

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-225  
Relating to Exemptions Under Section 27156  
of the Vehicle Code

CRANE CAM, INC.  
COMPUCAM 2000 SERIES 2010, 2020, AND 2030

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 Compucam 2000 series manufactured by Crane Cams, Inc. of 530 Fentress Blvd., Daytona Beach, FL 32114 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 and older General Motors vehicles powered with a 267 CID (4.4L) to 350 CID (5.7L) V-8 gasoline engines.

This Executive Order is valid provided that installation instructions for this Compucam 2000 Series will not recommend tuning the vehicle to specifications different from those submitted by Crane Cams, Inc.

Changes made to the design or operating conditions of the camshafts, 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 this performance package using any identification other than that shown in this Executive Order or marketing of this performance package 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 performance package 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 this performance package 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 CRANE CAMS' COMPUCAM 2000 SERIES CAMSHAFTS.

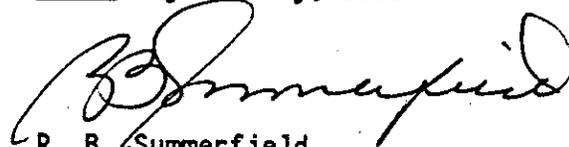
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No claim of any kind, such as "Approved by the Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

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 25<sup>th</sup> day of July, 1991.



R. B. Summerfield  
Assistant Division Chief  
Mobile Source Division

State of California  
AIR RESOURCES BOARD

EVALUATION OF CRANE CAMS, INC. COMPUCAM 2000 SERIES  
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE  
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF  
THE CALIFORNIA CODE OF REGULATIONS

July 1991

State of California  
AIR RESOURCES BOARD

EVALUATION OF CRANE CAMS, INC. COMPUCAM 2000 SERIES  
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THE CALIFORNIA CODE OF REGULATIONS

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 the mention of trade names or commercial products constitute endorsement or recommendation for use.)

## SUMMARY

Crane Cams, Inc. has applied for an exemption from the prohibitions of the Vehicle Code Section 27156 for their Compucam 2000 series 2010, 2020, and 2030 camshafts for installation on 1987 and older General Motors vehicles equipped with 267 CID (4.4L) to 350 CID (5.7L) V-8 gasoline engines utilizing feedback or conventional carburetors. Crane Cams has submitted a completed application and all the required information, as well as exhaust emissions test data performed at Crane Emissions Laboratory which demonstrated that the specified camshafts do not have any adverse effect on the exhaust emissions of the affected vehicles. Testing performed at the Air Resources Board (ARB) confirmed the test results of Crane Emissions Laboratory.

Based on the submitted information and the results of the emissions tests performed at Crane Emissions Laboratory and the ARB, the staff concludes that the installation of Crane Cams' Compucam 2000 series will not adversely affect exhaust emissions on the specified vehicles.

The staff recommends Crane Cams, Inc. be granted an exemption as requested and that Executive Order D-225 be issued.

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EVALUATION OF CRANE CAMS, INC. COMPUCAM 2000 SERIES FOR  
EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE  
WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

I. INTRODUCTION

Crane Cams, Inc. of 530 Fentress Blvd., Daytona Beach, Florida 32114, has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their Compucam 2000 series 2010, 2020, and 2030 camshafts for installation on 1987 and older General Motors vehicles using feedback or conventional carburetors.

Crane Cams has submitted a completed application and all the required information, as well as exhaust emissions test data performed at Crane Emissions Laboratory which demonstrated that the Compucam 2000 series does not have any adverse effect on the exhaust emissions of the affected vehicles. Testing performed at the Air Resources Board (ARB) confirmed the test results of Crane Emissions Laboratory.

The staff recommends Crane Cams, Inc. be granted an exemption as requested and that Executive Order D-225 be issued.

II. CONCLUSIONS

Based on the submitted information and the results of the emissions tests performed at Crane Emissions Laboratory and confirmatory testing conducted at the ARB, the staff concludes that the Crane Cams, Inc. Compucam 2000 series will not adversely affect exhaust emissions from vehicles for which the exemption is requested.

III. RECOMMENDATION

The staff recommends that Crane Cams, Inc. be granted an exemption as requested and that Executive Order D-225 be issued.

#### IV. COMPUCAM 2000 SERIES DESCRIPTION

Compucam 2010, 2020, and 2030 are specifically designed for installation on 1987 and older General Motors vehicles powered by 267 CID (4.4L) to 350 CID (5.7L) V-8 gasoline engines. The camshafts operate in conjunction with the original equipment manufacturer (OEM) computer controlled feedback or conventional carburetors along with the emission control systems already certified with the stock engines. The purpose of using the Compucam 2000 series camshafts is to increase the overall engine performance by modifying the valve characteristics, such as increasing the valve lift and duration.

The three camshafts vary in their characteristics, ranging from moderate to high engine performance. The cam lobes on the Compucam 2010 have been increased by 7.5 percent on the intake and 4.2 percent on the exhaust when compared to the OEM camshaft. These increases translate to a mild increase in valve lift, allowing the engine to increase its volumetric efficiency. The Compucam 2020 is designed to provide a mid-range performance with a 13.9 percent increase on the intake lobe and a 10.2 percent increase in the exhaust lobe. The greatest increase in cam lobe lift is on the Compucam 2030 which has a 20.3 percent increase in the intake lobe and a 16 percent increase in the exhaust lobe. The Compucam 2010 works best on the 267 CID engine while the Compucam 2030 is designed to enhance the performance of the high output 350 CID engine.

#### V. DISCUSSION OF THE COMPUCAM 2000 SERIES

A 1984 Chevrolet Camaro powered by a 305 CID engine was used for the evaluation of the Compucam 2000 series camshafts. Documentation given to Crane Cams by General Motors indicated that a prom change would calibrate their Camaro to California specifications. This information was verified by

the ARB during the application process and confirmatory testing. The dynamometer inertia weight and loading used during the testing were 3625 lbs. and 7.8 hp, respectively.

Emission tests conducted by Crane Emissions Laboratory consisted of cold-start CVS-75 emission tests with the Compucam 2030 installed on the test vehicle, and the vehicle calibrated to California configuration. This test was used to compare vehicle exhaust emissions in the modified configuration with the applicable emission standards. The test results are shown in Table 1.

Table 1  
CVS-75 TEST RESULTS  
(Crane Emissions Laboratory)

	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Emission standards	0.39	7.0	0.7
Baseline #1	0.38	4.98	0.66
Baseline #2	0.38	4.8	0.66
Average baseline	0.38	4.89	0.66
Compucam 2030 test 1	0.32	3.99	0.47
Compucam 2030 test 2	0.32	4.58	0.44
Average Compucam	0.32	4.29	0.46

Confirmatory testing was performed at the ARB. The results are shown in Table 2.

Table 2  
CVS-75 TEST RESULTS  
(Haagen-Smit Laboratory)

	<u>HC</u>	<u>CO</u>	<u>NOx</u>
Compucam 2030 test 1	0.36	5.84	0.49
Compucam 2030 test 2	0.38	6.80	0.49
Average Compucam	0.37	6.32	0.49

The CVS-75 emissions test results at Crane Emissions Laboratory and confirmatory testing at the ARB indicate that HC, CO and NOx emissions of the Compucam 2030 camshaft are well below the emission standards. This demonstrates that the installation of the Compucam 2000 series camshafts will not adversely affect the exhaust emissions of 1987 and older General Motors vehicles powered by 267 CID (4.4L) to 350 CID (5.7) V-8 gasoline engines.

Crane Cams has submitted all the required information and fulfilled the requirements for an exemption. The test results confirmed that Crane Cams' Compucam 2000 series meets the requirements for the exemption.