

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-431
Relating to Exemptions Under Section 27156
of the Vehicle Code

FORD MOTOR COMPANY
ECONOLINE AFT-OF-AXLE FUEL TANK KITS

Pursuant to the authority vested in the Air Resources Board (ARB) 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-45-9;

IT IS ORDERED AND RESOLVED: That the installation of the Econoline Aft-of-Axle Fuel Tank Kits (Econoline Kits), manufactured by Ford Motor Company of P.O. Box 1899, Room 272 WHQ, Dearborn, Michigan 48121-1899, has been found not to reduce the effectiveness of the applicable vehicle pollution control system, and therefore, the Econoline Kits are exempt from the prohibitions of Section 27156 of the California Vehicle Code for installation on the following 1997 model-year Ford Motor Company (Ford) 4.2/4.6/5.4 liter vehicles:

<u>Econoline Kit</u>	<u>Vehicle Application</u>
E-150 Kit	E-150 Econoline Incomplete Van 7,000 lb. GVWR equipped with an RV Prep. Package and P235/75Rx15XL tires E-150 Regular Club Wagon equipped with P235/75Rx15XL tires
E-250 Kit	E-250 Incomplete Regular and Super Econoline Vans 7,500 lb. GVWR equipped with an RV Prep. Package and LT225/75Rx16D tires E-250 Incomplete Heavy-Duty Regular and Super Econoline Vans 8,600 lb. GVWR equipped with an RV Prep. Package and either the LT225/75Rx16E tires or the LT245/75Rx16E tires

Note: The above vehicles must be equipped with Ford standard contoured rear bumpers or Ford optional step bumpers only (the aft-of-axle fuel tank kits are not compatible with aftermarket step or other style bumpers). In addition, the above vehicles must not be equipped with Ford auxiliary rear air conditioning/heating systems (the auxiliary system must be discarded before the aft-of-axle fuel tank kits can be installed).

This Executive Order is valid provided that installation instructions for the Econoline Kits not recommend tuning the vehicles to specifications different from those submitted by the vehicle manufacturer.

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ECONOLINE AFT-OF-AXLE
FUEL TANK KITS

EXECUTIVE ORDER D-431
(Page 2 of 2)

Changes made to the design or operating conditions of the Econoline Kits, as exempt by the ARB, which may adversely affect the performance of a vehicle's pollution control system, shall invalidate this Executive Order.

Marketing of the Econoline Kits using an identification other than that shown in this Executive Order or for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the ARB. Exemption of the Econoline Kits shall not be construed as an exemption to sell, offer for sale, or advertise any components of the Econoline Kits as individual devices.

This Executive Order does not constitute any opinion as to the effect the use of the Econoline Kits may have on any warranty either expressed or implied by the vehicle manufacturer.

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.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF FORD MOTOR COMPANY'S ECONOLINE AFT-OF-AXLE FUEL TANK KITS.

Violation of any of the above conditions shall be grounds for revocation of this Executive Order. The Executive Order may be revoked only after a ten-day written notice of intention to revoke the Executive Order, in which period the holder of the Executive 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 Executive Order may not be revoked until a determination after the hearing that grounds for revocation exist.

Executed at El Monte, California, this 10th day of June 1997.


R. B. Summerfield, Chief
Mobile Source Operations Division

State of California
AIR RESOURCES BOARD

EVALUATION OF FORD MOTOR COMPANY'S
ECONOLINE AFT-OF-AXLE FUEL TANK KITS
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13 OF THE
CALIFORNIA CODE OF REGULATIONS

June 1997

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AIR RESOURCES BOARD

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by

Mobile Source Operations Division

State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731-2990

(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

Ford Motor Company of P.O. Box 1899, Room 272 WHQ, Dearborn, Michigan 48121-1899 has applied for an exemption from the prohibitions of Section 27156 of the California Vehicle Code for their Econoline Aft-of-Axle Fuel Tank Kits. The aft-of-axle fuel tank kits have been designed to replace the original midship fuel tanks used on 1997 model-year Ford Motor Company 4.2/4.6/5.4 liter E-150 and E-250 vehicles.

Based on test data and engineering evaluation of the aft-of-axle fuel tank kits, the staff concludes that Ford Motor Company's Econoline Aft-of-Axle Fuel Tank Kits will not adversely affect the exhaust or evaporative emissions or the on-board diagnostic monitoring systems of the vehicles for which the exemption is requested. This vehicle application includes those vehicles that have been certified to enhanced evaporative emission standards and equipped with on-board evaporative system leak detection system.

Staff recommends that Ford Motor Company be granted an exemption for their Econoline Aft-of-Axle Fuel Tank Kits for installation on 1997 model-year 4.2/4.6/5.4 liter E-150 and E-250 vehicles, including those vehicles that have been certified to enhanced evaporative emission standards and equipped with on-board evaporative system leak detection system, and that Executive Order No. D-431 be issued.

CONTENTS

	Page Number
SUMMARY	i
CONTENTS	ii
I. INTRODUCTION	1
II. CONCLUSION	1
III. RECOMMENDATION	1
IV. DEVICE DESCRIPTION AND OPERATION	2
V. DEVICE EVALUATION AND DISCUSSION	2

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I. INTRODUCTION

Ford Motor Company (Ford) of P.O. Box 1899, Room 272 WHQ, Dearborn, Michigan 48121-1899 has applied for an exemption from the prohibitions of Section 27156 of the California Vehicle Code for their Econoline Aft-of-Axle Fuel Tank Kits (Econoline Kits) for installation on 1997 model-year Ford 4.2/4.6/5.4 liter E-150 and E-250 vehicles. Ford has submitted all the required information including drawings and installation instructions for their Econoline Kits. Ford has also submitted evaporative emissions and on-board diagnostic (OBD II) system test data for evaluation.

II. CONCLUSION

Based on the test data submitted by Ford and engineering evaluation of the Econoline Kits, staff concludes that Ford's Econoline Kits will not adversely affect the exhaust or evaporative emissions or the OBD II monitoring systems of the 1997 model-year 4.2/4.6/5.4 liter Ford E-150 and E-250 vehicles.

III. RECOMMENDATION

Staff recommends that Ford be granted an exemption as requested, permitting advertisement, sale and installation of their Econoline Aft-of-Axle Fuel Tank Kits on 1997 model-year 4.2/4.6/5.4 liter E-150 and E-250 vehicles, and that Executive Order No. D-431 be issued.

IV. DEVICE DESCRIPTION AND OPERATION

The aft-of-axle fuel tank kits have been designed by Ford to facilitate replacement of original equipment manufacturer (OEM) fuel tanks on 1997 model-year Ford 4.2/4.6/5.4 liter E-150 and E-250 vehicles. The kit consists of a steel fuel tank, fuel pump/sender, fuel supply/return lines, fuel tank vapor lines, and other fasteners and connectors. The replacement fuel tank has a nominal capacity of 30.5 gallons and replaces the 35-gallon OEM midship steel fuel tank. The relocation is allowed by utilizing longer fuel supply/return lines and extension of the fuel tank vapor lines. One rollover valve on the replacement fuel tank meters the vapor flow from the tank to the emission canister. The emission canister is moved forward, approximately 18 inches, from aft axle location to accommodate the fuel tank. Depending on the vehicle application, there are differences in the kit components and the required modifications: the E-150 Kit for E-150 Regular Club Wagons includes shock absorbers, spacers, and other hardware for mounting the fuel tank; the 5.4 liter vehicles with 2.75-inch diameter exhaust pipes require removal (by cutting) of 1 inch of the exhaust pipe; and different templates are available for installing the crossmembers needed for mounting the fuel tanks. All other OEM exhaust and evaporative emission control systems are retained without modification.

V. DEVICE EVALUATION AND DISCUSSION

The vehicles for which Ford is requesting exemption have been certified to meet the enhanced evaporative emission standards. Staff conducted an engineering evaluation to determine the emissions impact of the aft-of-axle replacement fuel tanks on the applicable vehicles.

The replacement fuel tank has a nominal tank capacity of 30.5 gallons and a vapor space volume of 9 gallons. In comparison, the OEM tank has a capacity of 34.9 gallons and a vapor space volume of 9.2 gallons. The change to smaller volumes of liquid and vapor spaces will result in lower

evaporative emissions from the fuel tank during hot soak and with diurnal cycles.

With the relocation of the fuel tank from midship to aft axle, the replacement fuel tank is farther away from the underbody catalyst and the heat-generating portions of the exhaust system. This will result in a cooler or lower fuel tank temperature profile (FTTP) during vehicle operation. However, the return fuel system used in the 4.2/4.6/5.4 liter E-150 and E-250 vehicles will cause an increase in the FTTP for a smaller capacity fuel tank. Ford did not conduct testing with the 30.5 gallon replacement fuel tank to quantify this increase but did conclude, based on previous testing conducted on other vehicles with various tank capacities, that this increase in FTTP will be entirely offset by the decrease resulting from the relocation of the fuel tank to a cooler location. Therefore, the FTTP of the replacement fuel tank will be very close to the FTTP of the OEM tank and will not cause any increase in running loss evaporative emissions.

The vehicles for which the aft-of-axle fuel tank kits have been designed are equipped with OBD II leak detection monitoring system. This system has been certified to detect 0.04" and larger orifice leaks throughout the evaporative system. Ford conducted testing on a 4.6 liter E-250 van with the 30.5-gallon replacement fuel tank to ensure that it does not trigger false malfunction indicator lights (MILs) or disable the leak detection system. A 0.02" and a 0.04" orifice leaks were induced at the service port (between the purge valve and emission canister) and at the filler neck. The vehicle's OBD II system did not detect the 0.02" leak at either the service port or the filler neck; therefore, there is no risk of false MILs. The system did detect the 0.04" leak at the filler neck; however, it did not detect the 0.04" leak at the service port. Ford concluded that the system's inability to detect the 0.04" leak at the service port may be attributable to the change from using two rollover valves in the OEM fuel tank to one rollover valve in the replacement fuel tank. Ford determined through additional testing that the system was able to detect a 0.06" orifice leak and requested that they be

allowed to monitor 0.06" and larger leaks near the service port. Advanced Engineering Section of the Air Resources Board granted Ford a waiver from the 0.04" leak monitoring requirement in the service port area for the replacement fuel tank.

Based on the above, staff concludes that the evaporative emissions and the OBD II leak detection systems of the vehicles for which the exemption is requested will not be affected by the installation of the aft-of-axle fuel tank kits.