

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-152  
Relating to Exemptions under Section 27156  
of the Vehicle Code

TURBO AUTO INTERNATIONAL  
(INTERCOOLER KIT NO. 9301200)

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 Intercooler Kit No. 9301200 manufactured by Turbo Auto International of 440 Northeast Oakland Street, Roseburg, Oregon 97470, 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 the 1983 and 1984 Ford Thunderbird and Mercury Cougar vehicles equipped with 2.3L turbocharged engines.

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 TURBO AUTO INTERNATIONAL INTERCOOLER KIT NO. 9301200.

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 18<sup>th</sup> day of February, 1985.

  
K. D. Drachand, Chief  
Mobile Source Division

State of California  
AIR RESOURCES BOARD

EVALUATION OF TURBO AUTO INTERNATIONAL INTERCOOLER KIT NO. 9301200 FOR  
EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE  
WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

February

1985

State of California  
AIR RESOURCES BOARD

Evaluation of Turbo Auto International Intercooler Kit No. 9301200 for  
Exemption from the Prohibitions of 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  
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

Turbo Auto International, 440 Northeast Oakland Street, Roseburg, Oregon, has applied for an exemption from the prohibitions in Vehicle Code Section 27156 of their intercooler kit No. 9301200. The exemption is sought for 1983 and 1984 OEM turbocharged Ford Thunderbird and Mercury Cougar with 2.3L gasoline-powered engines.

Turbo Auto International has submitted emissions data of comparative (with and without the intercooler kit installed on the test vehicle) tests performed at ECS Laboratory, Inc., located at 12011 Market Street, Livonia, Michigan 48150. The test vehicle is a 1984 Ford Thunderbird equipped with a 2.3L, OEM turbocharged, 4-cylinder engine. The staff evaluated the test results and found that the intercooler kit will not adversely affect the performance of the vehicles' emission control systems.

The staff recommends that Turbo Auto International be granted an exemption from the prohibitions of the Vehicle Code Section 27156 for their intercooler kit No. 9301200 and Executive Order No. D-152 be issued.

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EVALUATION OF TURBO AUTO INTERNATIONAL INTERCOOLER KIT NO. 9301200 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

I. INTRODUCTION

Turbo Auto International, 440 Northeast Oakland Street, Roseburg, Oregon, has applied for an exemption from the prohibitions in Vehicle Code Section 27156 of their intercooler kit No. 9301200. The exemption is sought for 1983 and 1984 OEM turbocharged Ford Thunderbird and Mercury Cougar with 2.3L gasoline-powered engines.

Turbo Auto International has submitted emissions data of comparative (with and without the intercooler kit installed on the test vehicle) CVS-75 and HFE tests performed at ECS Laboratory, Inc., located at 12011 Market Street, Livonia, Michigan 48150. The test vehicle is a 1984 Ford Thunderbird equipped with a 2.3L, turbocharged, 4-cylinder engine.

II. CONCLUSIONS

Emission test data performed with and without the intercooler for CVS-75 met the California emissions standards required for 1984 vehicles. The applicant also submitted the data taken from HFET tests. Since all the data show no adverse effect on the emissions, it is concluded that the applicant has met the requirement for the certification of exemption for their intercooler kit No. 9301200.

III. RECOMMENDATIONS

Based on the submitted test results, the staff recommends that Turbo Auto International be granted an exemption from the prohibitions of the Vehicle Code Section 27156 for their intercooler kit No. 9301200 and Executive Order No. D-152 be issued.

#### IV. DEVICE DESCRIPTION

The purpose of adding an intercooler to a turbocharger is to reduce the temperature of the intake air resulting in cooler air/fuel charge going into the engine. This reduction in intake charge temperature produces a higher charge density (more mass per unit volume) which allows more air/fuel mixture to flow into the engine at a given intake manifold vacuum/pressure. This increases the engine performance with no adjustment necessary from the OEM tune-up specifications.

The major components of the Turbo Auto International intercooler kit No.9301200 are tubing and hose couplings and a sized air-to-air heat exchanger matrix assembled with header tanks. They are packaged with mounting hardware and installation instructions and sold as a kit.

The heat exchanger is mounted in such a position that it is exposed to the ambient air stream when the vehicle is in forward motion. The ambient air cools the compressed air flowing through the heat exchanger. The cooler compressed air is then passed out of the heat exchanger to the throttle(s) for induction into the engine.

#### V. DISCUSSION

Turbo Auto International requested an exemption from the Vehicle Code Section 27156 for their add-on intercooler kit No. 9301200 to be installed on 1983 and 1984 Ford Thunderbird and Mercury Cougar vehicles powered by a 2.3L OEM turbocharged engine.

The applicant has demonstrated the performance of their system from the exhaust emission data performed on a 1984 Ford Thunderbird. The tests include CVS-75 and HFE; both were measured with and without the intercooler kit. The test results are shown in the attached table. The emission results from the



CVS-75 test showed no adverse effect on the vehicle's exhaust emissions when the intercooler kit is installed. The applicant also ran an HFE test on the same vehicle to show improvements in fuel economy due to the intercooler kit. However, the data from the HFE test show a slight decrease in fuel economy. The tests were performed by ECS Emissions Laboratory in Livonia, Michigan 48150 which is the original Ethyl Corporation Laboratory.

In addition, it is the staff's opinion that the combustion temperature will be reduced as a result of cooler intake charge with the use of the turbocharger intercooler kit. This reduction in combustion temperature will reduce the formation of NOx gases in the combustion chamber, resulting in less NOx emissions expelled through the exhaust system without adversely affecting converter light-off time.

EMISSIONS TEST RESULTS

Test vehicle: 1984 Ford Thunderbird 2.3L (4-cylinder)  
Add-on Part: Intercooler No. 9301200

<u>Test Mode</u>	<u>Exhaust Emissions (g/mile)</u>			<u>Fuel Economy (MPG)</u>	
	<u>HC</u>	<u>CO</u>	<u>NOx</u>	<u>City</u>	<u>Highway (HFET)</u>
Baseline	0.203	2.256	0.165	21.44	27.36
w/Intercooler -	0.195	1.503	0.147	22.03	26.24