

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-97-21  
Relating to Exemptions under Section 27156  
of the Vehicle Code

BAE TURBOSYSTEMS  
TURBOCHARGER KIT NO. T04B M2

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 add-on turbocharger kit No. T04B M2, manufactured by BAE Turbosystems, of 3032 Kashiwa Street, Torrance, California 90505, using a 0.96 A/R ratio AiResearch turbocharger 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 Airstream motorhomes powered by a 1981, 1982, or a 1983 California certified Isuzu Motors Limited six-cylinder heavy-duty diesel engine.

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different from those submitted by the device manufacturer.

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 ADD-ON TURBOCHARGER KIT NO. T04B M2.

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.

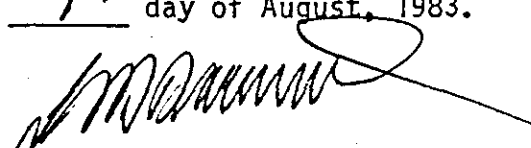
Section 43644 of the Health and Safety Code provides as follows:

"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.

Executive Order No. D-97-15 dated August 16, 1982, is superseded and of no further force and effect.

Executed at El Monte, California, this 9<sup>th</sup> day of August, 1983.

  
K. D. Drachand, Chief  
Mobile Source Control Division

STATE OF CALIFORNIA  
AIR RESOURCES BOARD

EVALUATION OF THE BAE TURBOCHARGER KIT  
NO. T04B M2 FOR EXEMPTION FROM THE  
PROHIBITIONS IN VEHICLE CODE SECTION 27156  
IN ACCORDANCE WITH SECTION 2222, TITLE  
13 OF THE CALIFORNIA ADMINISTRATIVE CODE

August 2, 1983

August 2, 1983

EVALUATION OF THE BAE TURBOCHARGER KIT  
NO. T04B M2 FOR EXEMPTION FROM THE  
PROHIBITIONS IN VEHICLE CODE SECTION 27156  
IN ACCORDANCE WITH SECTION 2222, TITLE  
13 OF THE CALIFORNIA ADMINISTRATIVE CODE

by

State of California  
Air Resources Board  
9528 Telstar Avenue  
El Monte, CA 91731

(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, of 3032 Kashiwa Street, Torrance, CA 90505, has requested an update to the existing Air Resources Board's Executive Order (E.O.) No. D-97-15. The applicant requested that their add-on turbocharger kit No. T04B M2 be also exempted from the prohibitions in Vehicle Code (V.C.) Section 27156 for the 1984 model-year Airstream motorhomes powered by a 1983 California certified Isuzu six-cylinder heavy-duty diesel engine.

Based on: 1) the previous comparative exhaust emission tests performed on a 1981 Airstream motorhome powered by a 1981 Isuzu heavy-duty diesel engine for granting E.O. D-97-5; and 2) the fact that the 1984 Airstream motorhomes are powered by a 1983 Isuzu heavy-duty diesel engine that is a carry-over engine from 1981 and 1982, the staff concludes that the kit will not adversely affect exhaust emissions from the motorhomes for which update is requested.

The staff recommends that BAE Turbosystems be granted their update request to include the 1984 model-year Airstream motorhomes powered by a 1983 California certified Isuzu six-cylinder heavy-duty diesel engine and that Executive Order No. D-97-21 be granted.

CONTENTS

	<u>Page Number</u>
<u>SUMMARY</u>	i
<u>CONTENTS</u>	ii
I. <u>INTRODUCTION</u>	1
II. <u>CONCLUSION</u>	1
III. <u>RECOMMENDATIONS</u>	1
IV. <u>TURBOCHARGER KIT DESCRIPTION AND OPERATION</u>	2
V. <u>TURBOCHARGER KIT EVALUATION</u>	2
VI. <u>DISCUSSION</u>	3

EVALUATION OF THE BAE TURBOCHARGER KIT NO. T04B M2 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, CA 90505, has requested by letter dated July 18 1983, an update to the existing Air Resources Board's Executive Order (E.O.) No. D-97-15.

The applicant requested that the exemption from the prohibitions in the Vehicle Code (V.C.) Section 27156 for their add-on turbocharger kit No. T04B M2 be updated to include the 1984 model-year Airstream motorhomes which are powered by a 1983 California certified Isuzu Motors Limited six-cylinder heavy-duty diesel engine.

II. CONCLUSION

Based on: 1) the previous comparative exhaust emission tests performed on a 1981 Airstream motorhome powered by a 1981 Isuzu heavy-duty diesel engine for granting E.O. D-97-5; and 2) the fact that the 1984 Airstream motorhomes are powered by a 1983 Isuzu heavy-duty diesel engine that is a carry-over engine from 1981 and 1982, the staff concludes that the kit will not adversely affect exhaust emissions from the motorhomes for which update is requested.

III. RECOMMENDATIONS

The staff recommends that BAE Turbosystems be granted their update request to include the 1984 model-year Airstream motorhomes powered by a 1983 California certified Isuzu six-cylinder heavy-duty diesel engine and that Executive Order No. D-97-21 be granted.

#### IV. TURBOCHARGER KIT DESCRIPTION

The purpose of turbocharging an engine is to increase the volumetric efficiency of an engine by forcing more air into an engine than it would take in under naturally aspirated conditions.

The major components of the BAE Turbosystems turbocharger kit are a 0.96 A/R ratio AiResearch turbocharger model No. T04B M2, an exhaust manifold to turbocharger adaptor, and an intake pipe. The components are packaged with installation hardware and instructions to complete the kit.

The exhaust manifold to turbocharger adaptor is installed on the OEM exhaust manifold located on the driver's side of the engine. The turbine inlet of the turbocharger mounts directly to the adaptor. The turbine, driven by exhaust gases, is linked to the compressor by a solid shaft. Compressed incoming air is routed to the intake manifold through the BAE Turbosystems intake pipe mounted transversely over the engine.

Maximum positive manifold pressure (boost) is limited to 13 psig by the size of (and exhaust flow through) the turbine housing. No wastegate or other active boost limiting device is used.

The cooling of the turbocharger is achieved by direct fan air from the engine and lubricating oil passing through the unit. The oil is piped from the filtered main oil galley to the turbocharger bearing housing. Oil from the turbocharger is returned to the oil pan.

No modifications to the OEM tune-up specifications are required when the turbocharger kit is installed.

#### V. TURBOCHARGER KIT EVALUATION

The detailed description of the Air Resources Board's evaluation of the kit is included in the ARB Staff Report titled "Evaluation of the BAE Turbocharger Kit No. T04B M2 for Compliance with the Requirements of Section 27156 of the Vehicle Code," dated June 5, 1981.



VI. DISCUSSION

E.O. No. D-97-15 was granted for 1981, 1982 and 1983 model-year Airstream motorhomes powered by a 1981 or 1982 California certified Isuzu Motors Limited six-cylinder heavy-duty diesel engine.

The applicant now intends to use its turbocharger kit No. T04B M2, using the same 0.96 A/R ratio AiResearch turbocharger, for the 1984 model-year Airstream motorhomes powered by a 1983 California certified Isuzu Motors Limited six-cylinder heavy-duty diesel engine and equipped with automatic transmissions. The applicant, therefore, is requesting that the exemption for this turbocharger kit be updated to include these 1984 model-year motorhomes as well.

In response to the request, the staff compared the design of 1981, 1982, and 1983 model-year Isuzu heavy-duty diesel engines. In particular, the effects the turbocharger kit might have on the vehicle's emissions were evaluated. Since the 1983 model-year California certified Isuzu heavy-duty diesel engine (used for the 1984 model-year motorhomes) are carry-over (identical engine design) from the 1981 and 1982 model-year California certified Isuzu engines used in the 1982 and 1983 model-year motorhomes, respectively, the staff is of the opinion that the turbocharger kit will have the same degree of performance/emissions impact on the motorhomes for which an update is requested. Since the test data on a 1981 model-year Isuzu engine show that the exhaust emissions were not adversely affected when the turbocharger kit was installed, the staff is of the opinion that the kit will have no adverse emission effect on the 1984 model-year motorhomes for which an update is requested.