Interim Report on Edde Dart

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Background

A request for Environmental Protection Agency testing of a vehicle with an induction system modified by Mr. Robert Edde was received from an acquaintance of Mr. Edde, Mr. Thomas Marks. The Test and Evaluation Branch responded to the request by asking if emission data existed on the vehicle which would indicate low emission potential. Shortly thereafter we were again contacted by Mr. Marks who stated that tests had been run by Scott Research Laboratories.

At a meeting set up at our Ann Arbor laboratory the data was reviewed and the vehicle examined. The Scott test results indicated emission levels of 2.39 grams per mile (gpm) hydrocarbons (HC), 7.43 gpm carbon monoxide (CO) and 2.95 gpm oxides of nitrogen (NO_x) using the 1975 Federal Test Procedure. Since these levels were much lower than the levels of the vehicle (uncontrolled 1964 Dodge Dart) before modification, a series of emission tests were scheduled.

Vehicle Tested

The modifications had been made on a 1964 Dodge Dart equipped with the 170 CID slant six cylinder engine and an automatic transmission. Extensive changes were made in the induction system of the vehicle to lower exhaust emissions. The main feature of the system was a special intake manifold which had been designed to remove liquid fuel from the intake charge. This was accomplished by using a gap which could only be crossed by fuel in the vapor state, suspended in the air charge or clinging to the upper walls of the manifold. Any liquid fuel flowing along the bottom of the manifold fell into the gap and was stored in a reservoir. The object of this approach is to reduce cold start emissions caused by the extra fuel required to allow enough vaporization to occur for combustion. Distribution can also be improved if only vapor reaches the cylinders. Improved distribution allowed the carburetor to be set leaner than is possible with conventional manifolds.

Additional modifications were also made to the carburetor's accelerator pump. No fuel was injected under slow throttle movement. Intake air was heated to improve vaporization.

Test Program

The 1975 Federal Test Procedure was used. A series of three tests were run.

Test Results

Results appear in the table attached. Minor adjustments were made to the vehicle in between tests by Mr. Edde. The data, therefore, does not indicate any repeatability trends.

The hydrocarbon and carbon monoxide levels achieved by the modified Dart are more than 80 percent lower than those which would have been expected from the vehicle before modification. Carbon monoxide levels are 80% lower than those required of new vehicles for model years 1972, 1973 and 1974.

Fuel consumption on the LA4 driving cycle was calculated to be 18.5 mpg using a carbon balance technique.

Conclusions

1. This control system greatly improves emissions over uncontrolled vehicles with conventional induction systems.

2. The system is too complicated and would be too expensive to be considered as a retrofit system for used cars.

3. It is unlikely that this system, by itself, could be optimized to obtain 1975-1976 emission levels.

4. The emission levels achieved with this system indicate a potential for use with 1975-1976 control systems.

1975 Federal Test Procedures

-all data in grams per mile-

Test Number	HC	CO	NO_x
18-0225	1.54	5.97	1.86
12-2212	1.63	7.69	2.40
12-2213	1.51	5.23	2.13
1975 Federal Standards	.41	3.40	3.1
1976 Federal Standards	.41	3.40	.40