

Emissions from a Suzuki Fronte GX Equipped
with a Prototype 1975 Control Device

February 1973

Alan Whitmyer
Test and Evaluation Branch
Environmental Protection Agency

Background

In late November 1972, U.S. Suzuki Corporation brought two cars to the EPA facility in Ann Arbor for 1973 certification. Suzuki requested that the Test and Evaluation Branch test one of the cars with a device designed to make the car meet the 1975 standards. The device is designed to regulate the air/fuel ratio during accelerations by applying a vacuum to the carburetor float bowl. The length of time during which the vacuum is applied is a function of the throttle opening. During cruise conditions the device has no effect.

Vehicle Description

The test vehicle is a 1973 Suzuki with a 360 cc (21.9 cu. in.) two-stroke engine and a manual transmission (4-speed). The engine is a water-cooled, 3-cylinder, in-line, two-stroke located in the rear of the car. The car has a two-door body with a seating capacity of four persons. It is a right-hand drive vehicle. Weight is 1060 pounds.

Test Program

All tests were conducted as specified in the 1975 Federal Test Procedure (FTP). A Beckman 402 flame ionization detector was used to continuously monitor hydrocarbon emissions. The sample for the FID was taken immediately downstream of the dilution box. A heated sample line was used and the sample was drawn through a transverse probe located in the CVS duct. A total of four tests were run on the car. Inertia weight was set at 1500 pounds.

In the first two tests conducted on the car, it became evident that the car was causing a severe interference problem with the Beckman FID. Due to this interference we were unable to obtain any useful information from the first two heated FID traces.

The third test was run with the hood on the engine compartment closed. This eliminated the interference problem with the FID. At this point, it became evident that the Beckman 402 was badly in need of an overhaul. The remainder of the tests were conducted with the FID built in-house by our laboratory personnel.

The final two tests were conducted with a moderate degree of success. During one test the CVS unit did not begin sampling until approximately 60 seconds into Bag 1. During the next test no heated FID sample was taken for Bag 3.

Results

The emission data obtained is shown in Tables I and II. The vehicle attained 1976 levels of NO_x while failing to meet CO

and HC requirements. A steady deterioration of CO, CO₂, and HC occurred during the testing sequence. Due to problems with the FID and CVS sampling, no single test had complete bag results for both systems. The individual bag results are shown in Table II.

Test #3 gave widely varying results, with bag 2 being much lower for the heated FID and bag 3 results being much higher for the FID. In test #4, the cold bag results were very close to the hot FID results for bags 1 and 2.

Conclusions

Although NO_x levels were well below 1976 standards, the vehicle failed both HC and CO standards.

Due to a lack of valid tests, it is not possible to say whether or not the heated FID gives results that are substantially different from the cold bag results. Because of the electrical interference generated by the engine in this car, it is necessary to shield electrical components being operated in the test cell when the car is being run.

TABLE I
 SUZUKI FRONTE GX
 Mass Emissions, Grams Per Mile
 1975 Federal Test Procedure

Test No.	HC cold bag	HC hot cont.	CO	NOx	CO ₂
16-81	1.86	---	7.06	0.22	372.70
16-89	0.74	---	11.00	0.21	381.12
16-129	---	--invalid	---	---	---
16-133	1.41	---	14.35	0.21	391.16

TABLE II
 SUZUKI FRONTE GX
 Hydrocarbon Mass Emissions, Grams Per Mile
 1975 Federal Test Procedure
 (individual bag data)

Test #	Bag 1		Bag 2		Bag 3	
	cold bag	hot cont.	cold bag	hot cont.	cold bag	hot cont.
16-81	2.84	---	0.15	---	0.71	---
16-89	2.90	---	0.05	---	0.43	---
16-129	---	---	0.23	.055	0.63	2.23
16-133	2.13	2.14	0.08	0.10	3.38	---