

Appendix E

AFVIP Zero Emission Motorcycle Evaluation Procedures

AFVIP ZERO EMISSION MOTORCYCLE EVALUATION PROCEDURES

1. Introduction

The Alternative Fuel Vehicle Incentive Program (AFVIP) provides rebates to eligible neighborhood electric vehicles (NEVs) and zero emission motorcycles (ZEMs). To ensure that these vehicles are robust and offer their purchasers enduring trouble-free performance, the California Air Resources Board (ARB) requires them to successfully complete established baseline performance evaluations.

NEVs must meet prescribed vehicle requirements developed by the NEV America Program and contained within the NEV America Technical Specifications. The NEV America program is sponsored by the United States Department of Energy Office of Transportation Technology. It is conducted by the Advanced Vehicle Testing Activity, a joint project of the Idaho National Laboratory and the National Renewable Energy Laboratory. Additional information on the NEV America Technical Specifications is contained in section 3.2.2 of the AFVIP Guidelines.

ZEMs must meet prescribed vehicle requirements based upon zero emission vehicle testing procedures developed by Southern California Edison's Electric Vehicle Testing Center. The ARB, in consultation with SCE, has modified the electric vehicle testing procedures to reflect the operating characteristics of ZEMs.

ZEM manufacturers seeking AFVIP rebate eligibility must have an ARB-recognized independent third-party vehicle standards organization¹ evaluate vehicle range and acceleration using the procedures contained in this document (data collected will be held confidentially). The ARB will review the evaluation and issue a pass or fail determination. Pass determinations will also state rebate eligibility amount based upon whether the ZEM is either freeway capable (completion of two circuits of the Pomona Loop²) or non-freeway capable³ (completion of one circuit of the Pomona Loop) vehicle. All other applicable legal requirements to certify operation of a motor vehicle on a public roadway must be satisfied before the vehicle is submitted for range certification.

2. Vehicle Receipt, Preparation and Inspection

A. Before accepting the vehicle for testing, the following must be satisfied:

1. The vehicle must be licensed for legal operation on public roadways.
2. The vehicle must pass a safety and functionality inspection.
3. The vehicle must have a minimum sustained speed capability of 35 mph on the Pomona Loop course⁴ and freeway-capable vehicles must be able to accelerate from 0 to 50 mph in 10 seconds or less.

¹ The ARB reserves the right to approve or disapprove the proposed vehicle standards organization.

² The Pomona Loop is an urban test course of 20 miles length in city traffic (see diagram at end of this document).

³ Non-freeway capable ZEMs are those falling under California Vehicle Code Section 400(c).

⁴ If this performance level cannot be met, then the vehicle could be considered for neighborhood electric vehicle testing. (See the NEV specifications contained in section 3.2.2 of the AFVIP Guidelines.)

B. Complete the following preparation and inspection steps:

1. Fill out the Vehicle Test Equipment and Nameplate Data Sheet (Form MSCD/AFV04).
2. When the tires are “cold”, check the air pressure and inflate the tires to the maximum pressure indicated on the tire sidewall using a calibrated tire pressure gage; for consistency, pressure should be checked within one hour of starting the test drive. Tires can be considered “cold” if the vehicle has been parked for at least two hours. Check the pressure before each test at a consistent time relative to the test drive schedule.
3. Check the vehicle fluid levels (coolant, brake fluid, etc.) if applicable before each drive.
4. Fully charge the vehicle’s battery pack in a controlled environment using the supplied battery charger and allow it to cool at least four, and not more than twelve hours before beginning the range test.

3. Pomona Loop Range Test

A. Pomona Loop Range Test

Record the odometer reading and starting ambient conditions on the Electric Vehicle Driving Test Data Sheet (Form MSCD/AFV05). It is preferable to start the drive in the morning at a consistent time and temperature. Drive the vehicle on the Pomona Loop, with no passengers, in a manner that is compatible with the safe flow of traffic, attempting to maintain the posted speed limit whenever possible, but at no time exceeding the posted speed limit. Complete one loop for non-freeway capable ZEMs, and two loops for freeway capable ZEMs.

Upon completion of the circuit, record the end-of-test data (odometer, state of charge, ending ambient conditions) on MSCD/AFV05. Recharge the vehicle battery in a controlled environment using the supplied battery charger, and record the recharge data.

If the vehicle fails to complete the required distance, follow the specifications in section B.4 before repeating the test once more.

B. Stop Conditions if Vehicle is Unable to Complete the Test

The maximum useable range of the vehicle is determined by vehicle gage indications specified by the manufacturer, or if no instructions are specified, by diminished vehicle performance such that the vehicle is no longer capable of safely operating with the flow of traffic. Typically, an electric vehicle will have two warning lights near the end of the vehicle’s range. The first is usually a cautionary light at roughly 20 percent state of charge (SOC). This light is usually a reminder to the driver that the state of charge is

low. The second warning usually comes on at about 10 to 15 percent SOC, and is an indication to charge immediately. A testing entity should use this second warning signal, as recommended by the manufacturer, to stop the range test, so that there is no chance to harm the traction battery by over-discharge. If within a mile or two of the test circuit starting position, and possible to drive it in slowly and conservatively, do so. If farther than that, the driver will stop the vehicle and have it transported in.

4. Acceleration Test

Upon successful completion of the Pomona Loop Range Test, follow the specifications in section B.4 before beginning the acceleration test. The acceleration test will be performed on a surface street with a posted speed limit of 50 miles per hour or greater and in a manner that is compatible with the safe flow of traffic. Upon completion of the acceleration test, record the state of charge and elapsed time in the “other comments” section of MSCD/AFV05.

5. Output

The manufacturer or testing entity will provide the ARB with completed forms MSCD/AFV04 through 06. The ARB will review the evaluation data and will provide the manufacturer with a pass/fail and freeway capable vs. non-freeway capable determination. All data collected will be shared with the vehicle manufacturer only and to others upon request only as required by law.

AFVIP Zero Emission Motorcycle Evaluation Procedure
FORMS AND DIAGRAMS

VEHICLE TEST EQUIPMENT AND NAMEPLATE DATA SHEET

Project/User Contact: _____ Test: _____
Date(s): _____ File Name(s): _____
Vehicle Number: _____ Technician: _____

VEHICLE

Manufacturer: _____ VIN: _____
Model: _____ Model Year: _____ Manufacture Date: _____
Mileage: _____
Motor Manufacturer: _____ Motor Type: _____
Motor Rating/Speed: _____
Version/Serial No.: _____
Controller Version/serial No.: _____
Battery Pack Type/Version/Serial No.: _____

TIRES

Tire Manufacturer: _____ Model: _____
Tire size: _____ Maximum Pressure: _____
Maximum Tire Load: _____ Treadwear Rating: _____

CHARGER

On-board / Off-board: _____ Manufacturer: _____
Model: _____ Serial Number: _____
Charger Type/Version: _____
EVSE Manufacturer: _____
EVSE Model/Version: _____ Serial Number: _____
EVSE Software Version: _____
Charge Port Manufacturer/Model/Version/SN: _____

TEST EQUIPMENT (Describe make and model as applicable)

Power Profiler: _____
kWh Meter: _____
Thermometer: _____
Optical Meter Probe: _____
Laptop Computer: _____
Desktop Computer: _____
Stopwatch: _____
Digital multimeter: _____
Battery Cycler: _____
Sound Level Meter: _____
Measuring Wheel: _____
Other Equipment: _____

WEIGHT CERTIFICATION

Scale Location and Proprietor: _____
Examiner: _____ Date: _____
Notes: _____
Total Curb Weight: _____ lb

URBAN POMONA LOOP

