

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-97-15  
Relating to Exemptions under Section 27156  
of the Vehicle Code

BAE TURBO-SYSTEMS  
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, using a 0.96 A/R ratio AiResearch turbocharger manufactured by BAE Turbo-Systems, of 3032 Kashiwa Street, Torrance, California 90505, 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 through 1983 model-year Airstream motorhomes which are powered by a 1981 or 1982 California certified Isuzu Motors Limited six-cylinder (L6) heavy-duty diesel engine and is equipped with automatic transmission.

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 TURBO-SYSTEMS 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-97-5 dated September 1, 1981, is superseded and of no further force and effect.

Executed at El Monte, California, this 16<sup>th</sup> day of August, 1982.



K. D. Drachand, Chief  
Mobile Source Control Division

State of California  
AIR RESOURCES BOARD

Staff Report

August 6, 1982

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

I. INTRODUCTION

BAE Turbo-Systems, of 3032 Kashiwa Street, Torrance, California 90505, has requested by letter dated July 9, 1982, an update to the existing Air Resources Board's Executive Order (E.O.) No. D-97-5.

The applicant requested that the exemption from the prohibitions of the Vehicle Code (V.C.) Section 27156 for their add-on turbocharger kit No. T04B M2 be updated to include the 1983 model-year Airstream motorhomes which are powered by a 1982 California certified Isuzu Motors Limited six-cylinder (L6) heavy-duty diesel engine and is equipped with automatic transmission.

II. 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 Turbo-Systems 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 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 Turbo-Systems intake pipe mounted transversely over the engine.

Maximum positive manifold pressure 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.

### III. 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.

### IV. DISCUSSION

E.O. No. D-97-5 was granted for 1981 and 1982 model years Airstream motorhomes powered by a 1981 California certified Isuzu Motors Limited six-cylinder (L6) heavy-duty diesel engine and equipped with automatic transmission.

The applicant is now making their turbocharger kit No. T04B M2, using the same 0.96 A/R ratio AiResearch turbocharger, for the 1983 model-year Airstream motorhomes powered by a 1982 California certified Isuzu Motors Limited six-cylinder (L6) heavy-duty diesel engine and equipped with automatic transmission. The applicant, therefore, is requesting that the exemption for this turbocharger kit be updated to include these 1983 model-year motorhomes as well.

In response to the request, the staff compared the engine design of both model year (1981 and 1982) Isuzu engine designs. In particular, the effects the turbocharger kit might have on the vehicle's emissions were evaluated. Since the 1982 model-year California certified Isuzu heavy-duty diesel engine (used for the 1983 model-year motorhomes) are carry-over (identical engine design) from the 1981 model-year California certified Isuzu engines used for the 1982 model-year motorhomes), 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 showed 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 effect on the motorhomes for which an update is requested.

IV. CONCLUSION AND RECOMMENDATION

Based on the above, the staff concludes that the BAE Turbo-Systems add-on turbocharger kit No. T04B M2, using an AiResearch turbocharger with an A/R ratio of 0.96, will not adversely affect the exhaust emissions from 1981 through 1983 model year Airstream motorhomes which are powered by a 1981 or 1982 California certified Isuzu Motors Limited six-cylinder (I6) heavy-duty diesel engine and is equipped with automatic transmission. The staff recommends that Executive Order No. D-97-15 be adopted.