

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-215-7
Relating to Exemptions Under Section 27156
of the Vehicle Code

EDELBROCK CORPORATION
PERFORMER ALUMINUM CYLINDER HEADS

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 Performer Aluminum Cylinder Heads, part nos. 6031, 6032, 6034, 6035, 6036, and 6037 manufactured by Edelbrock Corporation of 2700 California St., P.O. Box 2936, Torrance, California 90503, 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 1993 and older Ford Motor Company vehicles with either a 289, 302, or 351 CID V-8 gasoline engine.

This Executive Order is valid provided that installation instructions for the Performer Aluminum Cylinder Heads will not recommend tuning the vehicle to specifications different from those submitted by Edelbrock Corporation.

Changes made to the design or operating conditions of the cylinder heads, 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 cylinder heads using any identification other than that shown in this Executive Order or marketing of the cylinder heads for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board. This Executive Order does not constitute any opinion as to the effect the use of this cylinder heads 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 EDELBROCK CORPORATION'S PERFORMER ALUMINUM CYLINDER HEADS.

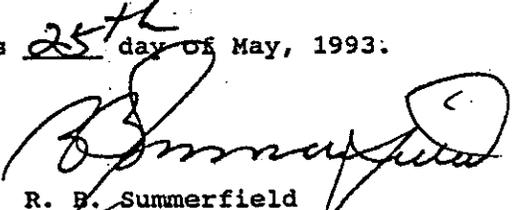
No claim of any kind, such as "Approved by the Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

EDELBROCK CORPORATION
Performer Aluminum Cylinder Heads

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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 25th day of May, 1993.



R. B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF THE EDELBROCK CORPORATION
PERFORMER ALUMINUM CYLINDER HEADS FOR EXEMPTION FROM THE PROHIBITIONS OF
VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE
CALIFORNIA CODE OF REGULATIONS

May 1993

State of California
AIR RESOURCES BOARD

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by

Mobile Source Division
State of California
Air Resources Board
9528 Telstar Avenue
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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

The Edelbrock Corporation (Edelbrock) of 2700 California St., P.O. Box 2936, Torrance, California 90503, has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the Performer Aluminum Cylinder Heads, part nos. 6031, 6032, 6034, 6035, 6036, and 6037. The cylinder heads are designed for installation on 1993 and older Ford Motor Company vehicles equipped with either a 289, 302, or 351 CID V8 gasoline engine.

Edelbrock submitted a completed application and other required information, as well as emissions test data performed at the Milton Roy Company in Orange, California, demonstrating that their cylinder heads do not have any adverse effect on emissions.

Based on the submitted information, the staff concludes that the Edelbrock Performer Aluminum Cylinder Heads will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

The staff recommends that Edelbrock be granted an exemption as requested and that Executive Order D-215-7 be issued.

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I. INTRODUCTION

The Edelbrock Corporation (Edelbrock) of 2700 California St., P.O. Box 2936, Torrance, California 90503, has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for their Performer Aluminum Cylinder Heads, part nos. 6031, 6032, 6034, 6035, 6036, and 6037. The cylinder heads are designed for installation on 1993 and older Ford Motor Company vehicles equipped with either a 289, 302, or 351 CID V8 engine.

Edelbrock submitted a completed application and other required information, as well as emissions test data performed at the Milton Roy Company (Milton Roy) in Orange, California, demonstrating that their cylinder heads do not have any adverse effect on emissions.

II. CONCLUSIONS

Based on the submitted information, the staff concludes that the Edelbrock Performer Aluminum Cylinder Heads will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

III. RECOMMENDATION

The staff recommends that Edelbrock be granted an exemption for their Performer Aluminum Cylinder Heads, part nos. 6031, 6032, 6034, 6035, 6036, and 6037 for installation on 1993 and older Ford Motor Company vehicles equipped with either a 289, 302, or 351 CID V8 engine. The staff also recommends that Executive Order D-215-7 be issued.

IV. PERFORMER ALUMINUM CYLINDER HEAD DESCRIPTION

Edelbrock's Performer Aluminum Cylinder Heads are specifically designed for installation on 1993 and older Ford Motor Company vehicles powered by a

289, 302, or 351 CID V8 gasoline engine. The Performer Aluminum Cylinder Heads operate in conjunction with the original equipment manufacturer's (OEM) emission control systems already certified with the stock engine. The purpose of using the modified cylinder heads, according to the manufacturer, is to increase the overall engine performance which is accomplished through the use of the finest materials available along with labor intensive machining. The intake and exhaust ports are machined to match the gasket and manifold surfaces, thus eliminating reversion at those junctures. The interior surfaces of the ports have been machined in the critical areas to reduce backpressure and maintain laminar flow. The valve seats are machined to provide optimum sealing and increased flow. The combustion chambers are polished to eliminate hot spots which could cause detonation or pre-ignition.

The following are the Performer Aluminum Cylinder Head specifications:

1. Head Casting ----- Aluminum

2. Chamber Volume----- 60 cc

3. Valves

P/Ns 6034 and 6035

Exhaust ----- Stainless steel, 1.6" in diameter

Intake ----- Stainless steel, 2.02" in diameter

P/Ns 6031, 6032, 6036, and 6037

Exhaust ----- Stainless steel, 1.6" in diameter

Intake ----- Stainless steel, 1.9" in diameter

4. Valve seats ----- Cast ductile iron

Edelbrock designed the Performer Aluminum Cylinder Heads with two different intake valve diameters, 1.9" and 2.02". The 1.9" valve is applicable to all vehicles, and the 2.02" valve is only applicable to those vehicles that are equipped with a valve relief piston designed to accommodate the larger intake valves. Part nos. 6034 & 6035 cylinder heads can accommodate either a

3/8" rocker stud or a pedestal mounted rocker arm, part nos. 6036 & 6037 are designed to use only pedestal mounted rocker, and part nos. 6031 & 6032 designed to use only the 3/8" rocker stud.

V. DISCUSSION OF THE PERFORMER ALUMINUM CYLINDER HEAD

The Edelbrock Corporation, has requested that the Performer Aluminum Cylinder Heads, part nos. 6031, 6032, 6034, 6035, 6036, and 6037, be exempted for 1993 and older Ford Motor Company vehicles equipped with either a 289, 302, or 351 CID V8 engine. A modified 1993 Ford Motor Company F-150 truck with a 351 CID V8 engine was used for testing (Performer Aluminum Cylinder Head, part no. 6035 installed). The F-150 truck was selected as the test vehicle due to its most popular (greater number of vehicles sold) and worst case status (largest engine displacement within the highest test weight class) within the application requested. Edelbrock performed emissions testing at Milton Roy where emission test results were compared against the vehicle's emission standards.

The results of the exhaust emissions test performed at Milton Roy are shown in Table 1.

Table 1

CVS-75 TEST RESULTS

(Milton Roy)

	<u>NHC</u>	<u>CO</u>	<u>NOx</u>
Standards	0.5	9.0	1.0
Cylinder Heads w/DFs	0.34	5.1	0.65

The CVS-75 emissions test results at Milton Roy indicate that the HC, CO and NOx emissions of the vehicle, with the Edelbrock Aluminum Cylinder Head installed, are below the emission standards set for that engine family.

The Air Resources Board did not conduct confirmatory testing to validate the emission test results submitted by Edelbrock. The Edelbrock Aluminum Cylinder Heads are functionally identical to the original equipment

manufacturer's cylinder head except for its valve sizes, chamber volume and casting material. A typical Ford Motor Company cylinder head may have intake valves ranging in diameter from 1.59" to 1.85" and exhaust valves ranging in diameter from 1.39" to 1.54", with cast iron construction. Edelbrock consolidated these variations by designing their cylinder heads to be at the top end of the OEM scale, 1.9" or 2.02" on intake and 1.6" on exhaust with the cylinder head constructed out of aluminum. The exhaust valve diameter is still within acceptable OEM range while the intake valve diameter translates to around 9 percent increase over OEM. The chamber volume for the Performer Aluminum Cylinder Head is measured at 60 cc, this is slightly less than the stock version which is in the 65 to 70 cc range; however, test results confirmed that the minimal changes in both the intake valve diameter and chamber volume does not cause any significant increase in emissions.

Edelbrock submitted all of the required information and fulfilled the requirements for an exemption.

APPENDIX



PERFORMER STREET ALUMINUM CYLINDER HEAD

for Small-block Ford V

#6034, #6035, #6036, & #60

CATALOG

GENERAL INSTRUCTION

- PLEASE study these instructions carefully before installing your new cylinder heads. If you have any questions or problems, do not hesitate to contact our Technical Hotline at: (310) 782-2900.

- **DESCRIPTION**

The Edelbrock Performer, Performer RPM, and Performer 5.0 Street Cylinder Heads are designed for street high performance use, and are interchangeable with original equipment small-block Ford cylinder heads. These new cylinder heads offer "out of the box" bolt-on performance with no additional porting required. The performance range is 1500-6500 rpm for great throttle response throughout the power band as well as top-end horsepower. The intake and exhaust ports are CNC machine "matched" and have been designed for maximum flow velocity when matched with either the Performer or the Performer RPM intake manifold, Performer-Plus or Performer RPM cam kit, and Performer Series Carburetors. The Performer RPM Power Package produced 400 horsepower in dyno tests on a 351-W Ford with 9.5:1 compression on pump gasoline. **NOTE:** These heads require 1/2" diameter head bolts as used on 351-W engines. Stock Ford 1/2" head bolts may be used to mount these heads on 351-W engines if hardened washers (ARP #200-8533) are used under the bolt heads. To mount these heads on 289-302 engines, you must use special ARP head bolts #254-3708. The use of stock 7/16 head bolts will not provide sufficient torque retention and will lead to head gasket failure.

- **IDENTIFICATION**

These heads are available in pairs, either bare or assembled, for the following applications:

Performer Ford head #6034 (bare), #6035 (complete)

For emission controlled 1965 & later 289, 302, and 351-W with rocker studs and pushrod guideplates; will not accept rail rocker

Performer 5.0 Ford head #6036 (bare), #6037 (complete)

For emission controlled 1982 & later 5.0 Liter V8s with pedestal mount rocker rocker arms; will not accept rail rockers.

Complete cylinder heads are assembled with the following components: Stainless steel, one-piece, swirl-polished intake and exhaust valves with under-cut stems for increased flow; 2-ring positive oil control seals; 3/8" rocker studs and 5/16" guideplates; Edelbrock Sure-Seat Valve Springs #5767, retainers #9724, and valve keepers #9611. Complete cylinder heads are assembled and prepared for installation right out of the box. Bare cylinder heads will have valve guides and seats installed, but will require final sizing and a valve job to match the valves you will be using.

- **ACCESSORIES**

Although Edelbrock Street Cylinder Heads will accept OEM components (rocker arms, valve covers, intake manifold, head bolts [351-W only], etc.) we highly recommend that premium quality hardware be used with your new heads.

HEAD BOLTS or STUDS: High quality head studs or head bolts with hardened washers must be used to prevent galling of the aluminum bolt bosses. Recommended head bolts are ARP #254-3708 for engines with 7/16" head bolt holes (289 and 302). Engines with 1/2" diameter head bolts (351-W and 302 SVO) use stock 351-W bolts or equivalent with high quality head bolt washers such as ARP #200-8533.

NOTE: It is recommended that 289-302 engines producing 380 or more horsepower (or with nitrous oxide) be converted to accept 1/2" diameter head bolts by a qualified machine shop to ensure maximum head gasket durability.

ROCKER ARMS: The valve springs supplied will accommodate valve lifts up to .575", which is much higher than stock rocker arms will allow. Roller rocker arms will be required if your camshaft has more than .480" lift. Stock rockers may require longer-than-stock pushrods to clear the valve springs.

VALVE COVERS: Because most roller rockers are physically larger than stock rockers, taller valve covers are usually required to clear them. For heads #6025 and #6035, use Edelbrock Signature Series chrome valve covers #4460, Elite Series

polished aluminum valve covers #4260, or cast aluminum Classic valve covers #4160. Performer 5.0 heads #6037 accept stock 5.0 Liter valve covers, which are required for component clearance on most street applications.

INTAKE MANIFOLD: Although stock intake manifolds will fit, the Edelbrock Street Cylinder Heads are matched in size and operating range with Edelbrock Performer or Performer RPM intake manifolds. If the Performer or Performer RPM is too tall to fit under your hood you may use the Edelbrock Torker II manifold (#5021 or #5081). Additionally, any manifold that matches Fel-Pro gasket #1250 may be used (Edelbrock Performer, Torker II, Victor Jr., etc.).

EXHAUST HEADERS: Any header or manifold designed for original equipment heads will fit the Edelbrock Street Cylinder Heads. Exhaust ports are CNC profiled to match Fel-Pro #141 exhaust gaskets which are recommended for this application.

SPARK PLUGS: Use 14mm x 3/4" reach gasketed spark plug Heat range will vary by application and may range from Champion N-9Y to N-14Y (or equivalent). Use anti-seize compound on the plug threads to prevent galling in the cylinder head, and torque to manufacturers specification for aluminum heads.

INSTALLATION

Before final installation of the cylinder heads several things need to be checked to assure proper engine operation:

1. **Piston to valve clearance** - Minimum intake valve clearance should be .080". Minimum exhaust valve clearance should be .110". The point of minimum intake valve to piston clearance will usually occur somewhere between 5° and 20° After Top Dead Center during valve overlap. The point of minimum exhaust valve to piston clearance will usually occur 20° to 5° Before Top Dead Center during valve overlap. With #6025 and #6035 heads, re-machining of the piston top eyebrows may be required with some pistons. #6037 heads should be compatible with stock 5.0 Liter engines that have the stock or recommended camshafts.
2. **Proper hydraulic lifter pre-load and rocker geometry** - With the #6025 and #6035 cylinder head hydraulic lifter pre-load is easily adjustable due to the stud/guideplate design. On #6037 Performer 5.0 heads, adjustments to lifter pre-load with non-adjustable pedestal bolt-down style rockers can only be made with shims as sold by Ford SVO #M-6529-A302 or Crane #99170-1. Rocker geometry should be checked making sure that the contact point of the roller or pad on a stock rocker remains properly on the valve tip and does not roll off the edge. Visual inspection of the rockers, valve springs, retainers, and pushrods should be made to ensure that none of these components come into improper contact with each other. If problems with valve train geometry occur, simple changes such as pushrod length may have to be made.

SPECIFICATIONS

Head bolt torque: (short/long bolts)	7/16" bolts - 70/80 ft./lbs. 1/2" bolts - 100/110 ft./lbs. (short/long bolts)
Rocker studs:	3/8" (#6025 & #6035 only)
Rocker stud torque:	45 ft./lbs.
Combustion chamber volume:	60-61 cc
Intake port volume:	170 cc
Exhaust port volume:	60 cc
Deck thickness:	5/8"
Valve Seats:	Hardened, interlocking ductile iron, compatible with unleaded fuels
Valve Size:	#6025 & #6035 - Intake- 2.02", Exhaust- 1.60" #6037 - Intake- 1.90", Exhaust- 1.60"
Valve Locks	11/32" x 7° (#9611)
Valve Spring Retainers	7° 4140 steel (#9724)
Valve Spring Diameter:	1.45"
Valve Spring Installed Height:	1.800"
Valve Spring Seat Pressure:	110-120 lbs.
Max. Valve Lift:	.575"
Pushrod guideplates:	4140 hardened steel (#6025 & #6035 only)
Rocker arms:	#6025 & #6035 accept stock (except rail style rocker) or aftermarket roller type

Other Assembly Tips

When installing the sparkplugs and exhaust manifolds, be sure to use a high temperature anti-seize compound on the threads to reduce the possibility of thread damage in the future.

Do not exceed a torque of 16-18 ft./lbs. on the intake manifold bolts and lubricate the bolt threads prior to assembly.

For emissions passage equipped cylinder heads, plugs have been supplied for the air injection passage which is drilled in the end of the heads. The plugs should be installed in the front of the heads to seal off the passages, and the stock air injection manifold is installed on the back of the engine in the stock location.

If pushrod to cylinder head contact is a problem, loosen rocker studs and re-position guideplate as needed for clearance.

Installation is the same as for original equipment cylinder heads. Consult service manual for specific procedures, if necessary.

Use Fel-Pro head gasket #1011-1 or equivalent. Be sure that the surface of the block and the surface of the head is thoroughly cleaned to remove any oily film before installation. Use alcohol or lacquer thinner on a lint-free rag to clean. Apply moly-oil mixture to head bolt threads, washer, and area under head bolt to prevent galling and improper torque readings. Torque to 70 ft./lbs. for 7/16" bolts (289/302) or 100 ft./lbs. for 1/2" bolt (351-W) in three or four steps following the factory tightening sequence (see Figure 1), then tighten the long (upper) head bolt to 80 ft./lbs. (7/16") or 110 ft./lbs. (1/2"). A re-torque is recommended after initial start-up and cool-down (allow 2-3 hours for adequate cooling).

Rocker arms:	#6037 accepts stock 5.0 Liter or aftermarket pedestal bolt-down style only
Pushrods:	#6025 & #6035 require hardened pushrods for use with guideplates
Spark plugs:	#6037 uses stock pushrods 14mm x 3/4" reach gasketed seat
Recommended head gaskets:	Fel-Pro #1011-1
Recommended intake gasket:	Fel-Pro #1250
Recommended exhaust gasket:	Fel-Pro #1415

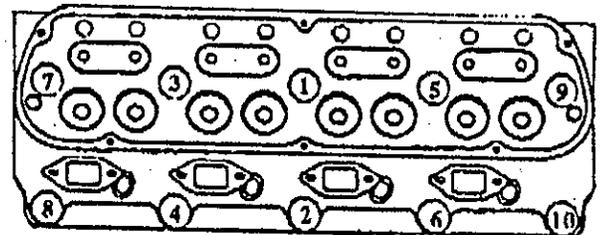


Figure 1— Tightening Sequence

PLEASE complete and mail your warranty card. Be sure to write the model number of this product in the "Part # _____" space.

THANK YOU.