

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-140-10
Relating to Exemptions under Section 27156
of the Vehicle Code

SPEARCO PERFORMANCE PRODUCTS, INC.
*INTERCOOLED TURBOCHARGER KIT FOR FORD VEHICLES
POWERED BY A 6.9 LITER INTERNATIONAL HARVESTER
HEAVY-DUTY DIESEL ENGINE

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 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 intercooled turbocharger kit (using a Rajay/Rotomaster turbocharger with an A/R ratio of 1.0) on heavy-duty Ford Motor Company vehicles powered by a 6.9 liter International Harvester heavy-duty diesel engine manufactured by Spearco Performance Products, Inc., of 7541 Woodman Place, Van Nuys, California 91405, 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 1983 through 1986 model-year Ford Motor Company vehicles powered by a 6.9 liter International Harvester heavy-duty diesel engine.

This Executive Order is valid provided that installation instructions for this device 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 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 a kit 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 SPEARCO PERFORMANCE PRODUCTS, INC. INTERCOOLED TURBOCHARGER KIT FOR INSTALLATION ON FORD MOTOR COMPANY VEHICLES POWERED BY A 6.9 LITER INTERNATIONAL HARVESTER HEAVY-DUTY DIESEL ENGINE.

No claim of any kind, such as "Approved by 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.

Executive Order No. D-140-9, dated October 11, 1985, is superseded and of no further force and effect.

Executed at El Monte, California, this 31st day of December, 1985.



K. D. Drachand, Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF SPEARCO PERFORMANCE PRODUCTS, INC.'S ADD-ON INTERCOOLED
TURBOCHARGER KIT FOR INSTALLATION IN FORD MOTOR COMPANY VEHICLES POWERED
BY A 6.9 LITER INTERNATIONAL HARVESTER HEAVY-DUTY DIESEL ENGINE

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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

Spearco Performance Products, Inc. has requested an update to the existing Air Resources Board's Executive Order (E.O.) No. D-140-9 which exempted Spearco's intercooled turbocharger kit from the prohibitions in California Vehicle Code Section 27156. The update request is to include 1986 model-year Ford Motor Company vehicles powered by a 6.9 liter International Harvester heavy-duty diesel engine.

Spearco has previously submitted data from comparative (stock baseline versus turbocharged) emission tests conducted on a 1984 Ford F-350XL heavy-duty diesel truck.

Based on the results from comparative exhaust emission tests previously performed by Spearco, and that the 1986 vehicles for which exemption update has been requested are carry-overs from the 1985 models which, in turn, are carry-overs from the 1984 models, the staff concludes that Spearco's intercooled turbocharger kit will not adversely affect exhaust emissions from vehicles for which exemption has been requested.

The staff recommends that Spearco be granted an exemption update for their add-on intercooled turbocharger kit for installation on 1983 through 1986 model-year Ford Motor Company vehicles powered by a 6.9 liter International Harvester heavy-duty diesel engine. The staff also recommends that Executive Order D-140-10 be issued.

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I. INTRODUCTION

Spearco Performance Products, Inc., of 7541 Woodman Place, Van Nuys, California 91405, has requested an update to the existing Air Resources Board's Executive Order (E.O.) No. D-140-9 which exempted Spearco's intercooled turbocharger kit from the prohibitions in California Vehicle Code Section 27156. The update request is to include 1986 model-year Ford Motor Company vehicles powered by a 6.9 liter International Harvester heavy-duty diesel engine.

Spearco has previously submitted data from comparative (stock baseline versus turbocharged) emission tests conducted on a 1984 Ford F-350XL heavy-duty diesel truck at FCI International Testing Laboratory in Santa Ana, California.

II. CONCLUSION

Based on the results from comparative exhaust emission tests previously performed by Spearco at an independent laboratory on a 1984 Ford F-350XL truck, and that the 1986 vehicles for which exemption update has been requested are carry-overs from the 1985 models which, in turn, are carry-overs from the 1984 models, the staff concludes that Spearco's intercooled turbocharger kit will not adversely affect exhaust emissions from vehicles for which exemption has been requested.

III. RECOMMENDATIONS

The staff recommends that Spearco be granted an exemption update for their add-on intercooled turbocharger kit for installation on 1983 through 1986 model-year Ford Motor Company vehicles powered by a 6.9 liter International Harvester heavy-duty diesel engine. The staff also recommends that Executive Order D-140-10 be issued.

IV. TURBOCHARGER KIT DESCRIPTION

The purpose of turbocharging an engine is to increase the volumetric efficiency of an engine by forcing more air into the engine than it would take in under non-turbocharged OEM conditions. An intercooler manifold is added to reduce the temperature of the compressed intake air going into the engine.

The major components of the Spearco intercooled turbocharger kit are a 1.0 A/R ratio Rajay/Rotomaster turbocharger, an exhaust manifold to turbocharger adaptor, an intercooler manifold, and an intake manifold bonnet. The components are packaged with installation hardware and instructions and sold as a kit.

The OEM exhaust manifold (left bank) is replaced by the Spearco exhaust manifold to turbocharger adaptor. The turbine inlet mounts directly to the replacement exhaust manifold. Intake air is routed from the air cleaner assembly to the compressor. Compressed air is then piped through the intercooler manifold into the engine.

For optimum performance of the turbocharger kit, the fuel pump is recalibrated for increased fuel delivery. Spearco recommends that the fuel delivery rate be increased by 12%. This can be accomplished by rotating the adjusting screw 150°.

Maximum positive manifold pressure (boost) is limited to 10 psig by the size of (and the speed of exhaust flow through) the turbine housing. No wastegate or other active boost limiting device is used.

Lubrication and cooling of the turbocharger is provided by oil hosed from the oil pressure sending unit. Oil from the turbocharger is returned to the oil pan.

All OEM emission controls are left intact.

V. TURBOCHARGER KIT EVALUATION

Evaluation of the Spearco add-on intercooled turbocharger kit consisted of comparative (without and with the kit installed on the test vehicle) exhaust emission test previously performed on a 1984 Ford F-350XL. The exhaust emission tests were performed according to the adopted "Criteria for Evaluation of Add-On Parts and Modified Parts; Criteria for Testing Aftermarket Turbochargers".

A summary of the data from comparative tests is shown in Table 1.

Table 1

Spearco's Emission Test Data
Evaluation of Spearco's Add-On Intercooled Turbocharger
Steady-State Tests

<u>Mode</u>	<u>Exhaust Emissions (ppm)</u>		
	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Baseline Idle	200	140	22
Turbo Idle	110	140	33
Baseline 20 mph	510	977	95
Turbo 20 mph	403	870	44
Baseline 30 mph	380	803	99
Turbo 30 mph	320	733	43
Baseline 40 mph	200	420	102
Turbo 40 mph	203	403	33
Baseline 50 mph	290	581	141
Turbo 50 mph	235	458	40
Baseline 55 mph	305	587	161
Turbo 55 mph	245	468	53

VI. DISCUSSION

The data in Table 1 indicates that exhaust emissions are lower with the turbocharger kit than without the kit, except a slight increase in oxides of nitrogen (NOx) emissions during idle. In general, the data demonstrates compliance with the requirements for the exemption.

Due to limited resources, ARB did not perform confirmatory tests.