

State of California
Air Resources Board

UPDATED INFORMATIVE DIGEST

**PLUG-IN HYBRID ELECTRIC VEHICLE TEST PROCEDURE AMENDMENTS
AND AFTERMARKET PARTS CERTIFICATION REQUIREMENTS**

Sections Affected

Amendments to title 13, California Code of Regulations (CCR), section 1961, and the following test procedure incorporated by reference: “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles,” adopted August 5, 1999, as last amended May 2, 2008; section 1962 and the following test procedure as renamed and incorporated by reference: “California Exhaust Emission Standards and Test Procedures for 2005 through 2008 Model Zero-Emission Vehicles, and 2001 through 2008 Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes,” adopted August 5, 1999, as last amended December 19, 2003; section 1962.1 and the following test procedure as renamed and incorporated by reference: “California Exhaust Emission Standards and Test Procedures for 2009 and Subsequent Model Zero-Emission Vehicles, and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes,” adopted September 1990, as last amended December 17, 2008; section 1976 and the following test procedure incorporated by reference: “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” adopted August 5, 1999, as last amended May 2, 2008; and section 1978 and the following test procedure incorporated by reference: “California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” adopted August 5, 1999, as last amended May 2, 2008; and the adoption of new section 2032, and the incorporated “California Certification and Installation Procedures for Off-Vehicle Charge Capable Conversion Systems for 2000 and Subsequent Model Year Hybrid Electric Vehicles.”

Background

In 1990, the California Air Resources Board (ARB or the Board) adopted an ambitious regulation to significantly reduce the environmental impact of light-duty vehicles through the commercial introduction of zero emission vehicles (ZEVs) into the California fleet. Over the years, the ZEV program has evolved to include

hybrid electric vehicle (HEV) technologies among compliance options. The ZEV regulation includes certification standards and test procedures for both HEV and ZEV technologies. The most recent changes to the ZEV regulation, considered in March 2008, included provisions that strongly encourage the commercialization of plug-in HEVs (PHEV), or off vehicle charge capable (OVCC) HEVs. OVCC HEVs may charge on or off the electric power grid. In the Hearing Notice and the staff report, the term PHEV is used to refer to OVCC HEVs, that is, vehicles capable of charging on or off the grid.

This rulemaking action focused on adapting existing test procedures to address new configurations of PHEVs. Additional adopted amendments in this rulemaking address HEV conversions and ZEV range testing. Aftermarket PHEV conversion system manufacturers (Conversion System Manufacturers) have developed products to convert existing HEVs to PHEVs. The Board also adopted certification requirements for PHEV conversion systems, and adopted an alternative all electric range (AER) determination for fuel cell vehicles (ZEV Range Test Procedures for Fuel Cell Electric Vehicles), based on fuel consumption.

Adopted Amendments and Sections

Amendment of the Exhaust Test Procedures for Hybrid Electric Vehicles: To specifically address PHEVs, a new section is being included in the renamed “California Exhaust Emission Standards and Test Procedures for 2009 and Subsequent Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes” (Exhaust Test Procedures). This section includes a determination of an equivalent all electric range (AER) and provides test procedures for more advanced PHEVs.

While the previous Exhaust Test Procedures were appropriate for testing current HEVs and battery electric vehicles (EV), the adopted amendments are needed to clarify requirements for conventional HEVs and to provide for equivalency in results from EV and PHEV AER tests. In addition, previous procedures were not adequate for testing PHEVs. The adopted changes more accurately determine the contribution of the electric drive and vehicle emissions from PHEVs.

Alternative AER Test Procedures for Fuel Cell EVs: The Board adopted to supplement the current AER test for electric vehicles, which was designed for battery EVs, with a procedure more appropriate for fuel cell EVs. The adopted procedure incorporates the newly revised Society of Automotive Engineers (SAE) J2572 “Recommended Practice for Measuring Fuel Consumption and Range of Fuel Cell and Hybrid Fuel Cell Vehicles Fueled by Compressed Gaseous Hydrogen.” This SAE Recommended Practice addresses both hydrogen measurement challenges and decreases the duration of the current AER Test Procedures by calculating the vehicle range based on fuel consumption.

Amendment of the Evaporative Emission and Refueling Related Test Procedures for PHEVs: HEVs are currently certified to comply with ARB's evaporative emission standards according to the "California Evaporative Emission Standards and Test Procedures For 2001 and Subsequent Model Motor Vehicles" (Evap Test Procedures), and the "California Refueling Emission Standards and Test Procedures For 2001 and Subsequent Model Motor Vehicles" (ORVR Test Procedures). Much like the Exhaust Test Procedures, the previous Evap and ORVR procedures were adequate for testing current HEVs, but did not address the unique characteristics of PHEV technologies. The ability to recharge batteries without internal combustion (IC) engine operation offers exhaust emission benefits; however, the accurate determination of evaporative emissions decreases with decreased IC engine use. Accordingly, the adopted amendments to the Evaporative and ORVR Test Procedures ensure that the evaporative emissions of PHEVs are reasonably characterized for certification purposes to demonstrate compliance with the applicable evaporative emission standards.

Create a New Set of Certification Procedures for PHEV Conversion Systems: The Board adopted a separate set of certification procedures to address conversions of HEVs to PHEVs. Certification of PHEV conversion systems will follow the same Exhaust, ORVR and Evap Test Procedures as described above. The addition of PHEV conversion requirements will ensure that the converted vehicle continues to meet the original emission standards under the warranty provided to the consumers. These certification procedures are tiered, such that as a conversion manufacturer increases their sales more requirements are needed. This tiered process was created to spread out and reduce the financial burden of certification to conversion manufacturers over conversions sold.

COMPARABLE FEDERAL REGULATIONS

Currently, there are no comparable federal test procedures for PHEVs. There are no federal certification procedures for aftermarket PHEV conversion systems. There are no federal test procedures specific to fuel cell EV range.