

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-195
Relating to Exemptions Under Section 27156
of the Vehicle Code

PAXTON PRODUCTS, INC.
SUPERCHARGER KIT MODEL NO. 10019

Pursuant to the authority vested in the Air Resources 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 supercharger kit model number 10019 manufactured by Paxton Products, Inc., of 929 Olympic Blvd., Santa Monica, California 90404, 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 1986-1989 model-year Ford Motor Company Bronco and F-150 vehicles powered by a 302 or a 351 CID engine.

This Executive Order is valid provided that installation instructions for this supercharger kit will not recommend tuning the vehicle to specifications different from those submitted by Paxton Products, Inc.

Changes made to the design or operating conditions of the supercharger kit, 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 supercharger kit using an identification other than that shown in this Executive Order or marketing of this supercharger kit 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 supercharger kit shall not be construed as an exemption to sell, offer for sale, or advertise any component of the kit as an individual device.

This Executive Order does not constitute any opinion as to the effect that the use of this supercharger kit 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 PAXTON PRODUCTS, INC. SUPERCHARGER KIT MODEL NO. 10019.

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 will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at El Monte, California, this 3rd day of August, 1989.



K. D. Drachand, Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF PAXTON PRODUCTS, INC.'S ADD-ON SUPERCHARGER KIT
MODEL NO. 10019 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE
CALIFORNIA CODE OF REGULATIONS

August 1989

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CALIFORNIA CODE OF REGULATIONS

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

Paxton Products, Inc. (Paxton) has requested for an exemption from the prohibitions of Vehicle Code Section 27156 for their add-on supercharger kit model number 10019. The supercharger kit is intended for installation on 1986-1989 Ford Motor Company Bronco and F-150 vehicles powered by a 302 or a 351 CID engine.

Paxton has submitted data from comparative emission tests conducted on a 1988 Ford Bronco powered by a 351 CID engine at Automated Custom Systems, Inc. Confirmatory tests were conducted on the same vehicle at the Air Resources Board (ARB) laboratory.

Based on the results from the comparative emission tests performed by Paxton and by the ARB, the staff concludes that Paxton's add-on supercharger kit will not adversely affect exhaust emissions from vehicles for which exemption is requested.

The staff recommends that Paxton be granted an exemption for their add-on supercharger kit model number 10019 for installation on 1986-1989 Ford Motor Company Bronco and F-150 vehicles powered by a 302 or a 351 CID engine, and that Executive Order D-195 be issued.

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EVALUATION OF PAXTON PRODUCTS, INC'S ADD-ON SUPERCHARGER KIT NO. 10019 FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTIONS 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

I. INTRODUCTION

Paxton Products, Inc. (Paxton), of 929 Olympic Blvd., Santa Monica, California 90404, has requested for an exemption from the prohibitions of Vehicle Code Section 27156 for their add-on supercharger kit model number 10019. The supercharger kit is intended for installation on 1986-1989 Ford Motor Company Bronco and F-150 vehicles powered by a 302 or a 351 CID engine.

Paxton has submitted data from comparative (stock baseline versus supercharged) emission tests conducted on a 1988 Ford Bronco powered by a 351 CID engine at Automated Custom Systems, Inc. of Orange California and Emission System Engineering of Huntington Beach, California. Confirmatory tests were conducted on the same vehicle at the Air Resources Board (ARB) laboratory in El Monte, California.

II. CONCLUSION

Based on the results from comparative emission tests performed by Paxton at Emission System Engineering and from the confirmatory tests performed by the ARB on a 1988 Ford Bronco, the staff concludes that Paxton's add-on supercharger kit will not adversely affect exhaust emissions from vehicles for which the exemption is requested.

III. RECOMMENDATIONS

The staff recommends that Paxton be granted an exemption for their add-on supercharger kit model number 10019 for installation on 1986-1989 Ford Motor Company Bronco and F-150 vehicles powered by a 302 or a 351 CID engine. The staff also recommends that Executive Order D-195 be issued.

IV. SUPERCHARGER KIT DESCRIPTION AND OPERATION

The Paxton supercharger kit is specifically designed for installation on 1986-1989 Ford Motor Company Bronco and F-150 vehicles powered by a 302 or a 351 CID engine. The kit operates in conjunction with the original equipment manufacturer (OEM) computer controlled electronic port fuel injection and emission control systems already certified with the stock engine. All the necessary hardware and supplies for installing the supercharger are included in the kit.

The purpose of supercharging an engine is to increase the volumetric efficiency of an engine by forcing more air into an engine than it would consume naturally aspirated (non-supercharged condition). This is accomplished by the addition of a centrifugal blower (Paxton P/N SN-60) that is belt driven at 1.5 times the speed of the engine. Intake air is delivered from the OEM air filtering system to the centrifugal blower. It is then compressed by the supercharger and routed to the throttle body of the electronic fuel injection system.

Maximum positive manifold pressure (boost) is limited to 5 psig by the blower scroll housing and the impeller design. No wastegate or other active boost limiting device is used.

To provide additional fuel to maintain proper air/fuel ratios during boost conditions a fuel control unit is added. The fuel control unit when placed in series with the OEM fuel pressure regulator in the fuel return line will increase the fuel pressure, and fuel delivery, under boost conditions. The unit is activated by a solenoid valve that is turned "on" and "off" via a pressure switch set at 0.95 psi based on the inlet manifold pressure. The fuel control unit has a static set pressure of 70 psi. Maximum static pressure of the OEM fuel pressure regulator is about 34 psi.

The blower is self lubricated by a piston-type oil pump. The oil sump has a capacity of 10 fluid ounces and uses type "A" automatic transmission fluid.

All OEM emission controls are left intact.

V. SUPERCHARGER KIT EVALUATION

A 1988 Ford Bronco powered by a 351 CID engine electronic port fuel injected engine was used for the evaluation of the supercharger kit. The dynamometer inertia weight and loading used during the testing was 5,250 lbs. and 15.6 hp, respectively.

Comparative emission tests conducted by Automated Custom systems, Inc., Emission System Engineering and the ARB consisted of back-to-back cold-start CVS-75 emission tests. Additionally, the ARB conducted comparative Highway Fuel Economy (HFET) tests. These tests were used to determine exhaust emissions and fuel economy in the unmodified and supercharged configurations for comparison. A summary of the test results is provided in the appendix.

VI. DISCUSSION

The results of the exhaust emission tests submitted by Paxton show no significant increase in emissions due to the installation of the supercharger kit (Table 1 of appendix). However, the initial confirmatory tests performed on the same test vehicle at the ARB facility showed that hydrocarbons (HC) and carbon monoxide (CO) significantly increased after the installation of the supercharger kit (Table 2 of appendix).

In order to reduce excess emissions to an acceptable level, Paxton replaced the fuel control unit supplied with the supercharger kit. The differences between the original fuel control unit and the replacement unit are: 1) the replacement unit contains an electronic circuitry which richens the air/fuel charge during fast accelerations; and 2) the replacement unit

contains a single diaphragm rather than two diaphragms of the original unit. Paxton feels that the replacement unit will reduce any excess emissions to an acceptable level.

A series of comparative exhaust emission tests were performed by Paxton at Emission System Engineering and by the ARB. The replacement fuel control unit was used during the device tests. The results of the exhaust emission tests submitted by Paxton (Table 3 of appendix) and of those performed by the ARB (Table 4 of appendix) show no significant increase in emissions due to the installation of the supercharger kit. Paxton has fulfilled the requirements for the exemption and, therefore, Executive Order D-195 should be issued.

APPENDIX

Table 1

Paxton Supercharger Kit No. 10019
 Exhaust Emission Test Results
 On A 1988 Ford Bronco 351 CID
 Automated Custom Systems

<u>Test Mode</u>	<u>Exhaust Emissions (gm/mi)</u>			<u>Fuel Economy (mpg)</u>
	<u>HC</u>	<u>CO</u>	<u>NOx</u>	<u>City</u>
Baseline	0.55	7.23	1.38	11.29
Baseline	0.55	6.57	1.29	11.31
Average	0.55	6.90	1.34	11.30
Device	0.57	7.68	1.36	11.41
Device	0.55	7.71	1.17	11.19
Average	0.56	7.70	1.27	11.30
% Change	+2	+12	-5	+0

Table 2

Paxton Supercharger Kit No. 10019
 Exhaust Emission Test Results
 On A 1988 Ford Bronco 351 CID
 Air Resources Board

<u>Test Mode</u>	<u>Exhaust Emissions (gm/mi)</u>			<u>Fuel Economy (mpg)</u>	
	<u>HC</u>	<u>CO</u>	<u>NOx</u>	<u>City</u>	<u>Highway</u>
Baseline	0.50	6.48	0.84	10.94	14.46
Baseline	0.43	5.11	0.89	10.90	14.40
Average	0.47	5.80	0.87	10.92	14.43
Device (1)	0.60	10.57	0.82	10.60	14.40
% Change	+29 (2)	+82 (2)	-5	-3	-0

(1): Only 1 test was performed during the device test. Paxton withdrew vehicle from test program because emissions exceeded limits allowed for exemption.

(2): Exceeds allowable limits for compliance with the requirements for the exemption.

Table 3

Paxton Supercharger Kit No. 10019
 Exhaust Emission Test Results
 On A 1988 Ford Bronco 351 CID
 Emission System Engineering

Test Mode	Exhaust Emissions (gm/mi)			Fuel Economy (mpg)
	HC	CO	NOx	City
Baseline	0.45	5.43	0.99	10.77
Baseline	0.48	5.97	0.97	10.82
Average	0.46	5.70	0.98	10.80
Device	0.45	5.73	0.95	10.80
Device	0.44	5.01	0.96	10.85
Average	0.45	5.37	0.96	10.83
% Change	-2	-6	-2	+0

Table 4

Paxton Supercharger Kit No. 10019
 Exhaust Emission Test Results
 On A 1988 Ford Bronco 351 CID
 Air Resources Board

<u>Test Mode</u>	<u>Exhaust Emissions (gm/mi)</u>			<u>Fuel Economy (mpg)</u>	
	<u>HC</u>	<u>CO</u>	<u>NOx</u>	<u>City</u>	<u>Highway</u>
Baseline	0.69	8.09	0.93	9.5	13.8
Baseline	0.49	4.70	0.98	10.3	14.0
Baseline	0.53	4.59	0.96	10.5	13.8
Average	0.57	5.79	0.96	10.1	13.9
Device	0.49	4.89	0.99	10.5	13.7
Device	0.60	6.26	1.00	10.5	14.1
Device	0.56	5.99	0.95	10.5	-
Average	0.55	5.71	0.98	10.5	13.9
% Change	-4	-1	+2	+4	+0