

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-136  
Relating to Exemptions under Section 27156  
of the Vehicle Code

E-Z FILL CORPORATION  
INSERT NOZZLE AUTO GAS CAP MODEL CF-701

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 Model CF-701 Insert Nozzle Auto Gas Cap manufactured by E-Z Fill Corporation, Arlington, TX 76012 has been found not to reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for the vehicle makes and model years listed below:

GM	75-83	Buick, Cadillac, Chevrolet, Oldsmobile, El Camino, Sprint, Pontiac
	79-83	Vans, Pick-Ups, Blazers, Jimmy
Ford	81-83	Mustang, EXP, Escort, LN-7, Lynx, Ranger
	82-83	Fairmont, Granada, T-Bird, Capri, Cougar XR-7, Zephyr, Continental
Chrysler	78-83	Chrysler, Dodge, Plymouth
	81-83	"K" Cars, Pick-Ups

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device 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 that the use of this device 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 ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE MODEL CF-701 INSERT NOZZLE AUTO GAS CAP.

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

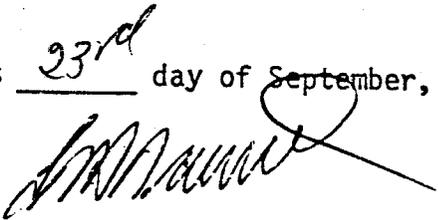
Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provides as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the state board for certification of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been certified by the state board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at El Monte, California, this 23<sup>rd</sup> day of September, 1983.

  
K. D. Drachand, Chief  
Mobile Source Division

State of California  
AIR RESOURCES BOARD

EVALUATION OF E-Z FILL CORPORATION'S INSERT NOZZLE AUTO GAS CAP MODEL  
CF-701 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156

August, 1983

State of California  
AIR RESOURCES BOARD

EVALUATION OF E-Z FILL CORPORATION'S INSERT NOZZLE AUTO GAS CAP MODEL  
CF-701 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156

by  
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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

E-Z Fill Corporation has applied for limited exemption of the model CF-701 aftermarket gas cap. This gas cap has a special trap door to allow refueling without cap removal.

The ARB performed a durability evaluation of the E-Z Fill cap and found it to perform in a manner similar to an original equipment cap even after the rigors of use.

The staff, therefore, recommends that the model CF-701 gas cap be granted an exemption for the vehicles as requested.

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EVALUATION OF E-Z FILL CORPORATION'S INSERT NOZZLE AUTO GAS CAP MODEL  
CF-701 FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE SECTION 27156

I. INTRODUCTION

E-Z Fill Corporation, Arlington, TX 76012, has applied for exemption from the prohibition of Vehicle Code Section 27156 for an aftermarket part known as the "Insert Nozzle Auto Gas Cap" (INAGC). The INAGC replaces the OE gas cap and allows tank refill without cap removal by a special spring loaded trap door.

The present application is a third generation design of the INAGC and is only designed for limited 1975 and newer make vehicles with threaded, screw-in type OE gas caps. The model designation of the third generation INAGC is CF-701.

This report describes the ARB's evaluation of the INAGC and their findings.

II. CONCLUSION

Durability tests performed both by the ARB and the applicant demonstrated that the third generation INAGC withstood the rigors of use, and no leakage was observed at the trap door seal as found on previous models.

Since leakage is the prime criteria for integrity of an evaporative emission control system, the ARB has judged the third generation E-Z Fill INAGC not to adversely effect the designed function of the evaporative control systems found on motor vehicles.

### III. RECOMMENDATIONS

Based on the durability/leakage test results, the staff recommends that the E-Z Fill INAGC model CF-701 receive limited exemption from the prohibitions of Vehicle Code Section 27156 for the vehicles as requested, and that Executive Order D-136 be issued.

### IV. DEVICE DESCRIPTION

The E-Z Fill cap is molded from a nylon substance which is impervious to gasoline and gasoline vapors. The model CF-701 uses two seals to prevent fuel tank vapors from escaping to the atmosphere. The first is a neoprene 'O' ring to seal the cap to the vehicle's filler neck. The second seal is sandwiched beneath the cap's face and a normally closed, oval shaped, spring loaded trap door which is hinged at the top. The cap's trap door opening is smaller in circumference than the corresponding opening in the seal which is offset at the point opposite of the hinge to prevent abrasion when a fill nozzle is inserted.

E-Z Fill caps incorporate pressure differential relief features similar to OE caps. Pressurized gasoline vapors, in the fuel tank, are vented through the cap at the rate of 150 cc/min when vapor pressure is above 0.25 psig (pounds per square inch gauge). Negative fuel tank pressure (vacuum) is equalized to atmospheric pressure when a differential exists of approximately 0.25 psig. The E-Z Fill caps accomplish venting through a special channel contained within the cap and by displacing the trap door. OE fuel caps have approximately the same venting rates, except there is no positive pressure relief below 2.0 psig.

The third generation cap includes the following new features:

- i) The offset trap door seal to prevent abrasion; and
- ii) Modifications to the inner neck to allow the trap door to seal properly.

V. DISCUSSION

Previous ARB evaluations of E-Z Fill caps<sup>(1)</sup> revealed that there were design problems which allowed evaporative emissions to increase on vehicles equipped with E-Z Fill caps. The primary problem found was vapor leakage at the cap's trap door seal. Although the seal functioned properly when new, it failed after 100 insertions of a standard fill nozzle due to abrasion.

In order to determine if the third generation model CF-701 INAGC could withstand the rigors of use, a durability test was performed, and at the conclusion of the test, the cap was pressure checked for leaks. The durability test entailed installing the model CF-701 on the filler neck of a 1982 Buick, and then a Wheaton vapor recovery type fill nozzle was inserted and removed 100 times to simulate refueling the vehicle during a two-year period. Each insertion including inserting the nozzle and latching it (held in place without physically holding the nozzle) and then unlatching and removing the nozzle. Fuel was also dispensed to assure no restrictions, spit-back, or premature unlatching would occur. Periodic inspections of the cap were performed to determine if abnormal wear or breakage occurred as a result of the nozzle insertions. After 100 insertions, the cap was removed and then coupled to a mock filler neck, which was capable of being pressurized by a hand pump. A soap solution was then sprayed on the cap to reveal bubbles which would

indicate leakage. The pressure check revealed no leaks at or around the trap door seal. Since trap door leakage was the cause for previous denials, the staff elected not to perform additional comparative SHED tests on the third generation model cap.

A second durability test was not performed with a fill nozzle which does not have vapor recovery paraphernalia. However, since the nozzle ends on both type nozzles which are inserted into the INAGC are similar, as for a latching characteristics, staff concluded the results would be the same in that no leakage would occur.

The venting characteristics of E-Z Fill caps differs slightly from OE caps. The E-Z Fill cap commences to vent positive pressure slowly (150 cc/min) at 0.25 psig, while the OE gas cap does not vent until 2.0 psig. However, the OE cap vents rapidly in excess of 2.0 psig, while the E-Z Fill caps continue to vent slowly. During negative pressure periods, both E-Z Fill caps and OE caps perform in a similar manner.

E-Z Fill caps also have several advantages over OE caps. Fuel spillage caused "Spit-Back" from too rapid of a fill rate is almost eliminated with the use of E-Z Fill caps. Also, the cap's surface area is greatly increased from the filler neck tube to allow for a better seal of the vapor boot on fill nozzles so equipped. Latching and unlatching was found not to be a problem with the E-Z Fill caps. The fill nozzle penetration was found to be adequate on the vehicle fitted with the model CF-701 E-Z Fill cap.

BIBLIOGRAPHY

1. Evaluation of E-Z Fill Corporation's "Clean Fill" Gasoline Filler Caps in Accordance with Section 2222, Title 13, of the California Administrative Code For Exemption From the Prohibitions of Section 27156 of the California Vehicle Code. El Monte, California: California Air Resources Board, July 26, 1982.

and

Evaluation of the E-Z Fill Corporation "Clean-Fill" Device in Accordance with Section 2222, Title 13, of the California Administrative Code, El Monte, California: Air Resources Board, March 30, 1979.