State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-279
Relating to Exemptions Under Section 27156
of the Vehicle Code

COMPETITION CAMS, INC.
MAGNUM ROLLER ROCKER ARMS
(P/N's 1412-16 and 1416-16)

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 Magnum Roller Rocker Arms manufactured by Competition Cams, Inc. of 3406 Democrat Road., Memphis, TN 38118 have been found not to reduce the effectiveness of the applicable vehicle pollution control system and, therefore, are exempt from the prohibitions of Section 27156 of the Vehicle Code for 1992 and older model-year General Motors vehicles equipped with 262 CID to 454 CID gasoline engines.

This Executive Order is valid provided that installation instructions for these rocker arms will not recommend tuning the vehicle to specifications different from those submitted by Competition Cams, Inc.

Changes made to the design or operating conditions of the rocker arms, 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 these rocker arms using any identification other than that shown in this Executive Order or marketing of these rocker arms 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 these rocker arms 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 rocker arms 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 COMPETITION CAMS, INC.'S MAGNUM ROLLER ROCKER ARMS.

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 9th day of September, 1992.

R. B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF COMPETITION CAMS, INC.'S MAGNUM ROLLER ROCKER ARMS FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

September 1992

State of California
AIR RESOURCES BOARD

EVALUATION OF COMPETITION CAMS, INC.'S MAGNUM ROLLER ROCKER ARMS FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE 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
9528 Telstar Avenue
El Monte, CA 91731-2990

SUMMARY

Competition Cams, Inc. has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their Magnum Roller Rocker Arms, part numbers 1412-16 and 1416-16, for installation on 1992 and older General Motors vehicles equipped with 262 CID (4.2L) to 454 (7.4L) CID V-8 gasoline engines. Competition Cams has submitted a completed application and all the required information, as well as exhaust emissions test data performed at E. C. S. Laboratories, Inc. The test data demonstrated that the specified rocker arms do not have any adverse effect on the exhaust emissions of the affected vehicles.

Based on the submitted information and results of the emission tests performed at E. C. S. Laboratories, Inc., the staff concludes that the installation of Competition Cams Magnum Roller Rocker Arms will not adversely affect exhaust emissions of the specified vehicles.

The staff recommends Competition Cams, Inc. be granted an exemption as requested and that Executive Order D-279 be issued.

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I. INTRODUCTION

Competition Cams, Inc. of 3406 Democrat Road, Memphis, Tennessee 38118, has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their Magnum Roller Rocker Arms, part numbers 1412-16 and 1416-16, for installation on 1992 and older General Motors vehicles equipped with 262 CID (4.2L) to 454 CID (7.4) gasoline engines.

Competition Cams has submitted a completed application and all the required information, as well as exhaust emissions test data performed at E. C. S. Laboratories, Inc. The test data demonstrated that the specified rocker arms do not have any adverse effect on the exhaust emissions of the affected vehicles.

II. CONCLUSIONS

Based on the submitted information and the results of the emission tests performed at E. C. S. Laboratories, Inc., the staff concludes that the Competition Cams, Inc.'s Magnum Roller Rocker Arms will not adversely affect exhaust emissions from vehicles for which the exemption is requested.

III. RECOMMENDATION

The staff recommends that Competition Cams, Inc. be granted an exemption as requested and that Executive Order D-279 be issued.

IV. ROCKER ARMS DESCRIPTION

The rocker arms are specifically designed for installation on 1992 and older General Motors vehicles powered by 262 CID (4.2L) to 454 CID (7.4L) V-8 gasoline engines. The rocker arms operate in conjunction with the original equipment manufacturer's (OEM) emission control systems already certified with the stock engines. The purpose of using the modified rocker arms is to increase the overall engine performance by increasing the lift of the intake and exhaust valves without modifying valve timing. The Magnum Roller Rocker Arms operate the same as the stock rocker arms. However, the Magnum Roller Rocker Arms reduce valvetrain friction losses since a roller bearing is used as the contact point between the valve and the rocker arm.

The OEM rocker arm ratio is 1.5:1. The rocker arm part number 1412-16 increases the rocker arm ratio to 1.52:1, thus increasing the intake lift by 1.1 percent and the exhaust lift by 1.3 percent. The rocker arm part number 1416-16 increases the rocker arm ratio to 1.6:1, thus increasing the intake and exhaust lift by 6.5 percent. Appendix A contains a copy of the installation instructions.

V. DISCUSSION

Competition Cams submitted emission testing conducted at E. C. S. Laboratories, Inc. on the 1.6 ratio rocker arm (P/N 1416-16). This rocker arm part number 1416-16 had the greatest lift increase, and was therefore, determined as the worst case. A 1987 Chevrolet Camaro powered by a 305 CID engine was used as the test vehicle for the rocker arms. The dynamometer inertia weight and loading used during the testing were 3625 lbs. and 7.6 hp, respectively.

Emission testing against the emission standards consisted of one cold-start CVS-75 Federal Test Procedure in the modified configuration. The Air Resources Board did not conduct confirmatory tests. The test results for the rocker arms are shown in Table 1.

Table 1

CVS-75 TEST RESULTS
(E. C. S. Laboratories, Inc.)

Test	Exhaust Emissions (gm/mi)		
Mode	HC	CO	NOx
1.6 rocker arms	0.144	1.472	0.415
emission standard	0.39	7.0	0.7

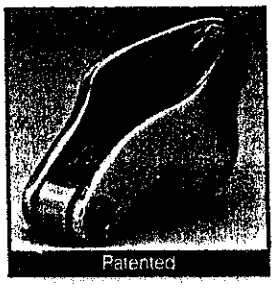
The CVS-75 emissions test results at E. C. S. Laboratories, Inc. indicate that HC, CO and NOx emissions of the rocker arms were below the emission standards for that vehicle. This demonstrates that the installation of the Magnum Roller Rocker Arms for all 1992 and older General Motors 262 CID (4.2L) to 454 CID (7.4L) gasoline engines will not adversely affect the exhaust emissions.

Competition Cams has submitted all the required information and fulfilled the requirements for an exemption. The test results confirmed that Competition Cams Magnum Roller Rocker Arms meet the requirements for the exemption.

APPENDIX A

EX M11511 M

MAGNUM ROLLER ROCKER ARMS



INSTALLATION INSTRUCTIONS

Congratulations on your purchase of Competition Cams' Magnum Rocker Arms. Magnum Rocker Arms are the strongest, most accurate replacement rocker arms on the market today. Magnum Rocker Arms not only improve engine performance and efficiency, they also reduce friction and guide wear to help your motor stay healthier longer. To ensure maximum benefit from your Magnum Rockers, installation and valve adjustment should be done with care. The following guide will assist you with the installation and adjustment of your new Magnum Rocker Arms.

Read all the instructions thoroughly before beginning installation!

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1 **Read the special instructions beginning on page 3.**

2 With the valve covers off, and old rocker arms removed, the first step will be to inspect the pushrods. Competition Cams strongly suggests when installing new rocker arms (of any kind), that new Competition Cams pushrods be incorporated to ensure that all mating surfaces are fresh to prevent any premature failures. If you are using the old pushrods, examine the ends of all pushrods for any flaking or galling. Any imperfections on the ends of the pushrods will result in either rocker arm or lifter failure.

Clean, and blow dry all pushrods. Also blow through the pushrod to remove any foreign matter such as sludge. Remember, in any type of motor work, cleanliness is imperative!

3 Inspect rocker arm studs, pedestals, etc. for excessive wear. Check to see if the old rocker was cutting into the side of the rocker arm stud. Also check the guide slots in the cylinder head or guide plates for excessive wear. Wipe clean the tops of all the valves and again inspect each one for wear or 'mushrooming' of the valve stem.

Movement of metal or galling of the studs, pedestals or valve stems is a sign of excessive wear. Now is the time to make whatever decisions are necessary. Installing new rocker arms on questionable studs or mushroomed valve stems is asking for trouble.

4 Remove the Magnum Rockers from the package and wash all balls, rockers and nuts thoroughly with soap and hot water or denatured alcohol (lacquer thinner.) Blow dry.

5 Install the pushrods into the motor. If pushrod has a long hardened tip, make sure it rides properly in guide plate. If pushrod has arrow, install pointing up. We suggest that all the pushrods be pre-oiled through the pushrod holes. Apply a small amount of Competition Cams assembly lube to valve stem tips and rocker arm pushrod seat.

6 Install rocker arm on rocker stud. Pay special attention to the pushrod and rocker arm positioning. Be sure that the pushrods are seated in the lifter and rocker arm seats.

Apply a liberal coating of Competition Cams assembly lube to the rocker arm ball and position it on the rocker stud, flat side up. Install adjusting nut, do not tighten the adjusting nut until you go through the proper sequence of lifter adjustment.

Install the remainder of rocker arms in this manner.

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Not legal for sale or use in CA on pollution-controlled motor vehicles.

Part # 250

COMPETITION CAMS® Valve Trains Engineered For The Way *You* Drive!

7 After carefully checking to be sure all pushrods are seated in the lifter and rocker arm, it is time for valve lash adjustment.

8 By installing the crankshaft dampner bolt back into the snout of the crankshaft, turn the engine over by hand in the direction of its running rotation until the **exhaust** pushrod begins to move upward to open the valve. You can now adjust the **intake** valve of that same cylinder and be assured that you are on the 'base circle' of the intake lobe.

Hydraulic Lifter Cams: Tighten the adjusting nut until all the slack is taken out of the rocker arm and pushrod. By lightly turning the pushrod with your fingers as you tighten the adjusting nut, you will discover or feel a point at which there will be a slight resistance. At that point, you have taken all the excess slack out of the pushrod. You are now at what we refer to as 'zero lash.' Turn the adjusting nut one-half turn more. This will give you the ideal pre-load of the rocker arm, pushrod and lifter. Following this procedure, carefully adjust all intake valves.

Solid Lifter Cams: Consult cam spec card or cam manufacturer for correct lash specs. Tighten adjusting nut while proper feeler gauge is between roller tip and valve to the point at which there is a slight drag when moving feeler guage. On solid lifter cams you may wish to use 4602-16 (3/8") or 4603-16(7/16") polylocks.

Following this procedure, carefully adjust all intake valves.

9 **Hydraulic Lifter Cams:** To adjust the **exhaust** valves, turn the engine over until the **intake** pushrod moves all the way up. Rotate past maximum lift, approximately one-half to two-thirds of the way back down. You are now on the base circle of the exhaust lobe and can adjust the exhaust valve.

Rotate the exhaust pushrod with your fingers and begin to tighten the exhaust adjusting nut. When you feel resistance on the pushrod, you are at zero lash. Tighten the adjusting nut one-half turn more.

Go through the exhaust valves and repeat the procedure carefully. You now have all of the valves adjusted with the proper pre-load.

Solid Lifter Cams: To adjust the exhaust valves, turn the engine over until the intake pushrod moves all the way up. Rotate past maximum lift, approximately one-half to two-thirds of the way back down.

Tighten adjusting nut while proper feeler gauge is between roller tip and valve to the point at which there is a slight drag when moving feeler gauge. Following this procedure carefully adjust all exhaust valves. On solid lifter cams you may wish to use 4602-16(3/8") or 4603-16(7/16") polylocks.

10 Before you re-install the valve covers, take your oil can and squirt oil down on the the rocker arm ball and on the roller tip of the rockers. This will be extra assurance that the rocker arms will have adequate lubrication until the oil travels up from the motor.

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BE SURE TO CHECK THE FOLLOWING BEFORE OPERATING THE ENGINE.

1. Old pushrods should not be used.
2. Immediately upon startup rocker arms must have adequate oil supply.
3. Check pushrod to cylinder head slot clearance.
4. Check rocker arm to valve spring retainer clearance.
5. Check for valve spring coil bind. If this occurs, the correct spring must be installed.
6. In most cases the maximum open spring pressure is 350 lbs.
7. Be sure to check for proper rocker geometry.

If you have any questions about your Magnum Roller Rocker Arms, call Cam-Help

CAM HELP 1-800-999-0853