State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-271-1
Relating to Exemptions Under Section 27156
of the Vehicle Code

KENNE BELL PERFORMANCE PRODUCTS
TS1000 TWIN SCREW SUPERCHARGER KIT

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 Section 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, with a 2.18" or 2" pulley, Part No. TS1000, manufactured by Kenne Bell Performance Products of 10743 Bell Court, Rancho Cucamonga, California 91730, 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 installation on 1986-1993 model-year Ford Mustangs and 1986 Mercury Capris with 5.0 liter gasoline engines.

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 the product 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 KENNE BELL TS1000 TWIN SCREW 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 communications.

Violation of any of the above conditions shall be grounds for revocation of this order. The order may be revoked only after 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 2nd day of February, 1993.

R.B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF KENNE BELL PERFORMANCE PRODUCTS' TS1000 TWIN SCREW 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

February 1993

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by

Mobile Source Division
State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731-2990

SUMMARY

Kenne Bell Performance Products, of 10743 Bell Court, Rancho Cucamonga, CA 91730 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the Kenne Bell TS1000 Twin Screw Supercharger Kit. The supercharger kit is designed for installation on 1986-1993 model-year Ford Mustangs and 1986 model year Mercury Capris equipped with 5.0 liter engines.

Based on the results from emission tests performed by Milton Roy Company of Orange, California, and confirmatory tests at the Haagen-Smit Laboratory on a 1990 Ford Mustang GT, the staff concludes that Kenne Bell TS1000 Twin Screw Supercharger Kit will not adversely affect exhaust emission from vehicles for which an exemption is requested.

The staff recommends that Kenne Bell Performance Products be granted an exemption as requested and that Executive Order D-271-1 be issued.

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I. INTRODUCTION

Kenne Bell Performance Products of 10743 Bell Court, Rancho Cucamonga, California 91730 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code for the Kenne Bell TS1000 Twin Screw Supercharger Kit. The supercharger kit is designed for installation on 1986-1993 model-year Ford Mustangs and 1986 Mercury Capris equipped with 5.0 liter engines.

Kenne Bell Performance Products has submitted data from testing on a 1990 Ford Mustang GT at Milton Roy Company, Orange, California. In addition, the Air Resources Board (ARB) conducted a confirmatory test at the Haagen-Smit Laboratory.

II. CONCLUSION

Based on the results from emission test performed at Milton Roy Company and the confirmatory test by the ARB on a 1990 Ford Mustang GT, the staff concludes that Kenne Bell TS1000 Twin Screw Supercharger Kit will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

III. RECOMMENDATIONS

The staff recommends that Kenne Bell Performance Products be granted an exemption for their TS1000 Twin Screw Supercharger Kit for installation on

1986-1993 model-year Ford Mustangs and 1986 model year Mercury Capris equipped with 5.0 Liter engine. The staff also recommends that Executive Order D-271-1 be issued.

IV. DEVICE DESCRIPTION

The Kenne Bell TS1000 Twin Screw Supercharger Kit is designed for installation on 1986-1993 model-year Ford Mustangs and 1986 model year Mercury Capris equipped with 5.0 Liter engines. The supercharger kit is comprised of an Autorotor 3-133 supercharger, a fuel system booster, and other hardware and plumbing necessary to install the kit. The supercharger kit operates in conjunction with the original equipment manufacturer (OEM) computer controlled fuel injection and the 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, the engine manifold pressure and 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 and fuel to enter the engine, resulting in higher power output.

The Autorotor 3-133 supercharger is a positive displacement (1.33L/rev) twin screw rotor air compressor powered by a crankshaft driven serpentine belt. The compressor operates with the rotation of two rotors, a "female" rotor and a

"male" rotor. The "male rotor is driven, using internal gearing, at 1.5 times the speed of the "female" rotor. The maximum volume of air is determined by selecting the proper ratio between the supercharger pulley and the crankshaft pulley. The Kenne Bell TS1000 Supercharger is available with two sizes of supercharger drive pulleys. One kit is offered with a 2.18" diameter pulley which drives the "female" rotor at a speed 2.67 times the speed of the crankshaft pulley. This allows for a maximum boost of 5 p.s.i. The kit is also available with a 2.0" pulley, which drives the "female" rotor at a speed 2.92 times the speed of the crankshaft. This kit provides an 8 p.s.i. maximum boost. For either kit, the OEM air cleaner assembly and air intake location are used. The OEM mass air flow meter is used, and the fuel delivery and spark timing are controlled by the OEM computer.

To maintain the correct air/fuel ratio during boost conditions, additional fuel is supplied by increasing the fuel pressure. This is accomplished by supplying an additional fuel system booster, which is enabled only during boost conditions. This is accomplished by biasing the fuel booster with manifold pressure. Installation of Kenne Bell TS1000 Twin Screw Supercharger Kit does not alter the OEM location of the oxygen sensor or the catalyst. The tune-up specifications also remain the same.

V. SUPERCHARGER KIT SYSTEM EVALUATION AND DISCUSSION

A 1990 Ford Mustang GT Convertible equipped with a 5.0 liter (302 CID) fuel injected gasoline engine was used for the evaluation of the TS1000 supercharger kit. The dynamometer inertia weight and loading were 3625-lbs and 9.8-hp respectively.

Emission tests conducted by Milton Roy Company for Kenne Bell Performance Products consisted of one Cold-Start CVS-75 emission test in the baseline configuration and one Cold-Start CVS-75 emission test with the Kenne Bell TS1000 8 p.s.i. supercharger kit installed. Confirmatory tests were performed by the ARB following the same test sequence. A summary of the test results is shown below:

Exhaust Emissions Test Results
On A 1990 Mustang GT 5.0
(Milton Roy Company)

Test Mode	Exhaust Emissions (gm/mi) NMHC	CO	NOx
Baseline	.379	1.317	.751
Modified	.085	.485	.676
Difference	-77.5%	-63.2%	-10.0%

Confirmatory Test
(*Haagen-Smit Laboratory*)

Test Mode	Exhaust Emissions (gm/mi) NMHC	CO	NOx
Baseline	.487	2.529	1.178
Modified	.182	1.682	.874
Difference	-62.6%	-33.5%	-25.8%

Results from the emission tests conducted at Milton Roy Company and the Haagen-Smit Laboratory show the vehicle emissions with the Kenne Bell TS1000 Twin Screw Supercharger Kit installed are not increased when compared to the baseline tests. Based on these test results, the staff concludes that the installation of the *Kenne Bell TS1000 Twin Screw Supercharger* Kit did not have an adverse effect on exhaust emissions of the affected vehicles. Kenne Bell Performance Products has submitted all the required information and fulfilled the requirements for exemption.