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STATE OF CALIFORNIA—RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

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TO: ALL MOTORCYCLE MANUFACTURERS

Enclosed please find our final "Component Bench Test For Evaporative Emissions Control System". The conditions stated in this enclosure are the minimum standards acceptable to the Air Resources Board for determining evaporative emissions bench test deterioration factors.

All questions regarding these standards should be directed to John McClendon, Manager, Engineering Evaluation Section (213) 575-6848 or Richard Kenny (213) 575-6847.

K. D. Drachand, Chief
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Enclosure

Revised April 1, 1981

Component Bench Test
For
Evaporative Emissions Control Systems
1983 and Subsequent Model Year Motorcycles

Objective: This Bench Test Procedure is acceptable for the determination of a bench test deterioration factor (DF_B) for evaporative emissions control systems.

Applicability: All 1983 and subsequent Model Year Motorcycles

Reference: "California Evaporative Emissions Standards and Test Procedures for 1978 and Subsequent Model Year Gasoline-Powered Motor Vehicles" dated June 26, 1980.

Introduction: The need for a standard bench test procedure for evaporative emissions control system components arose when the motorcycle manufacturers were required to calculate deterioration factors based on actual mileage accumulation as well as bench testing of evaporative emissions components as cited in the above mentioned reference. The following are acceptable methods for bench tests to determine DF_B.

General Conditions: All evaporative emissions control system components will be assembled as a complete system and will remain in those sets. Three sets of appropriate components will be bench aged for each applicable evaporative family. Each set will be installed and tested, one set after another, on a stabilized motorcycle. A stabilized motorcycle is defined as a motorcycle which is stabilized for all hydrocarbon emitting substances to avoid/minimize background variations. The evaporative emission control system will NOT be pressure tested. All failures of bench test components will require failure analysis and corrective action.

All plastic and rubber parts shall meet ASTM applicable standards for automotive parts and shall withstand ozone exposure according to ASTM (D-1171) with no deterioration for the useful life of the motorcycle.

Evaporative emission test procedures will be performed as per applicable sections of 40 CFR 86. A total of four evaporative emissions tests will be performed for each set. The test points are at the minimum test distance, the total test distance and at two equidistanced points in between.

The bench deterioration factor (DF_B) shall be determined by calculating a least-squares linear regression of the evaporative emissions data with respect to distance. The DF_B is defined as the extrapolated (from the regression) value at the useful life distance minus the interpolated value at the total test distance.

The minimum test, total test and useful life distances are defined as follows:

Displacement Class	Engine Displacement Range (cc)	Minimum Test Distance (km)	Total Test Distance (km)	Useful Life Distance (km)
I	50-169	2,500	6,000	12,000
II	170-279	2,500	9,000	18,000
III	> 280	3,500	15,000	30,000

Bench Tests

The following guidelines are considered to be the minimal conditions accepted by California Air Resources Board (CARB). The motorcycle manufacturer may, at his option, perform bench tests at more severe test conditions.

I Vibration Endurance Test

Applicability: All components (including carburetors

Test Conditions: The evaporative emissions control set will be fixed vertically on a mechanical/hydraulic vibrating table. The table will vibrate vertically at room temperature under the following conditions:

Acceleration:	$\pm$ 5G
Frequency:	20 $\pm$ 5 HZ

A 10 minute test is equivalent to 500 km on the road.

II. Thermal Exposure Tests

Applicability: All Components (including carburetors)
Test Conditions: The evaporative emissions control set will be exposed to the following conditions:

		Temperature °C	Duration (minutes)
1.	Low Temperature	-10 ± 5	20
2.	High Temperature	80 ± 5	20

A cycle is an exposure to low and high temperatures

Each test cycle is equivalent to 500 km on the road

III. Loading and Purging Tests

Applicability: HC storing components.

Test Conditions: A test cycle will include loading the HC storing components with Indolene vapors up to 80% by weight of its maximum storing capacity followed by 10 minutes waiting with the system intake port sealed. Then start purging using a flow rate of 1 ± 0.2 CFM @ 20 ± 5°C for 7.5 minutes.

The method to be used to load the storing components consists of heating a container filled with a pre-measured quantity of Indolene Clear up to 80°C. At 80°C approximately 1/3 of the Indolene will evaporate. The evaporated Indolene should be equivalent to 80% (by weight) of the HC storing capacity of the HC storing components. The Indolene vapors are allowed to enter through the intake of the storing components.

Each test cycle is equivalent to 100 km on the road.

IV Mechanical Endurance Tests

Applicability: All evaporative emissions control system components that move, open or close during a typical urban/suburban driving schedule.

Test Conditions: These components will be tested for mechanical movements identical to real life conditions.

For example: a carburetor throttle link system will be tested as follows:

a) Install carburetor on adaptor plate with production throttle body to manifold gasket mounting bolts and specified mounting torque

b) Install carburetor and adaptor plate assembly to linkage cycle test stand and cycle the throttle from closed to WOT position under the following conditions:

i. Supply Stoddard solvent to the fuel inlet connection of the carburetor at 4 psi.

ii. Adjust torques on throttle shaft at closed and WOT to 4 in. - lb and 25 in. - lb. respectively.

iii. Apply 15" Hg vacuum to carburetor throttle bores at closed throttle position and 0" Hg vacuum at WOT position.

iv. Cycle at a rate of one cycle every 6 sec. with dwell time of 3.5 sec. at closed throttle, 1.5 sec. at WOT position and one sec. total throttle travel time.

The test cycle is to be performed at 20 $\pm$ 5°C and with all external vacuum ports on the carburetor closed.

Each test cycle is equivalent to 1 km on the road.

All control valves (such as: purge control, vacuum switch, Thermal-vacuum switch, bimetal-vacuum switch,....etc.) will be tested for mechanical endurance (open-close) equivalent to minimum and total test distances.

Fuel filler cap - a cycle will consist of physically removing, dipping in gasoline and then reinstalling the cap. Each cycle is equivalent to 100 km on the road.

Evaporative emissions control components not mentioned above or not currently used may be bench tested in a similar manner. The CARB Executive Officer will approve/disapprove such test methods and procedures.