

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-216-5  
Relating to Exemptions Under Section 27156  
of the Vehicle Code

J. BITTLE AMERICAN, INC.  
T.F.S. CYLINDER HEAD

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 T.F.S. cylinder head manufactured by Wil-Burt Company of 169 S. Main St., Orville, Ohio 44667, for J. Bittle American, Inc. (JBA) of 9630 Aero Dr., San Diego, CA 92123, 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 1992 and older Ford Motor Company vehicles sold in California equipped with 289 to 351 CID V-8 gasoline engines.

This Executive Order is valid provided that installation instructions for this T.F.S. cylinder head (P/N WIL-302/351-990-2) will not recommend tuning the vehicle to specifications different from those submitted by JBA.

Changes made to the design or operating conditions of the T.F.S. cylinder head (P/N WIL-302/351-990-2), 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 cylinder head using any identification other than that shown in this Executive Order or marketing of this cylinder head 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 cylinder head 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 cylinder head 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 J. BITTLE AMERICAN'S T.F.S. CYLINDER HEAD (P/N WIL-302/351-990-2).

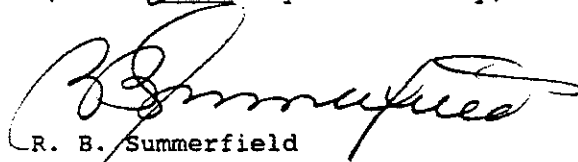
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No claim of any kind, such as "Approved by the Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

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 29<sup>th</sup> day of February, 1992.

  
R. B. Summerfield  
Assistant Division Chief  
Mobile Source Division

State of California  
AIR RESOURCES BOARD

EVALUATION OF J. BITTLE AMERICAN, INC. T.F.S. CYLINDER HEAD  
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE  
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF  
THE CALIFORNIA CODE OF REGULATIONS

February 1992

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

### SUMMARY

J. Bittle American, Inc. (JBA) has applied for an exemption from the prohibitions of Vehicle Code Section 27156 for their T.F.S. cylinder head (P/N WIL-302/351-990-2) for installation on 1992 and older Ford vehicles equipped with 289 to 351 CID V-8 gasoline engines. JBA has submitted a completed application along with all the required information.

Based on the submitted information and an engineering evaluation, the staff concludes that the installation of JBA's T.F.S. cylinder head will not adversely affect exhaust emission on the specified vehicles.

The staff recommends JBA be granted an exemption as requested and that Executive Order D-216-5 be issued.

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EVALUATION OF J. BITTLE AMERICAN, INC. T.F.S. CYLINDER HEAD  
EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE  
WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA CODE OF REGULATIONS

I. INTRODUCTION

J. Bittle American, Inc. (JBA) of 9630 Aero Dr., San Diego, CA. 92123, has applied for an exemption from the prohibitions of Vehicle Code Section 27156 on their T.F.S. cylinder head (P/N WIL-302/351-990-2) for installation on 1992 and older Ford vehicles. JBA has submitted a completed application and all the required information.

II. CONCLUSION

Based on the submitted information, and an engineering evaluation, the staff concludes that the JBA's T.F.S. cylinder head will not adversely affect exhaust emission on those vehicles for which the exemption is requested.

III. RECOMMENDATION

The staff recommends that JBA be granted an exemption as requested and that Executive Order D-216-5 be issued.

IV. T.F.S. CYLINDER HEAD DESCRIPTION

The T.F.S. cylinder head is specifically designed for installation on 1992 and older Ford vehicles equipped with 289 to 351 CID V-8 gasoline engines. The T.F.S. cylinder head operates in conjunction with the original equipment manufacturer's (OEM) emission control systems already certified with the stock engine. The purpose of using the modified T.F.S. cylinder head (P/N WIL-302/351-990-2) is to increase the overall engine performance and reliability which is accomplished according to the manufacturer, through labor intensive machining and the use of the finest materials available.

The intake and exhaust ports are machined to match the gasket and manifold surfaces. 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 provided optimum sealing and increase flow. The combustion chambers are polished to eliminate hot spots which could cause detonation or pre-ignition.

The following are the T.F.S. cylinder head specifications:

1. Head Casting ----- Cast Iron
2. Valves ----- 1.94" Diameter Intake  
----- 1.6" Diameter Exhaust
3. Chamber Volume ----- 68 cc
4. Spark Plug ----- Angled

V. DISCUSSION OF THE T.F.S. CYLINDER HEAD

The T.F.S. cylinder head is functionally identical to the original equipment manufacturer (OEM) except for its intake and exhaust valve sizes. A typical Ford cylinder head may have intake valves ranging from 1.59 to 1.85 inches and 1.39 to 1.54 inches on exhaust. JBA consolidated these variation by designing their cylinder head to be at the top end of the scale, 1.94 inches on intake and 1.6 inches on exhaust. This translates to a 4 percent increase in exhaust and 4.8 percent increase in intake when valve diameters are compared to OEM top scale.

Staff visually compared the T.F.S. cylinder head to a late model Ford Mustang cylinder head. No visual deviations were observed between the two castings other then a change in surface texture in three critical areas. Combustion chamber along with intake and exhaust ports were carefully machined until a smooth chrome like finish was achieved. Based on this data, the staff concludes that the installation of the T.F.S. cylinder

head will not have an adverse effect on exhaust emissions of the affected vehicles.

JBA has submitted all the required information and fulfilled the requirements for an exemption.

## **APPENDIX**

INSTRUCTIONS FOR THE INSTALLATION AND USE OF "TRICK FLOW" CAST IRON  
302/351 "HIGH PORT" CYLINDER HEADS

PART NUMBERS:

302-351-990-2 (with emissions)

Note: All parts recommended/mentioned in these instructions are available from your "Trick Flow" distributor.

In order to make your installation, as trouble free as possible, please follow these instructions:

- 1) Check for any visual damage immediately after removing the heads from their boxes. If any damage is noted contact the shipper as soon as possible.
- 2) Read and completely understand all of these instructions before you start. If you have a question or do not understand any of these instructions, please contact your "Trick Flow" distributor for clarification.
- 3) The valve guide holes need to be honed to size according to the valve stem diameter of the valves you are using. We recommend .0012 inch to .0015 inch of total clearance between the O.D. of the valve stem and the I.D. of the valve guide. We recommend using Sunnen brand diamond hones to make the most accurate and concentric holes.

Note: All valve guides are machined to accept 17/32 seals. We recommend using them.

- 4) For the best air flow possible, grind the tooling cuts, in the casting surface just below the valve seats, until they fade into the cast port wall. We recommend that this be done by a qualified automotive machine shop.
- 5) If you are using valves bigger than 1.94 inch intakes or 1.60 inch exhaust, you may want to bore the inside diameter of the valve seats larger. We recommend 89 percent of the valve diameter. (Example: 2.55 inches x .89 = 1.83 inches)
- 6) For your valve job, we recommend three angles - 30 degree top, 45 degree face, and 60 degree undercut. The 30 degree should be approx. .03 to .05 of an inch in width. The 45 degree should be approx. .06 to .08 of an inch in width. The 60 degree should fade out to the seat I.D.

- 7) The heads are machined for 1.437 inch diameter springs.

Note: If you want to install larger diameter springs and cups a cutter can be purchased through your "Trick Flow" distributor.

- 8) Always use the correct pressure springs specified by the manufacturer of the camshaft you are using.

- 9) If you are using guide plates, make sure you also have or use hardened pushrods. Torque rocker studs 55 to 65 ft/lbs.

Note: Stock pushrods are not hardened.

- 10) The rocker stud bosses are machined for 7/16 inch diameter screw-in rocker studs.

We recommend using ARP brand rocker studs. P/N RRS-3H (7/16 top thread) or P/N RRS-1H (3/8 top thread)

Note: Be sure to coat the rocker stud threads, that thread into the rocker bosses, with high temperature low volute silicone.

- 11) It is very important that after the valve job and any extra work you may do to the heads that you thoroughly wash out, in a parts cleaner, and blow dry, using an air hose, before final assembly.

- 12) Install head gaskets onto the engine block. Gasket to be used is: Ford part number E6ZE-60510A5A.

Note: Do not use any gasket sealer on head gaskets.

- 13) After placing the heads onto the engine block install and torque the head bolts. We highly recommend that a grade-8 or better steel washer be used on all head mounting bolts under the heads of the bolts. This will assure that the steel bolts will not damage the surface of the cast iron heads.

Torque all head bolts to the following specifications:

- Using 7/16" diameter long bolts...75 ft/lbs
- Using 7/16" diameter short bolts...65 ft/lbs
- Using 1/2" diameter long bolts... 105 ft/lbs
- Using 1/2" diameter short bolts...95 ft/lbs

- 14) Because the exhaust ports have been raised to help achieve more power a slight adjustment to your exhaust system may be necessary to bolt the exhaust manifolds to our heads.

On late model cars and trucks only minor pushing and pulling on the exhaust system is needed for proper alignment.

On early model cars and/or cars with 351 c.i. engines in place of 302 c.i. engines may require additional alternations to your exhaust system.

Note: Recommended exhaust manifold gasket - Mr. Gasket brand Part Number 5930.

- 16) Use only Motorcraft AG series spark plugs in these heads.
- 17) Install intake manifold gaskets onto the intake face of the heads using high temperature, low volute silicone, to hold it in place. Be sure gasket is properly aligned with all bolt holes in the heads and if any gasket material overlaps, into the intake ports, trim the material from the gasket.

Allow silicone to cure to assure the intake gaskets remain in their proper position. This will ease installation of your intake manifold.

Note: Recommended intake manifold gasket - Mr. Gasket brand Part Number 5832.

- 18) Recommend using Competition Cams brand roller tip rail rocker arms, Ford magnum rocker, 1.6 ratio, P/N 1431-16.
- 19) Intstall intake manifold. Torque intake bolts at 20-22 ft/lbs.

Note: Recommend using a 3/8 inch diameter drill bit through all of the intake manifold bolt holes to assure proper centering of the bolts within the holes in the manifold.

This will help assure the intake manifold seals with the intake gaskets properly. This only needs to be done if the manifold bolts are against the sides of the intake manifold bolt holes. If bolts are centered in the intake manifold bolt holes, then these holes do not need to be enlarged to 3/8 inch in diameter.

- 20) Install all remaining hardware and equipment.

Instructions for use of "TRICK FLOW" 302/351 "HIGH PORT" CYLINDER HEADS:

FOR 302-351-990-2 (with emissions)

DO NOT REMOVE THIS TAG

BEFORE READING AND UNDERSTANDING THE INFORMATION

In order to make the cylinder heads interchange from side to side, there are two holes in the ends, in each cylinder head to hold on the air pump crossover.

Use high temperature low volute silicone for sealing the threads for plugs and bolts.

The back holes, toward firewall, will be used to hold the crossover on. The front holes will be plugged. The two front holes must be plugged with the set screws provided using the silicone on the threads.

Failure to do this will cause oil leaks.

Expansion plugs must also be installed in the front of each respective head in the air pump holes. Also, use high temperature silicone in the hole before installing the plugs. The plugs can normally be installed by using a small socket or punch and driving them in just below flush.

\*Patent Pending

## LIMITED WARRANTY

The Seller warrants its products to the original Purchaser to be free from defects in material and workmanship for a period of six months from the date of purchase. The Seller shall not be responsible for any damage resulting to or caused by its products by reason of improper storage or installation, unauthorized service, alteration of products, neglect or abuse, or attempt to operate, intentionally or otherwise, at other than design specifications or rated capacity. This warranty does not extend to any component parts not manufactured by Seller; however, Seller's warranty herein shall not limit any warranties made by manufacturers of component parts which may extend to Purchaser.

NO PERSON, AGENT, DISTRIBUTOR, DEALER, SERVICE FACILITY, OR COMPANY IS AUTHORIZED TO CHANGE, MODIFY OR AMEND THE TERMS OF THIS LIMITED WARRANTY IN ANY MANNER OR FASHION WHATSOEVER, EXCEPT AND TO THE EXTENT PROVIDED HEREIN. SELLER MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, REGARDING ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ALL SUCH IMPLIED WARRANTIES ARE LIMITED TO THE DURATION OF THE EXPRESS WARRANTIES CONTAINED HEREIN. ANY DESCRIPTION OF THE GOODS SOLD HEREUNDER, INCLUDING ANY REFERENCES AND DESCRIPTION IN CATALOGS, CIRCULARS AND OTHER WRITTEN MATERIAL, IS FOR THE SOLE PURPOSE OF IDENTIFYING SUCH GOODS AND SHALL NOT CREATE AN EXPRESS WARRANTY THAT SUCH GOODS SHALL CONFORM TO SUCH DESCRIPTION. THE SELLER SHALL NOT BE LIABLE TO THE PURCHASER OR TO ANY OTHER PERSON FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSS OF PROFITS OR PRODUCT RESULTING FROM ANY DEFECT IN OR MALFUNCTION OR FAILURE OF ITS PRODUCTS. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

Claims for defects in material and workmanship shall be made in writing to Seller within thirty (30) days of the discovery of defect. Seller may either send a service representative or have the product returned to the factory at Purchaser's expense for inspection. If judged by the Seller to be defective in material or workmanship, the product will be replaced or repaired at the option of Seller, free from all charges except transportation.

THE REMEDIES OF PURCHASER SET FORTH HEREIN ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER REMEDIES. THE LIABILITY OF SELLER WHETHER IN CONTRACT OR TORT, UNDER ANY WARRANTY, OR OTHERWISE, SHALL NOT EXCEED BEYOND ITS OBLIGATION TO REPAIR OR REPLACE AT ITS OPTION, ANY PRODUCTS OR PART FOUND BY SELLER TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP. SELLER SHALL NOT BE LIABLE FOR COSTS OR INSTALLATION AND/OR REMOVAL.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

AT ALL TIMES YOUR VEHICLE SHOULD BE OPERATED IN COMPLIANCE WITH ALL STATE AND LOCAL TRAFFIC LAWS.