

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-397
Relating to Exemptions Under Section 27156
of the Vehicle Code.

GREDDY PERFORMANCE PRODUCTS, INC.
MAZDA MIATA TURBO 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 Mazda Miata Turbo Kit (Part Number 323814) consisting of the following main parts: Mitsubishi turbocharger, exhaust manifold, front pipe, turbo intake and compression pipes, secondary fuel pressure regulator, and Airinx air filter, manufactured by Trust Company, Ltd. of 3155-5 Odai, Shibayama-machi, Sanbun-gun, Chiba 289-16 Japan and marketed by GReddy Performance Products, Inc. of 9 Vanderbilt, Irvine, CA 92718 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 installation on 1990 through 1993 1.6L Mazda Miata vehicles except those equipped with anti-lock braking systems (ABS).

This Executive Order is valid provided that the installation instructions for the Mazda Miata Turbo Kit will not recommend tuning the vehicle to specifications different from those submitted by GReddy Performance Products, Inc.

Changes made to the design or operating conditions of the Mazda Miata Turbo Kit, as exempt by the Air Resources Board, which adversely affect the performance of a vehicle's pollution control system shall invalidate this executive order.

Marketing of the Mazda Miata Turbo Kit using any identification other than that shown in this Executive Order or marketing of the Mazda Miata Turbo 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 the Mazda Miata Turbo Kit 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 that the use of the Mazda Miata Turbo Kit may have on any warranty either expressed or implied by the vehicle manufacturer.

This Executive Order is granted based on emissions tests conducted in accordance with Cold-Start CVS-75 Federal Test Procedure. However, the Air Resources Board finds that reasonable grounds exist to believe that use of the Mazda Miata Turbo Kit may adversely affect emissions of motor vehicles when operating under conditions outside the parameters of the previously prescribed test procedures. Accordingly, the Air Resources Board 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 Mazda Miata Turbo Kit 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 Air Resources Board with reason to suspect that the Mazda Miata Turbo Kit will affect the durability of the emission control, GReddy Performance Products, Inc. shall be required to submit durability data to show that the durability of the vehicle emissions control system is not, in fact, affected and/or that the add-on or modified part demonstrates adequate durability.

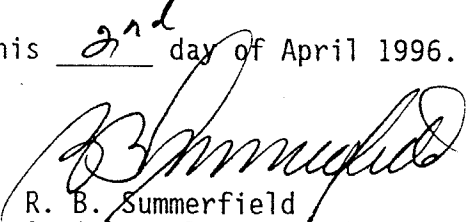
In addition to the foregoing, the Air Resources Board reserves the right in the future to review this Executive Order and the exemption provided herein to assure that the exempted add-on or modified part continues to meet the standards and procedures of Title 13, California Code of Regulations, Section 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 GREDDY PERFORMANCE PRODUCTS, INC'S MAZDA MIATA TURBO 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 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 April 1996.


R. B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF THE GREDDY PERFORMANCE PRODUCTS, INC.
MAZDA MIATA TURBO KIT
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13,
OF THE CALIFORNIA CODE OF REGULATIONS

April 1996

State of California
AIR RESOURCES BOARD

EVALUATION OF THE GREDDY PERFORMANCE PRODUCTS, INC.
MAZDA MIATA TURBO KIT
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SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13,
OF THE CALIFORNIA CODE OF REGULATIONS

by

Mobile Source Division
State of California
Air Resources Board
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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

GReddy Performance Products, Inc. (GReddy) of 9 Vanderbilt, Irvine, California, 92718 has applied for exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the GReddy Mazda Miata Turbo Kit (part number 323814). The Greddy Mazda Miata Turbo Kit, manufactured by Trust Company, Ltd. of 3155-5 Odai, Shibayama-machi, Sanbu-gun, Chiba 289-16 Japan, is designed for installation on 1990 through 1993 model year Mazda Miata's equipped with 1.6L engines except those equipped with anti-lock braking systems (ABS). It includes the following main emission related components: turbocharger, exhaust manifold, front pipe, turbocharger intake and compression (outlet) pipes, secondary fuel pressure regulator, and air filter. All the components except for the secondary fuel pressure regulator and turbocharger are installed in place of the original equipment manufacturer components. The components of the package provide for the connection of all emission control devices. The installation of the kit requires a timing retard of 4 degrees. All other tune-up specifications remain the same as for the stock Mazda Miatas.

GReddy has submitted comparative test data on a 1993 1.6L Mazda Miata tested at Roush Laboratories in Garden Grove, California. The results were confirmed at the Air Resources Board's Haagen Smit Laboratory in El Monte, California. Based on the results from the emission testing performed at Roush and the ARB, staff concludes that the GReddy Mazda Miata Turbo Kit will not adversely affect exhaust emissions from 1990 through 1993 1.6L Mazda Miata's except those equipped with ABS.

The staff recommends that GReddy be granted an exemption as requested and that Executive Order D-397 be issued.

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I. INTRODUCTION

GReddy Performance Products, Inc. (GReddy) of 9 Vanderbilt, Irvine, California 92718 has applied for exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the GReddy Mazda Miata Turbo Kit (part number 323814). The Mazda Miata Turbo Kit is designed for installation on 1990 through 1993 model year Mazda Miata 1.6L engines except those equipped with anti-lock braking systems (ABS). The Mazda Miata Turbo Kit includes the following main emission related components:

<u>Part Name</u>	<u>Manufacturer</u>	<u>Part Number</u>
Turbocharger	Mitsubishi	TDO4H-15C-8.5 cm
Exhaust manifold	Trust CO, Ltd.	323814-1
Front pipe	Trust CO, Ltd.	323814-2
Turbo intake pipe	Trust CO, Ltd.	323814-3
Turbo compression (outlet) pipe	Trust CO, Ltd.	323814-4
Secondary fuel pressure regulator	Trust CO, Ltd.	323814-5
Airinx air filter/adaptor	Trust CO, Ltd.	525002/52545

All the components except for the secondary fuel pressure regulator and turbocharger are installed in place of the original equipment manufacturer (OEM) components. The components of the package provide for the connection of all emission control devices. The installation of the kit requires a timing retard of 4 degrees. All other tune-up specifications remain the same as for the stock Mazda Miatas.

GReddy has submitted vehicle emission test data for a 1.6L Mazda Miata which was tested in the baseline (unmodified) and modified (turbo kit installed) configuration at Roush Laboratories in Garden Grove, CA. Confirmatory tests were conducted on this vehicle at the Air Resources Board's (ARB's) Haagen Smit Laboratory in El Monte, California.

II. CONCLUSION

Based on the results from emission testing performed at Roush and the ARB on the 1993 1.6L Mazda Miata, the staff concludes that the GReddy Mazda Miata Turbo Kit will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

III. RECOMMENDATION

The staff recommends that GReddy be granted an exemption for their Mazda Miata Turbo Kit for installation on 1990 through 1993 model year 1.6L Mazda Miata's except those equipped with ABS. The staff also recommends that Executive Order D-397 be issued.

IV. DESCRIPTION OF THE GREDDY PERFORMANCE PRODUCTS, INC. MAZDA MIATA TURBO KIT

The GReddy Mazda Miata Turbo Kit (part number 323814) is designed for installation on 1990 through 1993 model year 1.6L Mazda Miata's except those equipped with ABS. The components of Mazda Miata Turbo Kit operate in conjunction with the OEM's fuel injection and emission control systems.

The manufacturer claims the purpose of the modifications is to increase the volumetric efficiency of the 1990 through 1993 1.6L Mazda Miata vehicles equipped with the kit. The following are the main emission related components of the Mazda Miata Turbo Kit:

<u>Part Name</u>	<u>Manufacturer</u>	<u>Part Number</u>
Turbocharger	Mitsubishi	TDO4H-15C-8.5 cm
Exhaust manifold	Trust CO, Ltd.	323814-1
Front pipe	Trust CO, Ltd.	323814-2
Turbo intake pipe	Trust CO, Ltd.	323814-3
Turbo compression (outlet) pipe	Trust CO, Ltd.	323814-4
Secondary fuel pressure regulator	Trust CO, Ltd.	323814-5
Airinx air filter/adapter	Trust CO, Ltd.	525002/52545

1. Mitsubishi turbocharger (part number TDO4H-15C-8.5 cm)
2. Exhaust Manifold (Trust part number 323814-1) - The exhaust manifold is manufactured consistent with the OEM manufacturing process of cast iron. The overall length is one half the original length to accommodate the installation of the system and the wall thickness is 0.22 inches.
3. Front pipe (Trust part number 323814-2) - The front pipe is manufactured of 14 gage stainless steel. The front pipe is installed downstream of the exhaust manifold and has a port for the OEM oxygen sensor. The overall distance from the exhaust to the oxygen sensor is increased from fourteen inches stock to twenty six inches with the turbo kit installed.
4. Turbo intake pipe (Trust part number 323814-3) - The turbo intake pipe is manufactured of one quarter inch thick aluminum and is installed between the OEM air flow meter assembly and the turbocharger.
5. Turbo compression (outlet) pipe (Trust part number 323814-4) - The turbo compression pipe is manufactured of one quarter inch thick aluminum and is installed downstream of the turbocharger.

6. Secondary fuel pressure regulator - (Trust part number 323814-5) - The secondary fuel pressure regulator operates off of manifold pressure to increase the fuel pressure during turbocharger operation. The secondary fuel pressure regulator is installed in the fuel return line with the stock regulator.
7. Airinx air filter - (Trust part number 525002/52545 adapter) - The Airinx open element air filter is installed upstream of the OEM mass air flow meter in place of the OEM air box and cleaner element.

All the components except for the secondary fuel pressure regulator and turbocharger are installed in place of the OEM components. The components of the package provide for the connection of all emission control devices. The installation of the kit requires a timing retard of 4 degrees. All other tune-up specifications remain the same as for the stock Mazda Miatas.

V. DISCUSSION OF THE GREDDY PERFORMANCE PRODUCTS, INC. MAZDA MIATA TURBO KIT

The main components in the Mazda Miata Turbo Kit are installed in place of the OEM components aside from the secondary fuel pressure regulator and turbocharger which are additional. All emission control systems remain in the OEM configuration except for the PCV system and the oxygen sensor. The positive crankcase ventilation (PCV) system breather hose is re-routed so that the fresh air source to the crankcase is before the turbocharger. The (PCV) port used in the OEM system is capped. The new position of the PCV breather hose port should have no impact on emissions. The oxygen sensor is moved from it's original position at a distance of fourteen inches from the exhaust ports to twenty six inches from the exhaust ports. The installation of the kit requires a timing retard of four

(4) degrees. Any impact these modifications have on emissions should be evident in the emission test results. All other tune-up specifications remain the same as for the stock Mazda Miatas

A 1993 1.6L Mazda Miata was used for the evaluation of the Mazda Miata Turbo Kit. A cold-start CVS-75 Federal Test Procedure was conducted to determine emissions of hydrocarbons (HC), oxides of nitrogen (NOx), and carbon monoxide (CO). The vehicle was tested in the baseline (unmodified) configuration and then with the Mazda Miata Turbo Kit installed. The vehicle was tested at Roush Laboratories in Garden Grove, California. The test weight and actual dynamometer horsepower were 2500 pounds and 8.8 horsepower respectively.

A summary of the test results is shown below:

1993 Mazda Miata
Exhaust Emission Test Results (gm/mi)

	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Roush Baseline Test Results	0.175	1.883	0.08
Roush Modified Test Results	0.189	1.807	0.158
Difference	0.014	-0.076	0.078
Allowable Difference	0.10	1.0	0.10
ARB Baseline Test Results	0.171	2.34	0.089
ARB Modified Test Results	0.168	1.793	0.189
Difference	-0.003	-0.547	0.10
Allowable Difference	0.10	1.0	0.10

The "Procedures for Exemption of Add-On and Modified Parts" state that the modified parts will be in compliance if the difference between the device emission test results and the baseline emission test results (both of which are measured in grams per mile

or grams per test as applicable) is equal to or less than the larger of the limits for each of the component elements of exhaust emissions listed below:

Hydrocarbon	0.10 grams per mile or 10% of baseline
Carbon Monoxide	1.0 grams per mile or 15% of baseline
Oxides of Nitrogen	0.10 grams per mile or 10% of baseline

The results from the emission tests show that the difference between the baseline and modified emission test is within the allowable limits. Therefore, based on the test results, the staff concludes that the installation of GReddy's Mazda Miata Turbo Kit will not have an adverse effect on exhaust emissions on the vehicles for which exemption is requested.

GReddy has submitted all the required information and fulfilled the requirements for an exemption.