vehicle and Plug-In Hybrid Electric Vehicle Conductive Charge Coupler |
| SAE J1773 | SAE Electric Vehicle Inductively Coupled Charging |
| SAE J2293/1 | Energy Transfer System for Electric Vehicles - Part 1: Functional Requirements and System Architectures |
| SAE J2293/2 | Energy Transfer System for Electric Vehicles - Part 2: Communication Requirements and Network Architecture |
| SAE J2847/1 | Communication for Smart Charging of Plug-In Electric Vehicles Using Smart Energy Profile 2.0 |
| SAE J2894/2 | Power Quality Requirements for Plug-In Electric Vehicle Chargers |

2.1.2 IEEE Publications

Available from IEEE Operations Center, 445 and 501 Hoes Lane, Piscataway, NJ 08854-4141, Tel: 732-981-0060, www.ieee.org

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| IEEE 519 | Harmonic Specifications |
| IEEE 1159 | Recommended Practice for Monitoring Electric Power Quality |
| IEEE 1547 | Standard for Interconnecting Distributed Resources with Electric Power Systems |
| IEEE 2030.1 | Draft Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), and End-Use Applications and Loads |