

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-180-16
Relating to Exemptions Under Section 27156
of the Vehicle Code

THE TURBO SHOP, INC.
POWER SYSTEM CHIP

Pursuant to the authority vested in the Air Resources Board (ARB) 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 Power System Chip manufactured by The Turbo Shop, Inc. 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 1987-92 General Motors (GM) trucks with 5.0 to 7.4 liter engines as listed in Exhibit A, which is attached hereto and incorporated herein.

This Executive Order is valid provided that installation instructions for the Power System Chip 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 ARB, 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.

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

This Executive Order is granted based on results from emissions tests conducted in accordance with Cold-Start CVS-75 Federal Test Procedure. However, the ARB finds that reasonable grounds exist to believe that use of the Power System Chip may adversely affect emissions of motor vehicles when operating under conditions outside the parameters of the previously prescribed test procedures. Accordingly, the ARB reserves the right to conduct additional emission tests, in the future, as such tests are developed, that will more adequately measure emissions from all cycle phases. If such test results demonstrate that the Power System Chip adversely affects emissions during off-cycle conditions (defined as those conditions which are beyond the parameters of the Cold-Start CVS-75 Federal Test Procedure), this Executive Order shall be effectively rescinded as of the date the test results are validated. Further, if such test results or

other evidence provides the ARB with reason to suspect that the Power System Chip will affect the durability of the emission control system, The Turbo Shop, Inc. shall be required to submit durability data to show that the durability of the vehicle emission control system is not, in fact, affected and/or that the add-on or modified part demonstrates adequate durability.

In addition to the foregoing, the ARB reserves the right in the future to review this Executive Order and the exemption provided herein to assure that the exempted add-on or modified part continues to meet the standards and procedures of Title 13, California Code of Regulations, Section 2222, et seq.

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 SHOP, INC.' POWER SYSTEM CHIP.

No claim of any kind, such as "Approved by the 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 may result in its rescission or submission to the Attorney General of California for such action as he deems advisable.

The Bureau of Automotive Repair will be notified by copy of this order.

Executed at El Monte, California, this 28th day of April, 1992.



R. B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF THE TURBO SHOP, INC.'S POWER SYSTEM
CHIPS FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF
THE CALIFORNIA CODE OF REGULATIONS

April 1992

State of California
AIR RESOURCES BOARD

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THE CALIFORNIA CODE OF REGULATIONS

by

Mobile Source Division
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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 the mention of trade names or commercial products constitute endorsement or recommendation for use.)

SUMMARY

The Turbo Shop, Inc. (The Turbo Shop) has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their Power System Chips for installation on 1987 to 1992 model year General Motors trucks listed in Appendix A. The Turbo Shop has submitted a completed application and all the required information, as well as comparative exhaust emissions test data performed at California Environmental Engineering which demonstrated that the Power System Chips does not have any adverse effect on the exhaust emissions of the affected vehicles.

Based on the submitted information and the results of the emissions tests performed at California Environmental Engineering, the staff concludes that the installation of The Turbo Shop's Power System Chips will not adversely affect exhaust emissions on the specified vehicles.

The staff recommends The Turbo Shop, Inc. be granted an exemption as requested and that Executive Order D-180-16 be issued.

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EVALUATION OF THE TURBO SHOP, INC.'S POWER SYSTEM CHIPS FOR
EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE
WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

I. INTRODUCTION

The Turbo Shop, Inc. of 940 W. Manchester Blvd., Inglewood, CA 90301, has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their Power System Chips for installation on 1987 to 1992 model year General Motors trucks listed in Appendix A. The Turbo Shop has submitted a completed application and all the required information, as well as exhaust emissions test data performed at California Environmental Engineering on a 1991 7.4 liter Chevrolet full size truck.

II. CONCLUSION

Based on the submitted information and the results from comparative exhaust emissions test performed at California Environmental Engineering, the staff concludes that The Turbo Shop's Power System Chips will not adversely affect exhaust emissions from vehicles for which the exemption is requested.

III. RECOMMENDATION

The staff recommends that The Turbo Shop, Inc. be granted an exemption as requested and that Executive Order D-180-16 be issued.

IV. POWER CHIP DESCRIPTION

Many computer controlled vehicles are equipped with an electronic control unit (ECU) which is programmed using a PROM. Signals detected by the vehicle's sensors are fed directly into the ECU where they are analyzed and compared to the operational data programmed inside the PROM. The PROM sends out appropriate adjustments in the engine operation in response

to any changing conditions. For example, a PROM will adjust timing and fuel delivery when a vehicle is subjected to additional load. Thus, by modifying data in the PROM, spark timing and fuel delivery can be adjusted.

The Turbo Shop Power System Chips modifies the ignition advances and fuel curves of the original equipment manufacturer's (OEM) PROM under full throttle operation. Therefore, the performance chip monitors and modifies the vehicle operation under open-loop modes. The Turbo Shop claims these modifications translate to an increase in torque and horsepower. No modifications have been conducted on the Power System Chips that would affect throttle response and driveability, under closed-loop conditions (normal day-to-day driving). The manufacturer claims that modifications under full-throttle operation offer enhanced performance and acceleration. The Turbo Shop does not recommend the use of any particular fuel to obtain optimum performance or avoid knocking which may be caused by advanced or retarded timing. Installation instructions, included with the chip, is shown in Appendix B.

V. DISCUSSION OF THE POWER CHIP

A 1991 Chevrolet C3500 full size truck with the 7.4 liter (454 CID) V-8 gasoline engine, was selected as the test vehicle to evaluate the effect of the Power System Chips on tailpipe emissions. This vehicle (7.4 liter Chevrolet C3500) was chosen by staff as a worst case vehicle because it has the largest engine within the range of vehicle application. The test program consisted of two FTP CVS-75 (cold start) tests on the test vehicle in the baseline and then another in the modified configuration. The results of the exhaust emissions test performed at California Environmental Engineering are shown in Table 1.

Table 1

Exhaust Emissions Test Results from
 California Environmental Engineering
 On The Chevrolet C3500
Exhaust Emissions (gm/mi)

<u>Test Mode</u>	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Baseline	0.541	5.013	4.055
Device	0.445	4.111	4.066
Difference	-0.096	-0.902	+0.011

The differences between the device emission test results and baseline emission test results submitted by the applicant were within the allowed limits of 0.1 gm/mile or 10 percent of baseline HC, 1.0 gm/mile or 15 percent of baseline CO and .1 gm/mile or 10 percent of baseline NOx as specified in the "Procedures for Exemption of Add-On and Modified Parts." Based on the test results, the staff concludes that the installation of the Turbo Shop Power System Chips on the applicable vehicles will not adversely affect the exhaust emissions.

The Turbo Shop submitted all the required information and fulfilled the requirements for an exemption.

APPENDIX A

PSC90454SSA	90	GM 454 SS 1500 TBI AUTO
PSC91454SSA	91	GM 454 SS 1500 TBI AUTO (BROADCAST CODE) *
PSC92454SSA	92	GM 454 SS 1500 TBI AUTO (BROADCAST CODE) *
PSC875057PUBVA4	87	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 400
PSC885057PUBVA4	88	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 100
PSC895057PUBVA4	89	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 100
PSC905057PUBVA4	90	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 400
PSC915057PUBA(xxxx)	91	GM 305-350 TRUCKS, BLAZERS, VANS TBI AUTO (BROADCAST)*
PSC925057PUBA(xxxx)	92	GM 305-350 TRUCKS, BLAZERS, VANS TBI AUTO (BROADCAST)*
PSC875057PUBVA7R	87	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC885057PUBVA7R	88	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC895057PUBVA7R	89	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC905057PUBVA7R	90	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC9150PUBVA7R	91	CHEVY - GMC 305 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC9250PUBVA7R	92	CHEVY - GMC 305 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC9157PUBVA7R	91	CHEVY - GMC 350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC9257PUBVA7R	92	CHEVY - GMC 350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC875057PUBVAM	87	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN
PSC885057PUBVAM	88	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN
PSC895057PUBVAM	89	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN
PSC905057PUBVAM	90	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN
PSC915057PUBVAM	91	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN
PSC925057PUBVAM	92	CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN
PSC87454PUSA	87	CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC88454PUSA	88	CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC89454PUSA	89	CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC90454PUSA	90	CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC91454PUSMH(xxxx)	91	GM 454 TRUCKS, SUBURBAN, MH TBI AUTO/BROADCAST *
PSC92454PUSMH(xxxx)	92	GM 454 TRUCKS, SUBURBAN, MH TBI AUTO/BROADCAST *
PSC87454PUSM	87	GM 454 TRUCKS, SUBURBAN TBI MAN
PSC88454PUSM	88	GM 454 TRUCKS, SUBURBAN TBI MAN
PSC89454PUSM	89	GM 454 TRUCKS, SUBURBAN TBI MAN
PSC90454PUSM	90	GM 454 TRUCKS, SUBURBAN TBI MAN
PSC91454PUSM	91	GM 454 TRUCKS, SUBURBAN, MH TBI MAN
PSC92454PUSM	92	GM 454 TRUCKS, SUBURBAN, MH TBI MAN

* DENOTES MEM-CAL.

APPENDIX B

POWER SYSTEM CHIP
C.A.R.B. E.O. #D-180-XX

1. Disconnect the negative battery cable.
2. Locate the Electronic Control Unit and remove the E-Prom cover.
3. Remove the E-Prom or Cal-pac from the unit, making sure to note which way the notch faces before removal.
4. Install the new E-Prom or Cal-Pac into the ECU making sure not to bend any pins and that the notch faces the same as the original one did.

NOTE: Installation of this unit in the wrong location will destroy the unit and there is no warranty coverage for misinstalled or damaged units.

5. Connect the battery cable and turn the key to the on position. Check that the "CHECK ENGINE" light is on. Start vehicle the "CHECK ENGINE" light will now go off.
6. Reinstall the E-Prom cover and replace any parts removed during your disassembly.
7. Check the engine timing as outlined by your owners manual. We don't recommend any changes from the stock setting and none should be made.

PROBLEMS

The most common problem with installation of this unit is the bending of the pins during installation. If you have bent the pins gently bend them back into place with a small blunt object made of metal. If after checking the pins a problem still exist reinstall your original part and call the factory for help. You will need the following information for us to help you. The year, make, model, engine size and four (4) letter code that is listed on your ECU.

Exhibit A

PSC8745155A	87 GM 454 SS 1500 TBI AUTO
PSC8845155A	88 GM 454 SS 1500 TBI AUTO (BROADBENT CODE) *
PSC8945155A	89 GM 454 SS 1500 TBI AUTO (BROADBENT CODE) *
PSC875057PUBVA1	87 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 100
PSC885057PUBVA1	88 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 100
PSC895057PUBVA1	89 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 100
PSC905057PUBVA1	90 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 100
PSC915057PUBA(XXXX)	91 GM 305-350 TRUCKS, BLAZERS, VANS TBI AUTO (BROADBENT CODE) *
PSC925057PUBA(XXXX)	92 GM 305-350 TRUCKS, BLAZERS, VANS TBI AUTO (BROADBENT CODE) *
PSC875057PUBVA7R	87 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC885057PUBVA7R	88 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC895057PUBVA7R	89 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC905057PUBVA7R	90 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC915057PUBVA7R	91 CHEVY - GMC 305 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC925057PUBVA7R	92 CHEVY - GMC 305 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC9157PUBVA7R	91 CHEVY - GMC 350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC9257PUBVA7R	92 CHEVY - GMC 350 TRUCKS, BLAZERS, VANS TBI AUTO 700R
PSC875057PUBVAM	87 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN.
PSC885057PUBVAM	88 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN.
PSC895057PUBVAM	89 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN.
PSC905057PUBVAM	90 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN.
PSC915057PUBVAM	91 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN.
PSC925057PUBVAM	92 CHEVY - GMC 305-350 TRUCKS, BLAZERS, VANS TBI MAN.
PSC87454PUSA	87 CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC88454PUSA	88 CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC89454PUSA	89 CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC90454PUSA	90 CHEVY - GMC 454 TRUCKS, SUBURBAN TBI AUTO 400
PSC91454PUSMH(XXXX)	91 GM 454 TRUCKS, SUBURBAN, MH TBI AUTO/BROADBENT *
PSC92454PUSMH(XXXX)	92 GM 454 TRUCKS, SUBURBAN, MH TBI AUTO/BROADBENT *
PSC87454PUSN	87 GM 454 TRUCKS, SUBURBAN TBI MAN
PSC88454PUSM	88 GM 454 TRUCKS, SUBURBAN TBI MAN
PSC89454PUSM	89 GM 454 TRUCKS, SUBURBAN TBI MAN
PSC90454PUSM	90 GM 454 TRUCKS, SUBURBAN TBI MAN
PSC91454PUSM	91 GM 454 TRUCKS, SUBURBAN, MH TBI MAN
PSC92454PUSM	92 GM 454 TRUCKS, SUBURBAN, MH TBI MAN

* DENOTES MM-CAL.