

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-97-22
Relating to Exemptions under Section 27156
of the Vehicle Code

BAE TURBOSYSTEMS
"EGR RESTRICTOR PLATE"

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-5;

IT IS ORDERED AND RESOLVED: That the installation of the "EGR Restrictor Plate" manufactured by BAE Turbosystems, of 3032 Kashiwa Street, Torrance, California 90505, and identified by BAE part number 31005 has been found not to reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1981 and 1982 California-certified Allen Coach Works, Inc.'s limousines powered by a Ford Motor Company 302 cubic inch displacement fuel injected engine.

This Executive Order is valid provided that: (1) installation instructions for this device will not recommend tuning the vehicle to specifications different from those submitted by the device manufacturer; (2) that the limousine's curb weight will not exceed 4,980 lbs. (certification test weight of 5,500 lbs.); and (3) that the limousines body was not elongated more than 40 inches.

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board. Exemption of a kit shall not be construed as an exemption to sell, offer for sale, or advertise any component of a kit as an individual device.

This Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE BAE TURBOSYSTEMS EGR RESTRICTOR PLATE.

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provides as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the state board for certification of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been certified by the state board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at El Monte, California, this 17th day of November, 1983.


K. D. Drachand, Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF BAE TURBOSYSTEMS' EGR RESTRICTOR PLATE FOR EXEMPTION FROM
THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION
2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

November 15, 1983

Issue Date: November 15, 1983

EVALUATION OF BAE TURBOSYSTEMS' EGR RESTRICTOR PLATE FOR EXEMPTION FROM
THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION
2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

by

Mobile Source Division

State of California
Air Resources Board
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(This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.)

SUMMARY

BAE Turbosystems has applied for exemption from the prohibitions in Vehicle Code Section 27156 for an EGR restrictor plate. The restrictor plate, BAE part number 31005, has been approved for installation on 1983 model-year Executive Coach Builders, Inc.'s Lincoln Town Car 21" Limousine powered by a Ford Motor Company 302 cubic inch displacement fuel injected engine under Air Resources Board's Executive Order A-248. BAE requested that the restrictor plate also be approved for installation on 1981 and 1982 California-certified Allen Coach Works, Inc.'s Lincoln Limousines powered by a Ford Motor Company 302 cubic inch displacement fuel injected engine, provided that the Limousine's curb weight will not exceed 4,980 lbs. (certification test weight of 5,500 lbs.) and that the Limousine's body was not elongated more than 40 inches.

BAE has submitted data from cold-start CVS-75 emission tests. The tests were performed on a 1983 Lincoln Town Car Limousine. Comparative tests consisted of baseline with the Limousine in the stock configuration (no EGR restrictor plate), and modification (with the EGR restrictor plate installed).

Emission test results submitted by BAE indicate that the restrictor plate, as designed and installed on the test vehicle, will not have an adverse effect on exhaust emissions from vehicles for which exemption is requested.

Based on the above, the staff recommends that BAE Turbosystems be granted an exemption as requested and the Executive Order D-97-22 be issued.

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EVALUATION OF BAE TURBOSYSTEMS' EGR RESTRICTOR PLATE FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

I. INTRODUCTION

BAE Turbosystems, of 3032 Kashiwa Street, Torrance, California 90505, has applied for exemption from the prohibitions in Vehicle Code Section 27156 for an EGR restrictor plate. The restrictor plate, BAE part number 31005, has been approved under Air Resources Board Executive Order A-248 for installation on 1983 model-year Executive Coach Builders, Inc.'s Lincoln Town Car 21" limousine with a curb weight of 4,980 lbs. and powered by a Ford Motor Company 302 cubic inch displacement fuel injected engine. BAE requested that the restrictor plate also be approved for installation on 1981 and 1982 California-certified Lincoln limousines manufactured by Allen Coach Works, Inc.

BAE has submitted data from cold-start CVS-75 emission tests. The tests were performed by Fairway Environmental Engineering in Torrance, California, on a 1983 Lincoln Town Car limousine. Testing consisted of baseline with the limousine in the stock configuration (no EGR restrictor plate), and modification (with the EGR restrictor plate installed).

II. CONCLUSION

Emission test results submitted by BAE indicate that the EGR restrictor plate, as designed and installed on the test vehicle, will not have an adverse effect on exhaust emissions from vehicles for which exemption is requested.

III. RECOMMENDATIONS

Based on the above conclusion, the staff recommends that BAE Turbosystems be granted an exemption as requested and that Executive Order D-97-22 be issued.

IV. EGR RESTRICTOR PLATE DESCRIPTION AND OPERATION

BAE's EGR restrictor plate is designed to be inserted between the original equipment manufacturer (OEM) EGR valve base and intake manifold. The restrictor plate is manufactured of 1/4 inch steel stock and contains four holes: two for mounting screws and two for exhaust gas flow. The diameter of the intake hole on the plate (for flowing gases into the EGR valve) is of identical size as the EGR valve (3/4 inch), however, the effective outlet diameter of the EGR valve body for exhaust gas recirculation is reduced from 3/4 inch to 3/8 inch (50%) by the restrictor plate. The effective outlet flow area is reduced from 0.44 square inch to 0.11 square inch (75%) by the smaller diameter exhaust hole.

The restrictor plate, according to BAE, will reduce EGR flow rate at any valve opening and vacuum signal to the valve compared to the OEM design of the valve. This reduction in EGR flow is needed, according to BAE, in order not to increase CO emissions due to vehicle body elongation and increase in vehicle weight when converting the sedan vehicle into a limousine.

V. EVALUATION

A 1983 California-certified limousine converted by Executive Coach Builders, Inc. and powered by a Ford Motor Company 302 CID fuel injected engine was used for the evaluation of the restrictor plate. The certification dynamometer test parameters of 5,500 lbs. and 14.5 hp were used. Comparative tests were run with the limousine in the stock (no EGR restrictor plate), and in the modified (with the EGR restrictor plate installed) configurations. A summary of the test results is tabulated in the Appendices.

VI. DISCUSSION

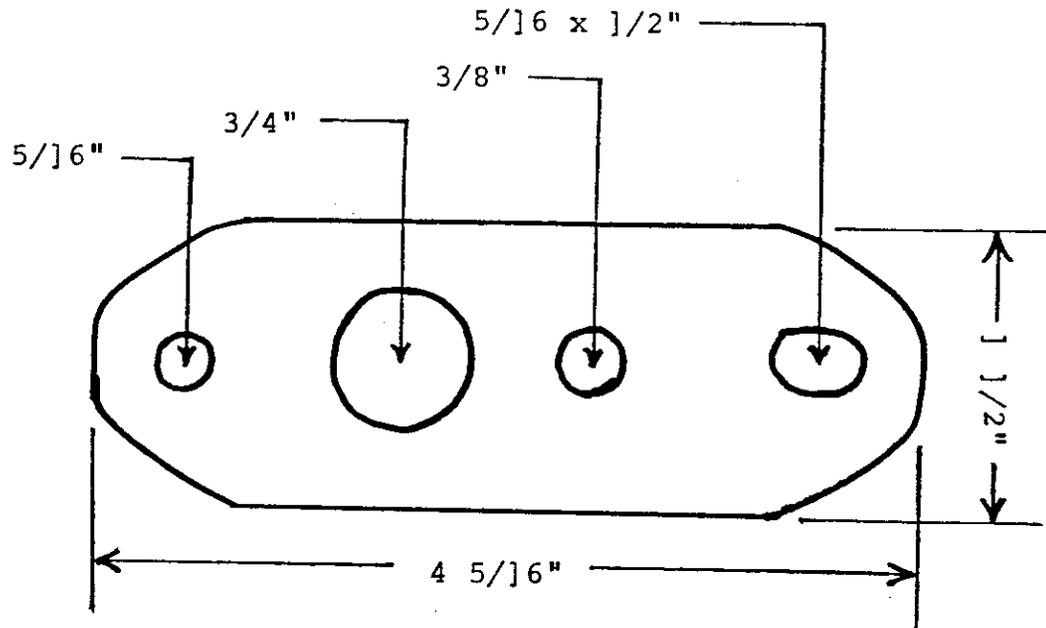
The test results indicate that HC and CO emissions are reduced with the installation of the EGR restrictor plate, while NOx emissions remain unchanged. This reduction in HC and CO emissions can be attributed to reduced throttle angle required with the EGR restrictor plate, in order to maintain any speed, compared to the vehicle without the restrictor plate; thus leaning the fuel charge and reducing HC and CO emissions.

Since the engines, manufactured by Ford Motor Company, used in the 1983 Executive Coach Builders, Inc.'s limousines are carry-overs (identical engine designs) as the ones used in the 1981 and 1982 Allen Coach Works, Inc.'s limousines, the staff is of the opinion that the BAE EGR restrictor plate will have the same degree of performance/emissions impact on the 1981 and 1982 Allen Coach Works, Inc.'s limousines as on the 1983 Executive Coach Builders, Inc.'s limousines.

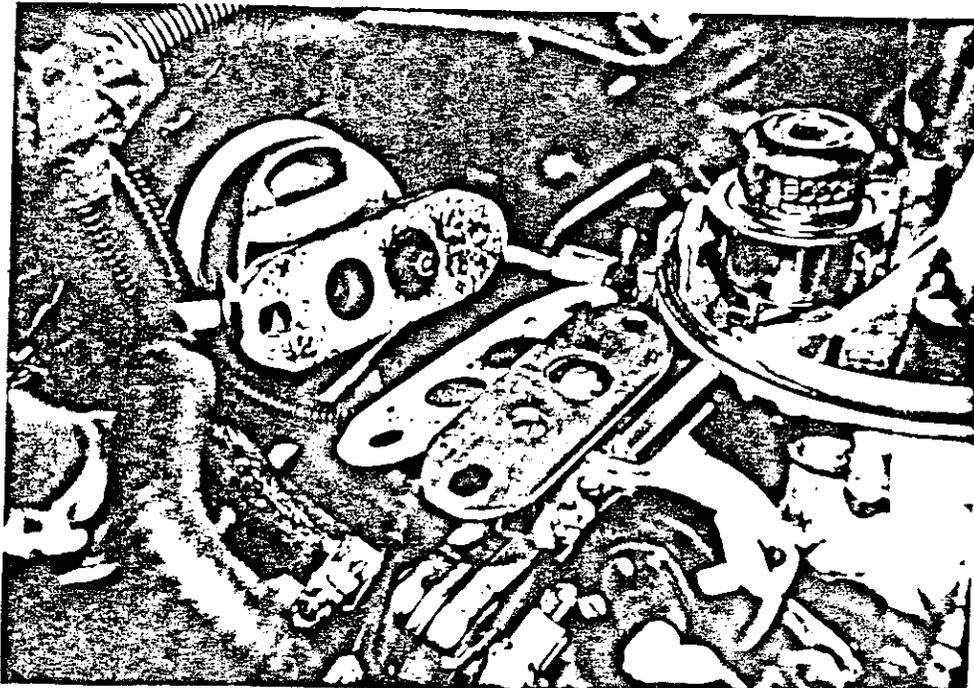
APPENDICES

DIAGRAM OF EGR SPACER PLATE

(actual size)



INSTALLATION OF EGR SPACER PLATE



Table

BAE's Exhaust Emission Test Data
 Evaluation of BAE's EGR Restrictor Plate
 1983 Executive Coach Builders' Limousine

<u>Test</u>	<u>Exhaust Emissions (gm/mi)</u>			<u>Fuel Economy (mpg)</u>
	<u>HC (1)</u>	<u>CO</u>	<u>NOx</u>	
Baseline	0.38	9.2	0.5	12.96
Device (2)	0.22	5.3	0.5	12.90
Emission Standard	0.41	7.0	0.7	-

- (1) total hydrocarbon measurements
- (2) average of two tests