

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-112  
Relating to Exemptions under Section 27156  
of the Vehicle Code

TURBO INTERNATIONAL  
TURBOCHARGER KIT MODEL NO. 301-E

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 turbocharger kit model number 301-E manufactured by Turbo International of 12272 Monarch Street, Garden Grove, California 92641, 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 older model year gasoline-powered motor vehicles having a Chevrolet 305 or 350 CID eight-cylinder engine and 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 TURBO INTERNATIONAL TURBOCHARGER, KIT MODEL NO. 301-E.

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.

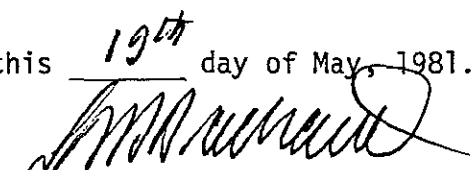
Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

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 19<sup>th</sup> day of May, 1981.

  
K. D. Drachand, Chief  
Mobile Source Control Division

State of California  
AIR RESOURCES BOARD

Staff Report

May 1, 1981

Evaluation of the Turbo International Turbocharger Kit for Compliance  
With the Requirements of Section 27156 of the Vehicle Code

I. INTRODUCTION

Turbo International of 12272 Monarch Street, Garden Grove, California 92641 has applied for exemption of a turbocharger kit from the prohibitions of Section 27156 of the Vehicle Code (V.C.). The kit, turbocharger kit model number 301-E, is intended for 1981 and older model year gasoline powered motor vehicles having a Chevrolet 305 or 350 CID eight-cylinder engine and automatic transmission.

Turbo International has submitted back-to-back emissions tests conducted on a 1981 Chevrolet Corvette at Custom Engineering Performance in Garden Grove, California. Confirmatory tests were conducted on the same vehicle at the Air Resources Board (ARB) laboratory in El Monte, California.

II. TURBOCHARGER KIT DESCRIPTION

The purpose of the turbocharger kit is to increase the volumetric efficiency of an engine. The major components of the Turbo International kit are a Rayjay turbocharger, a replacement exhaust manifold (right bank), a crossover pipe, a carburetor-to-manifold adapter box, and a water injection system. The components are packaged with installation hardware and instructions and sold as a kit.

The crossover pipe routes the exhaust from the left cylinder bank to join the right cylinder bank exhaust. The Turbo International's replacement manifold is connected directly to the turbine inlet of the turbocharger.

Maximum positive manifold pressure is limited to 7 psig by the size of the compressor inlet. No wastegate or other active boost limiting device is used.

The adapter box is mounted under the carburetor. The original carburetor is retained. No internal modifications are made to the carburetor.

Water injection is employed to limit detonation. Water is piped from a small plastic reservoir through a solenoid to the adapter box. The solenoid is activated by a signal from a pressure sensor located on the adapter box at the compressor outlet. When 1 psig of pressure is sensed, the solenoid injects water into the adapter box, ahead of the turbocharger, through a 0.042 inch orifice. A schematic of the turbosystem is shown in Figure 1.

### III. TEST PROGRAM

A 1981 Chevrolet Corvette with a 350 CID eight-cylinder engine and automatic transmission was used for testing. The certification test weight is 3625 lbs. The road load horsepower (RLHP) used in the testing was 8.0 horsepower at 50 mph. The following test procedure was used to determine emissions of the unmodified (baseline) vehicle at both Custom Engineering and ARB laboratories:

- . One cold start CVS-75 at 1 times RLHP
- . One hot start HFET at 1 times RLHP
- . One cold start CVS-75 at 2 times RLHP
- . One hot start HFET at 2 times RLHP

The test sequence was repeated on the vehicle after the applicant's turbocharger installation to provide a back-to-back emissions comparison.

IV. APPLICANT'S TEST DATA

The applicant's emissions test data in Table 1 was generated at Custom Engineering Performance.

Table 1

Applicant's Emissions Test Data  
1981 Chevrolet Corvette

<u>Test</u>	<u>Load</u>	<u>Exhaust Emissions (g/mi)</u>		
		<u>HC</u>	<u>CO</u>	<u>NOx</u>
Baseline CVS-75	1XRL	0.36	5.64	0.78
Device CVS-75	1XRL	0.41	4.74	0.66
Baseline HFET	1XRL	0.14	2.74	0.50
Device HFET	1XRL	0.11	3.49	0.34
Baseline CVS-75	2XRL	0.46	5.16	0.97
Device CVS-75	2XRL	0.41	4.55	0.73
Baseline HFET	2XRL	0.14	2.98	0.75
Device HFET	2XRL	0.13	4.16	0.56

V. ARB'S TEST DATA

The ARB's emissions test data is shown in Table 2.

Table 2

ARB's Emissions Test Data  
1981 Chevrolet Corvette

<u>Test</u>	<u>Load</u>	<u>Exhaust Emissions (g/mi)</u>		
		<u>HC</u>	<u>CO</u>	<u>NOx</u>
Baseline CVS-75 *	1XRL	0.31	3.96	0.50
Device CVS-75	1XRL	0.41	4.66	0.68
Baseline HFET	1XRL	0.13	1.83	0.23
Device HFET	1XRL	0.13	3.75	0.23
Baseline CVS-75	2XRL	0.31	3.63	0.70
Device CVS-75	2XRL	0.41	3.26	0.67
Baseline HFET	2XRL	0.15	2.71	0.40
Device HFET	2XRL	0.12	3.25	0.57

\*Quality Audit data

VI. DISCUSSION

The ARB's baseline tests under normal road condition did not yield any valid data due to instrument problem. As a result, the 2% quality audit data was used for comparison with the device test data.

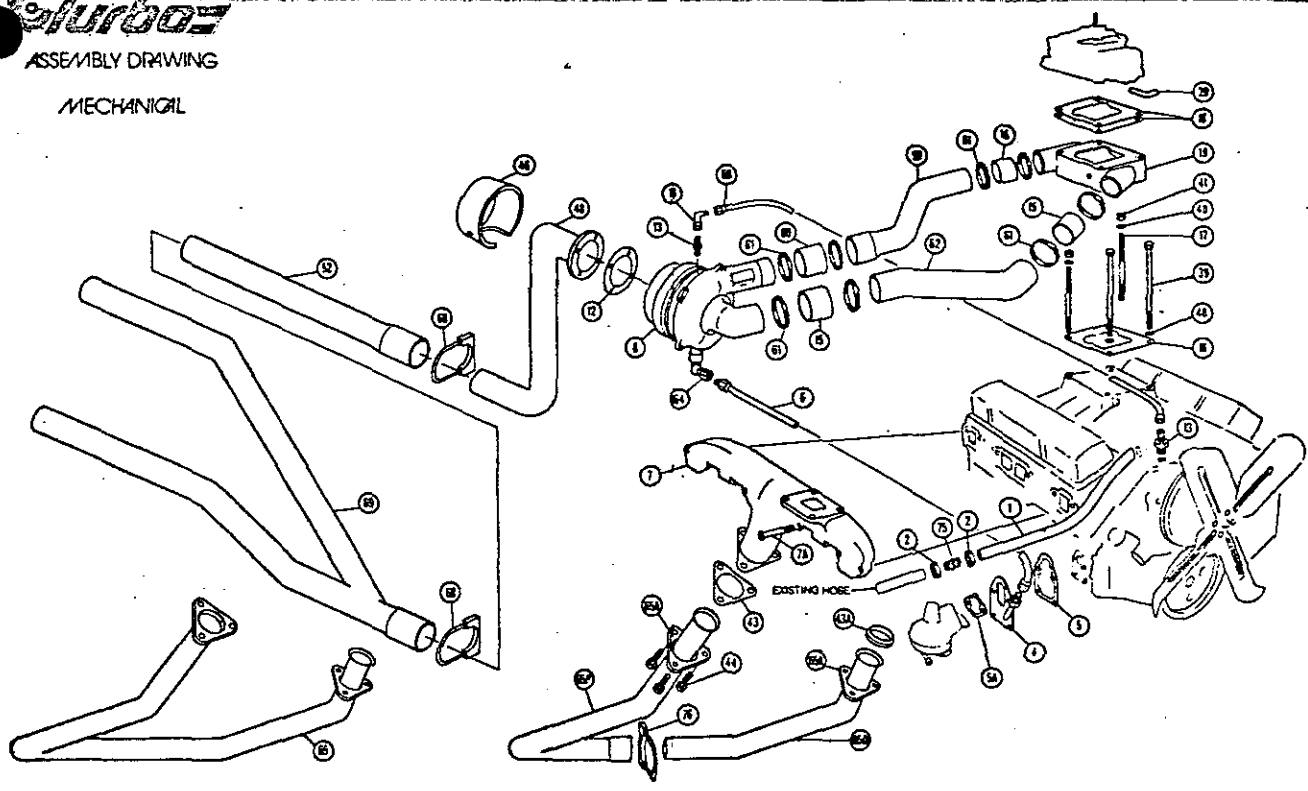
The 2 sets of laboratory data (Tables 1 and 2) show that there are some changes in emissions due to the installation of the turbocharger kit. The changes, however, are within the test variability and insignificant.

VII. CONCLUSION AND RECOMMENDATIONS

Emission tests indicate that the Turbo International turbocharger kit model 301-E will not significantly effect emissions when installed in accordance with the manufacturer's instructions. The staff recommends that Turbo International be granted an exemption from the prohibitions of V.C. Section 27156 for this kit for 1981 and older model year gasoline-powered motor vehicles having a Chevrolet 305 or 350 CID eight-cylinder engine and automatic transmission. The staff recommends that Executive Order D-112 be adopted.

Figure 1

**EDWARDS**  
 ASSEMBLY DRAWING  
 MECHANICAL



**ELECTRICAL & WATER**

