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# Air Resources Board

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Gray Davis  
Governor

Mail-Out #MSO 2000-08

June 29, 2000

TO: ALL MANUFACTURERS OF PASSENGER CARS  
ALL MANUFACTURERS OF LIGHT-DUTY TRUCKS  
ALL MANUFACTURERS OF MEDIUM-DUTY VEHICLES  
ALL OTHER INTERESTED PARTIES

SUBJECT: USE OF INNOVA PHOTOACOUSTIC MULTI-GAS MONITOR TO  
MEASURE ETHANOL EXHAUST AND EVAPORATIVE VEHICLE  
EMISSIONS

The Air Resources Board (ARB) received a vehicle manufacturer's request for approval to measure ethanol exhaust and evaporative emissions from vehicles using an INNOVA Model 1312 analyzer instead of the adopted method using midjet impinger samplers (aka bubblers) and gas chromatograph (GC) analysis as specified in ARB Method 1001 of the "California Non-Methane Organic Gas Test Procedures," last amended August 5, 1999. Based on the test data submitted and on further discussions with both the vehicle manufacturer and California Analytical (the manufacturer of the instrument), the ARB determined that the proposed use of the INNOVA instrument when specifically configured is an equivalent method of measuring ethanol exhaust and evaporative emissions. Consequently, the request was approved with certain qualifications.

The purpose of this Mail-Out is to inform all affected vehicle manufacturers that the INNOVA instrument (Model 1312, 1312-A or equivalent) can be used to measure ethanol exhaust and evaporative vehicle emissions as detailed in the attachment.

If you have any questions or comments regarding this Mail-Out, please call Mr. Duc Nguyen, Manager, Certification Section, or Mr. Shewen Chen, Staff Engineer, at (626) 575-6661, or by e-mail at [schen@arb.ca.gov](mailto:schen@arb.ca.gov).

Sincerely,

R. B. Summerfield, Chief  
Mobile Source Operations Division

Attachment

## **ATTACHMENT**

### **USE OF INNOVA PHOTOACOUSTIC MULTI-GAS MONITOR TO MEASURE ETHANOL EXHAUST AND EVAPORATIVE VEHICLE EMISSIONS**

**INSTRUMENT:** INNOVA Model 1312, 1312-A or equivalent by California Analytical Instruments.

**CONFIGURATION:** At a minimum, the instrument must be equipped with appropriate INNOVA infrared filters to permit analysis for ethanol and to provide corrections to the ethanol signal for the presence of water, carbon dioxide and ammonia. The instrument may be additionally equipped with an INNOVA filter to correct for the presence of methanol or other interfering substances.

**QUALIFICATIONS:**

1. The use of the subject INNOVA instrument and its associated configuration in measuring ethanol exhaust and evaporative vehicle emissions has been demonstrated to be equivalent to the method specified in ARB Method 1001 of the "California Non-Methane Organic Gas Test Procedures" using midget impinger samplers and GC analysis.
2. The INNOVA instrument may be used for certification testing, manufacturer in-use verification testing, manufacturer in-use confirmatory testing and ARB in-use compliance testing for E100 (100% ethanol), E85 (85% ethanol and 15% gasoline), and E10 (10% ethanol and 90% gasoline) test fuels as specified in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted on August 5, 1999.
3. The INNOVA instrument may be used for research testing of fuels from E100 to E10 provided that ethanol is the only oxygenate apart from trace amounts of other alcohols. The content of other alcohols shall not exceed 2% (by volume) of the ethanol content of the fuel. Additional test data is required to demonstrate equivalency for fuels with ethanol content below that of E10.
4. The INNOVA instrument, as configured above, may not be used for testing to determine a reactivity adjustment factor or for research work where the concentration of other alcohols must be measured.
5. For exhaust testing, the INNOVA ethanol measurement, which could also contain trace signals from other alcohols, shall be counted as all ethanol. Additionally, the INNOVA measurement shall be used for calculating the dilution factors. A separate methanol measurement is not required.

6. Because of the inherent calibration stability of the INNOVA instrument, calibration checks may be performed less frequently.
  - a. For exhaust emission measurements, the INNOVA instrument shall be calibration adjusted (zero and span checked and, if needed, adjusted) before the test, and the calibration shall be checked (zero and span) after the test rather than checking the calibration before and after each sample.
  - b. For hot soak evaporative emission measurements, the INNOVA instrument shall be calibration adjusted (zero and span checked and, if needed, adjusted) before the test, and the calibration shall be checked (zero and span) after the test rather than after each sample.
  - c. For diurnal evaporative emission measurements, the INNOVA instrument shall be calibration adjusted (zero and span checked and, if needed, adjusted) before measuring each required sample, and the calibration shall be checked (zero and span) after each required sample.
  - d. For running loss or onboard refueling vapor recovery emission measurements, the INNOVA instrument shall be calibration adjusted (zero and span checked and, if needed, adjusted) before the test. No calibration check is needed after the test.
  - e. Quality control calibration curve checks are still required periodically per applicable test procedures.