STATE OF CALIFORNIA—RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

AIR RESOURCES BOARD LABORATORY
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June 18, 1981

TO: ALL MOTORCYCLE MANUFACTURERS

Subject: California Motorcycle Certification Procedures

Applicability: 1982 and subsequent model year motorcycle exhaust emission control systems and 1983 and subsequent model year motorcycle evaporative emission control systems

Reference:

1. Title 13, California Administrative Code, Section 1958.
2. Title 13, California Administrative Code, Section 1976.
3. Title 13, California Administrative Code, Sections 2035, 2036, 2037, 2038, 2039, 2041, and 2042.
4. Title 13, California Administrative Code, Section 2290.
5. California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Gasoline-Powered Motor Vehicles as last amended on October 27, 1980.
6. California Motor Vehicle Tune-up Label Specifications dated March 1, 1978.
7. Executive Order G-70-16-E Relating to the Establishment of a Schedule of Compliance with the Air Resources Board's "Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks" for 1983 and Subsequent Model Year Motorcycles.
8. Various Manufacturers Advisory Correspondence listed in Appendix A.

Background

California and federal certification of motorcycle exhaust emission control systems started with the 1978 model year. The standards and test procedures for California and for the other 49-states were identical for the 1978 through 1981 model years. The certification process has been conducted by EPA, and the certificate of conformity issued by EPA has been accepted as equivalent to California certification.

Beginning with the 1982 model year, California exhaust emission standards become more stringent than the federal standards. Also, beginning with the 1983 model year, California has adopted standards for evaporative emissions. There are no federal standards for motorcycle evaporative emissions.

Manufacturers are currently planning for the 1982/1983 model year motorcycle certification. Recently, a number of inquiries were made to the ARB staff regarding possible differences and/or additions to the current test procedures (exhaust and evaporative) and administrative protocols which may result from the separate California certification. A workshop was held on November 17, 1980, to discuss these issues raised by the manufacturers.

This Manufacturers Advisory Correspondence outlines policies and suggested procedure guidelines to be utilized for motorcycle certification.

A. MOTORCYCLE CERTIFICATION POLICIES AND GUIDELINES

General

1. ARB will follow the certification process currently utilized for federal certification.[1] The federal certification application format shall be utilized.[2] In addition to the information currently included in the application, Section Nine of the federal protocol shall be used for evaporative family description and Section Thirteen shall be used for evaporative emission control deterioration program and data. Any submissions uniquely required for California which do not appropriately fit into designated sections shall be included in Section Seventeen.

[1] 40 CFR, Part 86, Subparts E and F, as they existed on April 15, 1978.

[2] Application Format for Certification of Motorcycles--1982 Model Year--Environmental Protection Agency.

2. The Manufacturer's Advisory Correspondence (MAC) system is utilized by ARB to convey to manufacturers any policies or procedure clarifications as the need arises. A number of these documents have been issued in the past for motorcycles and some which have been issued for other types of vehicles are now applicable to motorcycles. A list of these MAC's is included as Appendix A.

3. The submission of vehicle identification numbers (Ref: 40 CFR 414) and production reports (Ref: 40 CFR 415) are covered by MAC 79-6 dated May 30, 1979.

4. The outlier procedure will not be utilized for evaluation of data for determination of deterioration factors.

5. The federal "Standardized Engine Family Name" system may be used to designate California engine families.

6. Manufacturers are reminded that the provisions of Section 2035 et. seq., Title 13, California Administrative Code, relating to emission control system warranty are applicable to motorcycles. MAC 79-8 gives additional information.

7. Compliance with fuel tank fillpipes per Section 2290, Title 13, California Administrative Code, will be required in 1983 for Class I and II motorcycles and in 1984 for Class III motorcycles. Executive Order G-70-16-E, dated July 3, 1980, and MAC 76-1, provide further details.

8. A tune-up label vacuum routing diagram will be required unless the only vacuum controlled device is distributor vacuum advance.

B. <u>EXHAUST EMISSION CONTROL SYSTEM CERTIFICATION</u>

1. ARB will utilize EPA policies relative to carry-over, carry-across, test vehicle selection and engine family determiners.

2. Data from previous model year 49 state, 50 state or California service accumulation vehicles may be utilized for deterioration factor determination provided the engine family criteria and carry-over/carry-across criteria are met.

3. When the service accumulation vehicle does not meet California standards because it is a federal configuration, a new stabilized vehicle may be utilized to demonstrate compliance with California standards. A representative vehicle which has accumulated the minimum test distance[3)] will be considered to be stabilized. This vehicle shall be the worst case California configuration.

   An emission test shall be conducted on the stabilized vehicle after the minimum test distance has been accumulated. This test must be conducted at an accumulated distance within 240 kilometers (155 miles) of the nominal minimum test distance. This test will be the official test.

   The emission results of each pollutant obtained from the official test will be multiplied by the deterioration factor to determine the useful life emissions. The useful life emissions must be equal to or less than the applicable California standards.

   The deterioration factor (DF), to be applied to the stabilized vehicle test data, shall be computed using emissions data from the service accumulation vehicle.

   DF - extrapolated useful life distance emissions divided by the interpolated minimum test distance emissions.

4. A diurnal heat build will be required on all exhaust emission test vehicles which are equipped with evaporative emission controls, even if an evaporative emission (SHED) test is not required.

C. EVAPORATIVE EMISSION CONTROL SYSTEM CERTIFICATION

1. Evaporative emission control systems are to be designated by "Evaporative Emission Family". The criteria for family determination are delineated in EPA MSAPC A/C 59, Section D. In addition, the engine family displacement class will be a family determiner. The family description information shall be included in Section 9 of the application for certification. The EPA format for certification of light-duty vehicles should be used as a guide for motorcycle evaporative family information. The evaporative emission control deterioration program is to be included in Section 13. Include a complete description of the method used to calculate the evaporative emission deterioration factor. Describe in detail the test procedures used, the data generated and complete deterioration factor calculation.

[3)] Minimum test distance (Ref: 40 CFR 86.427)

Class	Distance (Kilometers)
I	2500
II	2500
III	3500

2. Carry-over and carry-across between families will be allowed if the family determiners are identical, or are similar enough to be judged to have the same deterioration characteristics. Some criteria for judging similarity are included in Appendix B.

3. Evaporative emission vehicle selection will be based on worst case criteria. Appendix C contains the criteria for determination of worst case vehicle configuration.

4. The test procedures for motorcycle evaporative emission control systems are contained in "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Gasoline-Powered Motor Vehicles". Incorporated by reference in these procedures are sections of 40 CFR, Part 86, Subpart B, "Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures". Since these test procedures were for light-duty vehicles, the following test specifications are to clarify the application of the procedures to motorcycle testing.

   a. The procedures require that the vehicle be in the vertical position for the diurnal portion of the evaporative emissions test. Either the center stand or side stand may be used during hot soak.

   b. The temperature of the fuel used for vehicle preconditioning need not be controlled. The temperature of the fuel used for the evaporative emission test must meet the procedure specification.

   c. The test procedures specify that the fuel tank cap not be installed until the fuel has reached a specified temperature. In order to prevent possible fuel spillage, a vented cap may be installed while the vehicle is moved from the fueling area to the SHED test area.

   d. Exhaust emissions are to be measured and the data reported for the CVS test between the diurnal and the hot soak tests even if the test is being conducted for evaporative emissions only.

   e. The test procedures for light-duty vehicles allow only two minutes from the end of the exhaust emission test to the sealing of the SHED doors. For motorcycles, the allowable time shall be four minutes $\pm$ one minute. However, the motorcycle's engine shall be turned off at the end of the exhaust emissions test (no idling). Also, the CVS blower and exhaust evacuation fan shall be turned off at the end of the exhaust emissions test.

f. If the manufacturer believes that the heating strip locations specified in the procedures are not applicable to a particular tank configuration, alternate locations may be proposed.

g. All fuel tanks on the vehicle (auxiliary, spare, etc.) must be heated to the temperature profile specified in the procedures.

h. The manufacturer may control the tolerance of the positioning of the temperature sensors. However, ARB will not necessarily conform to these location tolerances during testing at the ARB facility. If a manufacturer believes that ARB's temperature sensor locations would cause failed tests, the manufacturer may provide a fuel tank with accurately located sensors.

i. The initial vapor temperature defined by the procedure temperature profile is 21°C ± 1.7°. There is also a provision for an initial vapor temperature up to 5°C above 21°C. Therefore, the initial vapor temperature may be between 19.3°C and 26°C. However, if the vapor temperature should rise above 26°C before 9.9 minutes of the diurnal heat build has elapsed, the test would be void.

j. Running loss tests may be required. If the specified procedures lead to vehicle operational problems, the manufacturer may propose alternate procedures.

k. The manufacturer may conduct evaporative emission testing to the useful life point (as provided in 40 CFR 86-435 and 86-436).

5. The evaporative emission family deterioration factor (D.F.) is the average of the D.F. derived from the service accumulation vehicle and the D.F. derived from bench testing.

a. The D.F. will be applied to the official evaporative emission test data from the service accumulation vehicle.

b. If there is no exhaust service accumulation vehicle, the evaporative D.F. will be that derived from the bench test. This D.F. will be applied to the test data from a stabilized vehicle evaporative emission test.

c. A <u>bench</u> test is always required. A <u>vehicle</u> test <u>only</u> is not acceptable for the determination of the evaporative D.F.

d. The April 1, 1981, "Component Bench Test for Evaporative Emissions Control Systems 1983 and Subsequent Model Year Motorcycles" is revised to delete the requirement for two test points between the minimum test distance point and the total test distance point. The bench deterioration factor (DF_B) shall be the extrapolated useful life distance emissions minus the interpolated total test distance emissions based on the average minimum test distance data, the average maintenance test distance data (if any) and the average total test distance data.

e. Evaporative testing may be conducted to the useful life distance. In this case, the total test distance emissions must be less than the standard.

6. The following are clarifications to the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Gasoline-Powered Motor Vehicles"

a. Section 8.b.i indicates that the Executive Officer may allow manufacturers to provide the tank heating apparatus. This provision permits the manufacturer to use alternate heat sources/temperature controllers if necessary due to tank/vehicle configuration. The Executive Officer retains the option to review the system to determine that it will not produce unrepresentative data.

b. Section 8.c.i requires that the fuel be cooled to below 30°C after the diurnal test. The manufacturer may elect not to cool the fuel. The data generated will be acceptable in either case.

c. Section 8.c.ii specifies fuel and vapor temperatures, temperature tolerances, temperature rise profiles, final temperatures and fuel/vapor temperature relationships. The combination of these parameters is inconsistent due to fuel/vapor temperature rise specification of 20°C. If the 20°C specification is exceeded, the data generated will be acceptable if the test time and temperatures are within the specified tolerances.

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Attachments

Appendix A

Manufacturers Advisory Correspondence List

76-1	Fuel Tank Fill Pipe Application Format
77-8	Definition of Motorcycle Model
79-1	Submission of Warranty Information
79-6	Vehicle Identification Numbers
79-8	Motorcycle Warranty
80-1	Alternate Dirunal Temperature Profile
80-002	Tune-up Label Specifications
80-004	California Warranty Regulations

Appendix B

Criteria For Grouping of Evaporative Emission Family Characteristics

Evaporative emission family determination for evaporative emission control systems is based on EPA MSAPC Advisory Circular 59, Section D.* When these characteristics are applied to motorcycle evaporative emission control systems a large number of families are created. The following criteria may be used group families which are essentially equivalent with respect to the generation of data for deterioration factor determination.

1. Vapor storage device working capacity within 30 grams.
2. Carburetor bowl volume within 25 cc.
3. Carburetor vent. (Internal or External)
4. Engine displacement class - if identical evaporative families are used with engine families of more than one displacement class, the D. F. determined from the highest displacement class may be used.

*Accelerator pump will not be a family determiner.

Appendix C

Criteria For Motorcycle Test Vehicle Selection For Evaporative Emissions

In order to demonstrate compliance with standards, the evaporative emission control system must be tested on a representative vehicle and the evaporative emissions measured. The vehicle emission control system configuration is to be that configuration which is expected to have the greatest probability of exceeding the standard (worst case). The following may be used in evaluation of evaporative emission control systems in order to select worst case configuration. The list is not in order of priority.

Component		Characteristic
Canister	1.	Smallest working capacity
	2.	Synthetic carbon
Carburetor	1.	Largest number of carburetors
	2.	Largest bowl volume
	3.	Bowl location which is exposed to highest heating
	4.	With accelerator pump
Fuel Tank	1.	Largest capacity tank
	2.	Metal tank
	3.	Without liner
	4.	Without vapor control baffle
	5.	Vented fill pipe cap
	6.	Tank location which is exposed to highest heating
Vapor Transmission System	1.	Uncontrolled purge

The manufacturer shall prioritize the evaporative characteristics in order to determine the worst case vehicle configuration to be based on the individual design of the manufacturer's systems. The manufacturer may determine the worst case vehicle configuration based on performance evaluation of emission test results or technical evaluations.