

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-176-6  
Relating to Exemptions Under Section 27156  
of the Vehicle Code

DINAN PERFORMANCE ENGINEERING  
M-CAR STROKER 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 M-Car Stroker Engine manufactured by Dinan Performance Engineering (Dinan) of 81 Pioneer Way, Mountain View, CA 94041, 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 the 1984 to 1988 BMW M5 & M6, and 1991 to 1993 BMW M5 sports cars equipped with a 3.5L gasoline engine.

The Dinan's M-Car Stroker Engine includes the following: Crankshaft, pistons, rings, and programmable read only memory (PROM) chip. No emission control components are removed during the installation.

This Executive Order is valid provided that installation instructions for the M-Car Stroker Engine will not recommend tuning the vehicle to specifications different from those submitted by Dinan Performance Engineering.

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

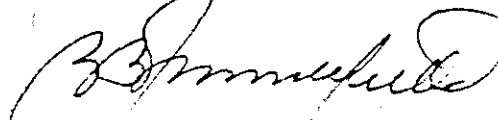
This Executive Order does not constitute any opinion as to the effect the use of these M-Car Stroker Engine may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF DINAN PERFORMANCE ENGINEERING'S M-CAR STROKER ENGINE.

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 28<sup>th</sup> day of October, 1992.



R. B. Summerfield  
Assistant Division Chief  
Mobile Source Division

State of California  
AIR RESOURCES BOARD

EVALUATION OF DINAN PERFORMANCE ENGINEERING'S  
M-CAR STROKER ENGINE FOR EXEMPTION FROM THE PROHIBITIONS OF  
VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE  
CALIFORNIA CODE OF REGULATIONS

October 1992

State of California  
AIR RESOURCES BOARD

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by

Mobile Source Division  
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Air Resources Board  
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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

Dinan Performance Engineering (Dinan) of 81 Pioneer Way, Mountain View, CA 94041, has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the M-Car Stroker Engine. The M-Car Stroker Engine is designed for installation on 1984 to 1988 BMW M5 & M6, and 1991 to 1993 BMW M5 sports cars equipped with a 3.5L gasoline engine.

Dinan submitted a completed application and other required information, as well as emissions test data performed at the Milton Roy Company in Orange, California.

Based on the submitted information, and emissions testing conducted at the Milton Roy Company and confirmed by the Air Resources Board, the staff concludes that the Dinan's M-Car Stroker Engine will not adversely affect exhaust emissions from the vehicles for which an exemption is requested.

The staff recommends that Dinan Performance Engineering, be granted an exemption as requested and that Executive Order D-176-6 be issued.

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I. INTRODUCTION

Dinan Performance Engineering (Dinan) of 81 Pioneer Way, Mountain View, CA 94041, has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the M-Car Stroker Engine. The M-Car Stroker Engine is designed for installation on 1984 to 1988 BMW M5 & M6, and 1991 to 1993 BMW M5 sports cars equipped with a 3.5L gasoline engine.

Dinan submitted a completed application and other required information, as well as emissions test data performed at the Milton Roy Company in Orange, California.

II. CONCLUSIONS

Based on the submitted information, and emissions testing conducted at the Milton Roy Company and confirmed by the Air Resources Board, the staff concludes that the Dinan's M-Car Stroker Engine will not adversely affect exhaust emissions from the vehicles for which an exemption is requested.

III. RECOMMENDATION

The staff recommends that Dinan Performance Engineering, be granted an exemption for their M-Car Stroker Engine designed for installation on 1984 to 1988 BMW M5 & M6, and 1991 to 1993 BMW M5 sports cars equipped with a 3.5L gasoline engine. The staff also recommends that Executive Order D-176-6 be issued.

IV. M-CAR STROKER ENGINE DESCRIPTION

The purpose of the M-Car Stroker Engine package is to increase rear wheel horse power and torque by altering the design characteristics of the

crankshaft, pistons, rings, and programmable read only memory (PROM) chip. The new crankshaft is designed to provide an additional 6 mm increase in the stroke of the piston. Increasing the stroke requires Dinan to install specially designed forged aluminum pistons with high performance rings. Table 1 compares the stock engine to the M-Car Stroker Engine as provided by Dinan Performance Engineering. Dinan sells the M-Car Stroker Engine package as a short-block assembly (engine block minus the cylinder heads) with the modified crankshaft, pistons, and rings already assembled. Other components in the M-Car short block assembly are either reconditioned or new OEM parts. The new PROM incorporated with the M-Car package differs from the OEM PROM in ignition timing and fuel. The PROM tables are altered to compensate for the changes made to the engine and the recommendation of premium fuel.

Table 1.

	Stock	Modified
Displacement	3453 cc	3798 cc
Bore	93.4 mm	93.6 mm
Stroke	84.0 mm	92.0 mm
Compression Ratio	9.8 to 1	10.2 to 1
Peak Horsepower	256 HP	328 HP

Any additional components which are not part of the original short block assembly are removed and installed on the Dinan short block assembly using the supplied gaskets. No adjustments are required during the installation.

#### V. DISCUSSION OF THE M-CAR STROKER ENGINE

Dinan Performance Engineering, has requested that the M-Car Stroker Engine be exempted for 1984 to 1988 BMW M5 & M6, and 1991 to 1993 BMW M5 sports cars equipped with a 3.5L gasoline engine. A 1990 BMW M-5 with a 3.5L engine



was used for testing. Dinan performed testing at the Milton Roy Company with the vehicle emissions compared against emission standards. The inertia weight was set at 4000 lbs. and 7.7 hp.

The results of the exhaust emissions test performed at the Milton Roy Company are shown in Table 2.

Table 2

CVS-75 TEST RESULTS

(Milton Roy Company)

	<u>HC</u>	<u>CO</u>	<u>NOx</u>
	(grams/mile)		
Device	0.19	1.60	0.24
Standard	0.39	7.0	0.7

Confirmatory testing was conducted at the Air Resources Board's Haagen-Smit. Results are shown in Table 3.

Table 3

CVS-75 TEST RESULTS

(Haagen-Smit)

	<u>HC</u>	<u>CO</u>	<u>NOx</u>
	(grams/mile)		
Device	0.345	1.50	0.287
Standard	0.39	7.0	0.7

These results show that the emissions of the modified vehicle do not exceed the vehicle's emissions standards.

Dinan Performance Engineering submitted all of the required information and fulfilled the requirements for an exemption.

**APPENDIX**

Modified parts list: 91 > US M5

Quantity	DINAN Part Number	Description
1	D512-0310	Billet Crankshaft 92mm
6	D512-0200	Forged aluminum pistons
6 sets	D520-0200	High-Performance ring
1	D903-0440	Calibration PROM

Modified parts list: 84-88 Euro M5 and M6

Quantity	DINAN Part Number	Description
1	D512-0300	Billet Crankshaft 92mm
6	D512-0200	Forged aluminum pistons
6 sets	D520-0200	High-Performance rings
1	D903-0600	Calibration PROM

Modified parts list: 87-88 US M5 and M6

Quantity	DINAN Part Number	Description
1	D512-0300	Billet Crankshaft 92mm
6	D512-0200	Forged aluminum pistons
6 sets	D520-0200	High-Performance rings
1	D903-0500	Calibration PROM