State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-438
Relating to Exemptions Under Section 27156
of the Vehicle Code

RIMMER ENGINEERING, INC.
5 PSI. SUPERCHARGER KIT

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 Section 39515 and Section 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That the installation of the 5 PSI. Supercharger Kit, manufactured and marketed by Rimmer Engineering, Inc., 940 Motor City Drive, Colorado Springs, Colorado 80906 has been found not to reduce the effectiveness of the applicable vehicle pollution control system and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1987-97 Rover Group Limited vehicles equipped with the 4.0/4.6L engine.

The 5 PSI. Supercharger Kit includes the following main components: Eaton M-62 supercharger, hardware and tubing necessary to connect to stock intake manifold and air filter housing, and a new throttle-body housing. No changes are made to the stock fuel delivery system or ignition system. The manufacturer recommends 91 or higher octane fuel. **The kit includes a 2.375" diameter supercharger pulley.**

This Executive Order is valid provided that the installation instructions for the supercharger will not recommend tuning the vehicle to specifications different from those of the vehicle manufacturer.

Changes made to the design or operating conditions of the supercharger, as exempt by the Air Resources Board, which adversely affect the performance of the vehicle's pollution control system shall invalidate this Executive Order.

Marketing of the supercharger using any identification other than that shown in this Executive Order or marketing of the supercharger 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 the supercharger shall not be construed as 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 the use of the supercharger may have on any warranty either expressed or implied by the vehicle manufacturer.

This Executive Order is granted based on submitted emissions test data which showed that the Rimmer Engineering, Inc.'s 5 PSI. Supercharger Kit did not adversely affect tailpipe emissions during the Cold Start CVS-75 Federal Test Procedure. However, the ARB finds that reasonable grounds exist to believe that use of the Rimmer Engineering, Inc.'s Supercharger Kit 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 supercharger 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 supercharger will affect the durability of the emission control systems, Rimmer Engineering, 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 RIMMER ENGINEERING, INC.'S SUPERCHARGER KIT.

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.

Violation of any of the above conditions shall be grounds for revocation of this order. The order may be revoked only after a ten-day written notice of intention to revoke the order, in which period the holder of the order may request in writing a hearing to contest the proposed revocation. If a hearing is requested, it shall be held within ten days of receipt of the request and the order may not be revoked until a determination after hearing that grounds for revocation exist.

Executed at El Monte, California, this 9th day of October 1997.

Raphael Susnowitz

for R. B. Summerfield, Chief
Mobile Source Operations Division

State of California
AIR RESOURCES BOARD

EVALUATION OF RIMMER ENGINEERING, INC.'S SUPERCHARGER KIT FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

October 1997

State of California
AIR RESOURCES BOARD

EVALUATION OF RIMMER ENGINEERING, INC.'S SUPERCHARGER KIT FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

by

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

SUMMARY

Rimmer Engineering, Inc. of 940 Motor City Drive, Colorado Springs, Colorado 80906 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for their supercharger designed for 1987-97 Rover Group Limited vehicles equipped with the 4.0/4.6L engine.

Based on submitted emissions test data, the staff concludes that the supercharger will not adversely affect exhaust emissions from vehicles for which the exemption is requested.

The staff recommends that Rimmer Engineering, Inc. be granted an exemption as requested and that Executive Order D-438 be issued.

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I. INTRODUCTION

Rimmer Engineering, Inc. of 940 Motor City Drive, Colorado Springs, Colorado 80906 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for their supercharger designed for 1987-97 Rover Group Limited vehicles equipped with the 4.0/4.6L engine.

II. CONCLUSIONS

Based on submitted emissions test data, the staff concludes that Rimmer Engineering, Inc.'s 5 PSI. Supercharger Kit will not adversely affect exhaust emissions from the vehicles for which the exemption is requested.

III. RECOMMENDATION

The staff recommends that Rimmer Engineering, Inc. be granted an exemption for their 5 PSI. Supercharger Kit for installation on those applicable Rover vehicles. The staff also recommends that Executive Order D-438 be issued.

IV. SUPERCHARGER KIT DESCRIPTION

The 5 PSI. Supercharger Kit has been specifically designed for installation on 1987-97 Rover Group Limited vehicles equipped with the 4.0/4.6L engine. The kit operates in conjunction with the original equipment manufacturer's (OEM) computer controlled fuel injection system and emission control system already certified with the stock engine.

The purpose of supercharging an engine is to increase its volumetric efficiency and power output at particular engine loads and throttle openings. At light engine loads and small throttle openings, power output is the same as a normally aspirated engine. At heavy engine loads and increased throttle openings, the manifold pressure is increased by the supercharger allowing more air to enter the engine, resulting in a higher power output. The supercharger is driven utilizing the engine's standard serpentine belt loop system.

The supercharger used for this kit is an Eaton roots type blower, designed to have a maximum boost of 5 PSI. Boost is limited only by the diameter of the input pulley.

The installation of the kit does not require any major modifications to the stock motor, except for the new intake tubing, intake manifold adaptors, a new throttle body housing, and hardware needed to transfer the stock components. The stock air cleaner is utilized with the supercharger installation. New parts include the intake air tubing which connects the supercharger to the stock intake manifold and stock air cleaner, throttle body housing, and all necessary hardware to mount the supercharger kit.

V. DISCUSSION OF THE SUPERCHARGER KIT

A 1996 Land Rover Discovery with a 4.0L fuel injected engine was used for the evaluation of the supercharger. Testing consisted of one Cold Start CVS-75 Federal Test Procedure in the baseline configuration, one Cold Start CVS-75 Federal Test Procedure in the modified configuration, and an OBD II evaluation. The dynamometer inertia weight and horsepower settings were 4750-lbs and 14.0-hp, respectively. The emissions testing was conducted by California Environmental Engineering. Table 1. list emission results in gm/mi.

Table 1.

	NMHC	CO	NOx
Baseline	0.34	2.59	0.23
Device	0.38	1.94	0.17
Difference	0.04	- 0.65	- 0.06

Results from the emission tests conducted at California Environmental Engineering show the vehicle emissions with the 5 PSI. Supercharger installed to be within the allowable test variability of 0.1 grams per mile or 10 percent of baseline for hydrocarbons and oxides of nitrogen and 1.0 grams per mile or 15 percent of baseline for carbon monoxide. Based on the test results, the staff concludes that the installation of the Rimmer Engineering, Inc.'s 5 PSI. Supercharger Kit will not have an adverse effect on exhaust emissions of the affected vehicles. The ARB did not perform testing to confirm the emission test results

submitted by the applicant; however, ARB staff evaluated the impact of the supercharger on the OBD II system. Scan tool testing confirmed that the supercharger did not affect the vehicle's ability to perform the OBD II system operation. Therefore, based on the test results and OBD II evaluation, the staff concludes that the installation of the supercharger will not have an adverse effect on exhaust emissions on those applicable vehicles when operated similar to the CVS-75 Federal Test Procedure.

Rover Group Limited certified one engine family in 1997 (VLR4.058GFFK) to the Enhanced Evaporative Emission Standards. The vehicle's evaporative emissions should not be affected because the installation of Rimmer Engineering, Inc.'s Supercharger Kit does not modify the vehicle's fuel or evaporative emission control system, and the stock closed element air cleaner is retained. Rimmer Engineering, Inc. has submitted all the required information and fulfilled the requirements for an exemption.