State of California
AIR RESOURCES BOARD

RESOLUTION 80-8

April 23, 1980

WHEREAS, Section 39601 of the Health and Safety Code authorizes the Air Resources Board to adopt standards, rules, and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, Sections 43101 and 43104 of the Health and Safety Code authorize the Board to adopt vehicle emission standards and test procedures in order to control or eliminate air pollution caused by motor vehicles;

WHEREAS, the California Environmental Quality Act and Board regulations require that an activity not be adopted as proposed where the activity will have significant adverse environmental impacts and alternatives or feasible mitigation measures to the proposed activity exist;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of the Administrative Procedure Act (Government Code, Title 2, Division 3, Part 1, Chapter 4.5);

WHEREAS, the Board finds:

That more than 96% of California's 1980 certification fleet complies with the two gram evaporative emission standard without any allowance for non-fuel emissions from paints, plastics, lubricants and rubber components (background emissions);

That vehicle manufacturers are able to reduce and stabilize background emissions through various aging and cleaning techniques;

That the United States Environmental Protection Agency has adopted for 1981 and newer light-duty vehicles and light-duty trucks (includes passenger cars and medium-duty vehicles, respectively), an evaporative emission standard of two grams per test without any allowance for background emissions;

That the background emissions allowance of one gram per test as permitted under current test procedures is not necessary;

That this action will have no significant adverse environmental effects.

NOW, THEREFORE, BE IT RESOLVED, that the Board hereby amends its regulations in Article 2, Subchapter 1, Chapter 3 of Title 13, California Administrative Code as follows:

Amend Section 1976(c) as follows:

1976 [Standards and Test Procedures for Fuel Evaporative Emissions from Gasoline-Powered Vehicles.]

(c) The procedure for determing compliance with these standards is set forth in "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Gasoline-Powered Motor Vehicles" adopted by the Air Resources Board on April 16, 1975, as amended May 14, 1975, March 31, 1976 October 5, 1976, November 23, 1976, June 8, 1977, December 19, 1977, and October 12, 1979, and April 23, 1980.

BE IT FURTHER RESOLVED, that the Board hereby adopts the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Gasoline-Powered Motor Vehicles" dated April 16, 1975, as last amended April 23, 1980.

BE IT FURTHER RESOLVED, that the Board finds that these regulations are, individually and in the aggregate, at least as protective overall of public health as comparable federal regulations

I certify that the above is a true and correct copy of Resolution 80-8, as adopted by the Air Resources Board.

Sally Rump

Sally Rump
Board Secretary

May 8, 1980

State of California
AIR RESOURCES BOARD

Note: These procedures are printed in a style to indicate the adopted changes. New text is underlined and deleted portions are noted.

CALIFORNIA EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR 1978 AND SUBSEQUENT MODEL GASOLINE-POWERED MOTOR VEHICLES

ADOPTED: April 16, 1975
AMENDED: May 14, 1975
AMENDED: March 31, 1976
AMENDED: October 5, 1976
AMENDED: November 23, 1976
AMENDED: June 8, 1977
AMENDED: December 19, 1977
AMENDED: October 12, 1979
AMENDED: April 23, 1980

CALIFORNIA EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR 1978 AND SUBSEQUENT MODEL GASOLINE-POWERED MOTOR VEHICLES

The provisions of Title 40, Code of Federal Regulations (CFR), Part 86, Subparts A and B, as they pertain to evaporative emission standards and test procedures and as they existed on January 28, 1979 are hereby adopted as the California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Gasoline-Powered Motor Vehicles with the following exceptions and additions:

1. These standards and test procedures are applicable to all new 1978 and subsequent model gasoline-powered passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles, and motorcycles which are subject to registration and first sold and registered in this state. These standards and test procedures do not apply to motor vehicles which are exempt from exhaust emission certification. The evaporative emission standards for the following classes of vehicles are:

Class of Vehicle	Model Year	Hydrocarbons (grams per test)
Passenger car Light-duty trucks Medium-duty vehicles Heavy-duty vehicles	1978 and 1979	6.0
Passenger cars Light-duty trucks Medium-duty vehicles Heavy-duty vehicles	1980 and subsequent	2.0
Motorcycles	1983 and 1984	6.0
Motorcycles	1985 and subsequent	2.0

2. The definitions in Section 1900, Title 13, California Administrative Code, and in the applicable model year California exhaust emission standards and test procedures, are hereby incorporated into this test procedure by reference.

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Passenger cars Light-duty trucks Medium-duty vehicles Heavy-duty vehicles	1980 and subsequent	2.0
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Motorcycles	1985 and subsequent	2.0

2. The definitions in Section 1900, Title 13, California Administrative Code, and in the applicable model year California exhaust emission standards and test procedures, are hereby incorporated into this test procedure by reference.

3. Approval of medium-duty vehicles shall be based on the same standards and test procedures as light-duty trucks. In selecting medium-duty test vehicles the Executive Officer shall consider the availability of test data from comparably equipped light-duty vehicles and the size of medium-duty vehicles as it relates to the practicability of evaporative emission testing.

4. <u>For all motor vehicles except motorcycles:</u>

Demonstration of system durability and determination of an evaporative emission deterioration factor for each evaporative emission engine family shall be based on tests of representative vehicles and/or systems. For purposes of evaporative emission durability testing a representative vehicle is one which, with the possible exception of the engine and drive train, was built at least three months prior to the commencement of evaporative emission testing, or is one which the manufacturer demonstrates has stabilized non-fuel-related evaporative emissions.

a. For 1978 model evaporative emission engine families which require durability testing for exhaust emissions certification, either

i. Evaporative emission testing shall be conducted on all durability vehicles at the 5,000, 10,000, 20,000, 30,000, 40,000 and 50,000 mile test points. Testing may be performed at more frequent intervals with advance written approval from the Executive Officer. The results of all valid evaporative emission tests within each evaporative emission engine family shall be plotted as a function of mileage, and a least-squares fit straight line shall be drawn through the data. The evaporative emission deterioration factor is defined as the interpolated 50,000 mile value on that line minus the interpolated 4,000 mile value on that line, but in no case shall the factor be less than zero. The interpolated 4,000 and 50,000 mile points on this line must be within the standards of Paragraph 1 or the data will not be acceptable for use in the calculation of a deterioration factor, unless no applicable data point exceeded the standard.

OR

ii. The manufacturer shall propose in his preliminary application for approval a method for durability testing and for determination of a deterioration factor for each evaporative emission engine family. The 4,000 and 50,000 mile test points (or their

equivalents) used in determining the deterioration factor must be within the standards of Paragraph 1 or data will not be acceptable for use in the calculation of a deterioration factor. The Executive Officer shall review the method, and shall approve it if it meets the following requirements:

A. The method must cycle and test the complete evaporative emission control system for the equivalent of at least 50,000 miles of typical customer use.

B. The method must reflect the flow of liquid and gaseous fuel through the evaporative emission control system, and the exposure (both peak and cyclical) to heat, vibration, and ozone expected through 50,000 miles of typical customer use.

C. The method must have the specifications for acceptable system performance, including maximum allowable leakage after 50,000 miles of typical customer use.

No evaporative emission control system durability testing shall be required for 1978 model year vehicles which do not require exhaust emission control system durability testing, unless the Executive Officer determines that durability performance is likely to be significantly inferior to 1977 model year systems.

b. For 1979 and later model evaporative emission engine families, both (4) (a) (i) and (4) (a) (ii) shall apply to all families selected for exhaust emission durability testing, and (4) (a) (ii) shall apply to those evaporative emission engine families which are not subject to testing for exhaust emission durability. The deterioration factors determined under (4) (a) (i), if any, shall be averaged with the deterioration factors determined under (4) (a) (ii) to determine a single evaporative emission deterioration factor for each evaporative emission engine family.

5. Approval of heavy-duty vehicles, excluding medium-duty vehicles, shall be based on an engineering evaluation of the system and data submitted by the applicant. Such evaluation may include successful public usage on light-duty or medium-duty vehicles, adequate capacity of storage containers, routing of lines to prevent siphoning, and other emissions-related factors deemed appropriate by the Executive Officer.

equivalents) used in determining the deterioration factor must be within the standards of Paragraph 1 or data will not be acceptable for use in the calculation of a deterioration factor. The Executive Officer shall review the method, and shall approve it if it meets the following requirements:

A. The method must cycle and test the complete evaporative emission control system for the equivalent of at least 50,000 miles of typical customer use.

B. The method must reflect the flow of liquid and gaseous fuel through the evaporative emission control system, and the exposure (both peak and cyclical) to heat, vibration, and ozone expected through 50,000 miles of typical customer use.

C. The method must have the specifications for acceptable system performance, including maximum allowable leakage after 50,000 miles of typical customer use.

No evaporative emission control system durability testing shall be required for 1978 model year vehicles which do not require exhaust emission control system durability testing, unless the Executive Officer determines that durability performance is likely to be significantly inferior to 1977 model year systems.

b. For 1979 and later model evaporative emission engine families, both (4) (a) (i) and (4) (a) (ii) shall apply to all families selected for exhaust emission durability testing, and (4) (a) (ii) shall apply to those evaporative emission engine families which are not subject to testing for exhaust emission durability. The deterioration factors determined under (4) (a) (i), if any, shall be averaged with the deterioration factors determined under (4) (a) (ii) to determine a single evaporative emission deterioration factor for each evaporative emission engine family.

5. Approval of heavy-duty vehicles, excluding medium-duty vehicles, shall be based on an engineering evaluation of the system and data submitted by the applicant. Such evaluation may include successful public usage on light-duty or medium-duty vehicles, adequate capacity of storage containers, routing of lines to prevent siphoning, and other emissions-related factors deemed appropriate by the Executive Officer.

6. ~~Commencing with~~ For the 1980 model year, the measured evaporative emissions from all test vehicles, except vehicles tested pursuant to paragraph (4) above and motorcycles, shall be corrected for background emissions by subtracting 1.0 grams per test. This correction for background emissions may be extended to include the 1981 model year, on a case-by-case basis, if the Executive Officer finds that a manufacturer has had insufficient lead-time to comply with the April 23, 1980 amendment to this procedure.

7. For the purposes of these test procedures, the following references in 40 CFR, Part 86, Subpart B to light-duty vehicle evaporative testing shall also apply to motorcycles: 86.117-78, and 86.121.78. In addition, 40 CFR, part 86, subparts E, F, and other cited sections of subpart B are incorporated into this test procedure by reference.

8. Certification of a motorcycle evaporative emission control system requires that the manufacturer demonstrate the durability of each evaporative emission control system family.

The motorcycle manufacturer can satisfy the vehicle durability testing requirement by performing an evaporative emission test at each scheduled exhaust emission test (86.427-78) during the motorcycle exhaust emissions certification test (86.424-78) for each evaporative emission family. The minimum mileage accumulated shall be the total test distance (one-half the useful life distance), although the manufacturer may choose to extend the durability test to the useful life distance (86.436-78). The displacement classes and test distances are shown below:

a. i.

Displacement Class	Engine Displacement Range (CC)	Total Test Distance (km)	Useful life Distance (km)
I	50-169	6,000	12,000
II	170-279	9,000	18,000
III	280 and greater	15,000	30,000

ii. All durability vehicles shall be built at least one month before the evaporative emissions test, or the manufacturer must demonstrate that the non-fuel related evaporative emissions have stabilized.

iii. Testing at more frequent intervals than the scheduled exhaust emissions tests may be performed only when authorized in writing by the Executive Officer.

iv. The deterioration factor shall be determined by calculating a least-squares linear regression of the evaporative emissions data with respect to mileage. The deterioration factor is defined as the extrapolated (from the regression) value at the useful life distance minus the interpolated value at the total test distance, where these distances are taken from the table in Paragraph (8)(a)(i).

v. The extrapolated useful life and total test distance emissions shall be less than the applicable evaporative emission standards of Section 1 or the data will not be acceptable for use in the calculation of a deterioration factor.

vi. Motorcycle manufacturers shall also propose in their application a method for durability testing and determination of a deterioration factor for each evaporative emission engine family that is similar to the requirements specified in Paragraph (4) (a) (ii). Any reference to 4,000 miles and 50,000 miles in Paragraph (4) (a) (ii) shall mean total test distance and useful life distance respectively as defined in Paragraph (8)(a)(i) for the appropriate engine displacement class.

vii. The deterioration factor determined under Paragraph (8)(a)(iv) shall be averaged with the deterioration factor determined under Paragraph (8)(a)(vi) to determine a single evaporative emission deterioration factor for each evaporative emission engine family.

viii. The emission label (86.413-78) shall identify the evaporative emission family.

ix. Preconditioning shall be performed in accordance with 86.532-78. The provisions of 86.132-78 which prohibit abnormal system loading during fueling and setting the dynamometer horsepower using a test vehicle shall be observed. Additional preconditioning (86.132-78, 3) may be allowed by the Executive Officer under unusual circumstances.

b. Instrumentation

The instrumentation necessary to perform the motorcycle evaporative emission test is described in 40 CFR, Section 86.107-78 with the following changes:

i. Revise Section (a) (4) to read: Tank fuel heating system. The tank fuel heating system shall consist of two separate heat sources with two temperature controllers. A typical heat source is a pair of heating strips. Other sources may be used as required by circumstances and the Executive Officer may allow manufacturers to provide the

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heating apparatus for compliance testing. The temperature controllers may be manual, such as variable transformers, or they may be automated. Since vapor and fuel temperature are to be controlled independently, an automatic controller is recommended for the fuel. The heating system must not cause hot spots on the tank wetted surface which could cause local overheating of the fuel or vapor. Heating strips for the fuel, if used, should be located as low as practicable on the tank and should cover at least 10 percent of the wetted surface. The centerline of the fuel heating strips, if used, shall be below 30% of the fuel depth as measured from the bottom of the fuel tank and approximately parallel to the fuel level in the tank. The centerline of the vapor heating strips if used, should be located at the approximate height of the center of the vapor volume. The temperature controller must be capable of controlling the fuel and vapor temperatures to the diurnal heating profile within the specified tolerance.

ii. Revise section (a) (5) (Temperature recording system) to read: In addition to the specifications in this section, the vapor temperature in the fuel tank shall be measured. When the fuel or vapor temperature sensors can not be located in the fuel tank to measure the temperature of the prescribed test fuel or vapor at the approximate mid-volume sensors shall be located at the approximate mid-volume of each fuel or vapor containing cavity. The average of the readings from these sensors shall constitute the fuel or vapor temperature. The fuel and vapor temperature sensors shall be located at least one inch away from any heated tank surface. The Executive Officer may approve alternate sensor locations where the specifications above cannot be met or where tank symmetry provides redundant measurements.

iii. Calibrations shall be performed in accordance with 86.516-78 sections b, c(1), and c(3).

c. Test Procedure

i) The motorcycle exhaust emission test sequence is described in 40 CFR 86.530-78 through 86.540-78. The evaporative emission test shall be accomplished by performing a diurnal evaporative emission test (86.133-78 except sections a(1); K; and p; and neglecting references to windows and luggage compartments) after preconditioning and soak but to cooled to below 30°C after the diurnal test. The "cold" and "hot" start exhaust emission tests shall then be run. The motorcycle will then be returned to the SHED for the hot soak evaporative emission test. This general sequence is shown in figure B78-10 under 86.130-78. The specified time limits shall be followed with the exception of soak times which are specified in 86.53278 for motorcycles.

Running loss tests, when necessary, will be performed in accordance with 86.134-78, except references to 86.135-78 through 86.137-78 shall mean 86.535-78 through 86.537-78.

ii) The fuel and vapor temperatures for the diurnal portion of the evaporative emission test shall conform to the following functions within ± 1.7°C with the tank filled to 50% ± 5 2.5 of its actual capacity, and with the motorcycle resting on its center kickstand (or a similar support) in the vertical position.

$$T_f = (1/3)\ t + 15.5°C$$

$$Tv = (1/3)\ t + 21.0°C$$

where T_f = fuel temperature, °C

Tv = vapor temperature, °C

t = time since the start of the diurnal temperature rise, minutes

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where T_f = fuel temperature, °C

Tv = vapor temperature, °C

t = time since the start of the diurnal temperature rise, minutes

The test duration shall be 60 ± 2 minutes, giving a fuel and vapor temperature rise of 20°C. The final fuel temperature shall be 35.5 °C ± .5°C.

An initial vapor temperature up to 5°C above 21°C may be used. For this condition the vapor shall not be heated at the beginning of the diurnal test. When the fuel temperature has been raised to 5.5°C below the vapor temperature by following the T_f function the remainder of the vapor heating profile shall be followed.

iii. An alternate temperature rise for the diurnal test may be approved by the Executive Officer. If a manufacturer has information which shows that a particular fuel tank design will change the temperature rise significantly from the function above, the manufacturer may present the information to the Executive Officer for evaluation and consideration.

iv. The hot soak evaporative emission test shall be performed immediately following the "hot" start exhaust emission test. This test is described in 86.138-78, except for item (d) which is revised to require that the motorcycle be pushed with the engine off rather than driven at minimum throttle from the dynamometer to the SHED.

v. Calculations shall be performed in accordance with 86.143-78, except the standard volume for a motorcycle shall be 5 $ft.^3$ instead of 50 ft^3.

d. Motorcycle manufacturers with annual sales of less than 2,000 units for the three displacement classes in California are not required to submit the information specified by these test procedures to the Executive Officer. However, all information required by these test procedures must be retained on file and be made available upon request to the Executive Officer for inspection. These manufacturers shall submit the following information for evaporative emission certification:

i. A brief description of the vehicles to be covered by the Executive Order. (The manufacturer's sales data book or advertising including specifications will satisfy this requirement for most manufacturers.)

ii. A statement signed by an authorized representative of the manufacturer stating "The vehicles described herein have been tested in accordance with the provisions of the 'California Evaporative Emission Standards and Test Procedures For 1978 and Subsequent Model Gasoline-Powerd Motor Vehicles,' and on the basis of those tests are in conformance with the aforementioned standards and test procedures."

Definitions:

Motorcycle Evaporative Emission Family: The group of motorcycle models which meet the criteria of EPA's MSAPC Advisory Circular #59, Section D.

ii. A statement signed by an authorized representative of the manufacturer stating "The vehicles described herein have been tested in accordance with the provisions of the 'California Evaporative Emission Standards and Test Procedures For 1978 and Subsequent Model Gasoline-Powerd Motor Vehicles,' and on the basis of those tests are in conformance with the aforementioned standards and test procedures."

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State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider Changes to Evaporative Emission Regulations for 1981 and Subsequent Model-Year Motor Vehicles.

Public Hearing Date: April 23, 1980

Response Date: April 23, 1980

Issuing Authority: Air Resources Board

Comment: None

Response: N/A

Certified: Sally Rump

Date: May 8, 1980

State of California

Memorandum

To : Huey D. Johnson
Secretary
Resources Agency

Date : May 8, 1980

Subject : Filing of Notice of Decision of the Air Resources Board

From : Air Resources Board

Pursuant to Title 17, Section 60007(b), and in compliance with Air Resources Board certification under section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decision and response to environmental comments raised during the comment period.

Sally Rump

Sally Rump
BOARD SECRETARY

attachments
Resolution 80-6
[redacted]
Resolution 80-10
Resolution 80-25