

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-220
Relating to Exemptions Under Section 27156
of the Vehicle Code

MECROM USA, INC.
FUEL EZ GAS CAP

Pursuant to the authority vested in the Air Resources by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Section 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 Fuel EZ gas cap manufactured for Mecrom USA, Inc. of 4144 Haywood Road, Horse Shoe, North Carolina 28742, 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 1991 and older motor vehicles with screw or cam type gas caps.

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. Exemption of a kit shall not be construed as an exemption to sell, offer for sale, or advertise any component of the product as an individual device.

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 MECROM USA, INC.'s FUEL EZ GAS CAP.

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 communications.

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 12th day of June, 1991.



R.B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF MECROM USA, INC. FUEL EZ GAS CAP
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE
CALIFORNIA CODE OF REGULATIONS

June 1991

State of California
AIR RESOURCES BOARD

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CALIFORNIA CODE OF REGULATIONS

by

Mobile Source Division
State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731

(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

Mecrom USA, Inc., of 4144 Hayward Road, Horse Shoe, North Carolina 28742 has applied for an exemption for the Fuel EZ gas cap from the prohibitions of Section 27156 of the California Vehicle Code. Fuel EZ gas cap replaces the OEM fuel cap of 1991 and older model year vehicles (see Appendix for vehicle applications). Fuel EZ gas caps are available in two models, screw type and cam type. The fuel cap is designed with a special self-closing trap door so that the vehicle's fuel tank may be refueled without the cap's removal.

Based on results from a comparative SHED evaporative emissions test and a durability test conducted at an independent laboratory and verified at the Air Resources Board's Haagen-Smit laboratory, the staff concludes that Mecrom USA Inc.'s Fuel EZ fuel cap will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

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THE PROHIBITIONS OF VEHICLE CODE SECTION 27156 IN ACCORDANCE
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I. INTRODUCTION

Mecrom USA, Inc., of 4144 Hayward Road, Horse Shoe, North Carolina 28742 has applied for an exemption for the Fuel EZ gas cap from the prohibitions of Section 27156 of the California Vehicle Code. Fuel EZ fuel gas cap replaces the OEM fuel cap of 1991 and older model year vehicles (see Appendix for vehicle applications). The fuel cap is designed with a special self-closing trap door so that the vehicle's fuel tank may be refueled without the cap's removal.

II. CONCLUSIONS

Based on results from a comparative SHED evaporative emissions test and a durability test conducted at an independent laboratory and verified at the Air Resources Board's Haagen-Smit laboratory, the staff concludes that Mecrom USA Inc.'s Fuel EZ fuel cap will not adversely affect exhaust emissions from vehicles for which an exemption is requested.

III. RECOMMENDATION

The staff recommends that Mecrom USA, Inc. be granted an exemption for the Fuel EZ fuel cap for installation on 1991 and older model-year vehicles and that Executive Order D-220 be granted.

IV. DESCRIPTION

Fuel EZ fuel cap is molded from a reinforced fiberglass which is impervious to gasoline and gasoline vapors. Two types of seals are used to prevent fuel tank vapors from escaping into the atmosphere. The first is an

"O" ring to seal the cap to the vehicle's filler neck. The second seal is sandwiched beneath the caps face and a normally closed, oval shaped, spring loaded trap door. A 360 degree seal is obtained when the trap door is closed against the smaller diameter cap face. The cap comes in two models; a screw type and a cam type model. Both models are 2.5 inches wide and 2.0 inches high with the trap door opening at 1.25 inches in diameter. The screw type is 2.0 inches high, while the cam type is only 1.5 inches.

The Fuel EZ consists of three parts: top cover, main body, and trap door. The round cover with dimensions of 2.5" x 1.0" is tapered at the top, allowing the cap to make contact with the vapor recovery boot on fuel filler nozzle. Two clips, spaced equally apart, hold the body and the cover together which can only be separated when squeezed together. The bottom side of the cap is cut out to not interfere with the operation of the trap door. A previous design did not have this cut out and the trap door would disengage from the body when the trap door was opened to its full extent. To solve this problem, the trap door was re-designed to be part of the body making it impossible to disengage.

Fuel EZ is only designed for vehicles listed in the Appendix. Using the Fuel EZ in vehicles other than those specified in Appendix could cause the fuel filler nozzle not to open the trap door in the filler neck of the gas tank, resulting in a fuel splash back.

V. DISCUSSION

A 1991 Ford Mustang was chosen as the test vehicle to determine the impact of the device on evaporative emissions test. A baseline evaporative emissions (SHED) test was performed on the test vehicle. Following the baseline evaporative emission testing, a durability evaluation was performed

in which a fuel filler nozzle was inserted 100 times into the Fuel EZ while installed on the test vehicle. One tenth of a gallon of fuel was pumped into the vehicle's fuel tank on the initial and on every fifth cap duration cycle. The purpose of pumping fuel is to lubricate the seal area with gasoline and expose fuel to the materials in this area as normally would occur during refueling. This durability test is designed to simulate two years usage of the cap and to determine if the cap's control of gasoline vapors would be affected by the use. After this procedure, another SHED test was conducted with the Fuel EZ installed on the vehicle.

The difference between the SHED with the device test results and baseline SHED test results indicated that total evaporative emissions are within the allowable limits of 0.2 grams (see Appendix). Therefore, the installation of the Fuel EZ gas cap did not have an adverse effect on evaporative emissions of the test vehicle. The staff recommends that Executive Order D-220 be granted to Mecrom USA, Inc.

APPENDIX

TEST RESULTS

Test vehicle: 1991 Ford Mustang 5.0L

Engine Family: MFM5.0V5HBG7

Fuel Capacity: 15.4 gallons (40% fill = 6.2 gallons)

Odometer: 9,015 miles

INDEPENDENT TEST LABORATORY:

Automotive Testing and Development Services, Inc.

15442 Chemical Lane

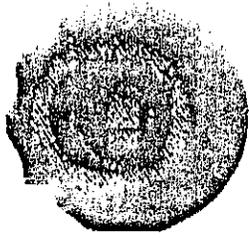
Huntington Beach, CA 92649

Test Cap	Diurnal(Cold)	Hot Soak	Total (grams)
OEM Cap Test 1	0.205	0.136	0.341
EZ Cap Test 1	0.438	0.135	0.573
EZ Cap Test 2	0.088	0.136	0.224
OEM Cap Test 2	0.178	0.129	0.307
Average OEM Cap	0.192	0.132	0.324
Average Fuel EZ Cap	0.264	0.136	0.399
Difference	+0.072	+0.004	+0.075
Percent Difference	+38%	+1%	+23%

CONFIRMATORY TESTING

ARB's Haagen-Smit Laboratory

Test Cap	Diurnal(Cold)	Hot Soak	Total (grams)
OEM Cap Test 1	0.330	0.130	0.460
EZ Cap Test 1	0.460	0.180	0.640
Difference	+0.130	+0.050	+0.180
Percent Difference	+39%	+28%	+39%



FUELEEZ™

The revolutionary new
fuel filler cap from Macrom USA

1990-91 APPLICATION CHART

ACURA

Integra		
1990-86	All	Cam type
Legend		
1990-86	All	Cam type

AUDI

Quattro		
1988	All	Cam type
1987-86	All (exc. Turbo)	Cam type
1985-82	All	Cam type
60, 72, 75, 80, 90		
1989-88	All	Cam type
100, 100GL, 100L, 100LS, Coupe		
1989	Sta. Wag.	Cam type
200 Turbo, Quattro, Wagon		
1989	All	Cam type
4000, 4000 Coupe, 4000 Quattro		
1987-80	All	Cam type
5000, 5000 Turbo, Coupe, GT		
3-6i	All (exc. Turbo)	Cam type
1987-85	All Turbo	Cam type
1984	All	Cam type
1983-80	Gas Eng. (exc. Coupé)	Cam type
1982-80	Diesel Eng.	Cam type

BMW

Bavaria		
1974-73	All	Cam type
M3, M5, M6		
1988	All	Cam type
318i		
1985-83	All	Cam type
320, 320i		
1982-79	All	Cam type
325, 325e, 325eS		
1988-84	All	Cam type
528e, 528i, 524td		
1988-85	All	Cam type
1982-79	All	Cam type
533i, 535i		
1988-83	All	Cam type
633CSi, 635CSi		
1988-79	All	Cam type
733i, 735i		
1987-79	All	Cam type
1600/2, 1600/4		
1972-66	1600/2, 1600/4 Touring	Cam type
3.0Si		
1976-75	All	Cam type
525		
1977-75	All	Cam type
300i		
1976-75	Sedan	Cam type

BUICK

Century, Electra, Estate Wagon, Invicta, LeSabre, Limited, Park Avenue, Riviera, Roadmaster, Wildcat		
1981-75	All	Screw type
Apollo, Century, Gran Sport, GS, Regal, Special, Skylark, Somerset, Somerset Regal, Sportwagon		
1989-75	All	Screw type
Skyhawk		
1989-82	All	Screw type
Electra, LeSabre, LeSabre Wagon, Century, Regal, Skylark		
1990	All	Screw type
Reatta, Riviera		
1990-88	All	Screw type

CADILLAC

1989-75	All (exc. Allante)	Screw type
DeVille, Fleetwood, Eldorado, Seville		
1990	All	Screw type

CHEVROLET (Cars)

Bel Air, Biscayne, Brookwood, Caprice, Caprice Classic, DelRay, Fleetline, Fleetmaster, Impala, Kingswood, Nomad, Stylemaster Townsman		
1989-75	All	Screw type
Beretta, Corsica		
1989-83	All	Screw type
Camaro, Berlinetta, I-Roc, Z-28		
1982	All w/Pressure Vacuum Cap	Screw type
1981-75	All	Screw type
Cavalier, Celebrity, Eurosport, Z-24		
1990-82	All	Screw type
Chevelle, Monte Carlo, Malibu		
1988-75	All	Screw type
Chevette		
1987-78	All	Screw type
Chevy II, Nova, Concours		
1989-85	All	Screw type
1979-75	All	Screw type
Citation, Citation II		
1985-80	All	Screw type
Corvette		
1990-75	All	Screw type
Spectrum, GEO		
1989-85	All	Screw type
Sprint		
1989-85	All	Screw type
GEO Metro		
1990-85	All	Screw type
Lumina, Lumina APV Van		
1990	All	Screw type

1990-91 APPLICATION CHART

Ford, Mustang, Mustang II		
1990-81	Mustang	Screw type
1981-79	Mustang prior to 4-1-81	Cam type
Taurus		
1990-86	All	Screw type
Tempo		
1990-84	All	Screw type
Thunderbird		
1990-83	All	Screw type
1982		Cam type
1982		Screw type
1981-71	All	Cam type
Torino, Gran Torino, Elita, LTD II		
1979-71	All	Cam type

FORD (TRUCKS)

Bronco, Bronco II		
1990-84	Bronco II	Screw type
1990-87	Bronco w/threaded cap	Screw type
1987	Bronco w/cam type cap	Cam type
1986-84	Bronco	Cam type
1983	All	Cam type
1982		Cam type
1982		Screw type
1981-79	All	Cam type
1978	Calif.	Cam type
1977	All	Cam type
Ranger		
1990-82	All	Screw type
F Series Pickup & Chassis Cab, 4x2, 4x4		
1989-88	All	Screw type
1990	F150-350 w/threaded cap	Screw type
1987	Pickup w/threaded cap	Screw type
	Pickup w/cam type cap	Cam type
1986-85	Pickup	Cam type
1984	Pickup w/cam type cap	Cam type
	Pickup w/threaded cap	Screw type
1983-82	Pickup w/cam type cap	Cam type
	Pickup w/threaded cap	Screw type
1981-80	Pickup	Cam type
1979	Styleside (Aft, Mid Tank)	Cam type
1978-77	Styleside (Aft, Mid Tank) F-100 & Calif.	Cam type
F53 Motorhome Stripped Chassis		
F59 Commercial Stripped Chassis		
1990-89		Screw type
Aerostar		
1990-87	All	Screw type
E100, E150, E250 Econoline & Club Wagon (Including Cutaway)		
1990-89	All w/threaded cap	Screw type
1988-87	All w/threaded cap (Except Cutaway)	Screw type
1988-87	All w/cam type (Exc. Cutaway, Ambulance)	Cam type
1986-80	All (Exc. Cutaway, Amb.)	Cam type
1990-89	All w/threaded cap	Screw type

GMC TRUCKS

Jimmy (Incl. S-15), Suburban		
1990-79	All	Screw type
Print, Caballero		
1985-75	All	Screw type
Pickups (Incl. S-15), Chassis Cab (4x2, 4x4)		
1990-79	All	Screw type

Safari (Mini Vans)		
1990-85	All	Screw type
G1500, G2500, G3500, Rally Vans, Vanduras		
1990-79	All	Screw type
Motor Home Chassis, Conventional Forward Control Chassis, Value Van		
1990-79	All	Screw type
Heavy Duty Trucks & Buses		
1982-79	50, 60 70 Series w/292, 350, 366, 427, 454 Eng., Right Hand w/20 Gal. Single Tank, Calif.	Screw type

HONDA

Civic, Civic CVCC, CRX		
1990-78	All	Cam type
Accord		
1989-78	All	Cam type
Prelude		
1989-79	All	Cam type

IHC TRUCKS

Travelall		
1975-74	All	Cam type
Medium & Heavy Duty Trucks		
Cargostar		
1982-73	All w/30 Gal. Diesel Wrap Tank, D354 Eng. Chassis built from 1/2/73 and later (w/Evaporative Emission System)	Cam type
1982-70	All w/30 Gal. Wrap Tank— Gas w/Evaporative Emission System	Cam type
Fluetstar		
1978-70	All RD Eng. Side Mounted w/Evaporative Emission System	Cam type
Loadstar		
1978-73	All w/20 Gal. Side Mounted Code 15120; w/21 Gal. Under Cab Code 15123; w/31 Gal. Side Mounted Code 15230, 15330, 15430 (Calif. Only)	Cam type
1978-73	All w/30 Gal. Side Mounted Code 15123, 245 Calif. only	Cam type

ISUZU

I-Mark		
1984-81	All	Cam type
Impulse		
1988-83	All	Cam type

JAGUAR

1985-82	XJS	Cam type
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JEEP

Cherokee, Wagoneer, Wagoneer Sportwagon		
1990-1984	Cherokee	Screw type
1989-84	Wagoneer Sportwagon	Screw type
1990	Wagoneer	Screw type
Comanche		
1990-86	All	Screw type

FUELEEZ™

1990-91 APPLICATION CHART

CHEVROLET (Trucks)

Blazer, (Incl. S10) Suburban		
1990-79	All	Screw type
El Camino		
1988-75	All	Screw type
Pickups (Incl. S-10), Chassis Cab (Exc. LUV)		
(4x2, 4x4)		
1990-79	All	Screw type
Astro (Mini) Van		
1990-85	All	screw type
Chevy Van, Sport Van, Beauville, Bonaventure, Step		
Van, Forward Control Vehicles & Motor Home Chassis		
1990-79	All	Screw type
Medium & Heavy Duty Trucks		
1982-80	50, 60, 70 Series w/292, 350, 366, 427, 454 Eng. Right hand w/20 Gal. Single Tank Calif. only	Screw type
1982-80	Some 50, 60, 70 Series w/292, 350, 366, 427, 454, 4-63T Eng., w/Gas Tank Nos. 2005523, 2005524, 2060384, 2060385, 2060386, 2060387, 2074100, 3938787, 3938788.	Screw type

CHRYSLER

Executive Sedan, Executive Limousine, "E" Class, Newport, Royal, Saratoga, Town & Country, Windsor, Crown, 300		
1989-80	All	Screw type
Fifth Avenue, New Yorker		
1983-80	All	Screw type
Conquest		
1989-87	All	Screw type
Cordoba		
1983-80	All	Screw type
1978	All	Screw type
Imperial		
1983-81	All	Screw type
1990	All	Screw type
Laser		
1986-84	All	Screw type
LeBaron, LeBaron GTS		
1990-80	All (exc. '81-80 Sta. Wag.)	Screw type
TC-Maserati		
1990-88	All	Screw type
Town & Country (Mini-Van)		
1990	All	Screw type

DODGE (CARS)

Monaco		
1990, 1978	All (exc. Sta. Wag.)	Screw type
Aries		
1989-80	All	Screw type
Colt, Colt Vista Wagon		
1990-85	All	Screw type
Conquest		
1986-85	All	Screw type
Magnum, Mirada, St. Regis		
1981-80	Mirada, St. Regis	Screw type
1978	Magnum	Screw type
Deltona		
1984	All	Screw type
Dynasty		
1990-88	All	Screw type

Diplomat, Medallion

1989-80	All (exc. '81-80 Sta. Wag.)	Screw type
Lancer		
1989-85	All	Screw type
Omni, Q24		
1990-84	All	Screw type
Pacifica		
1989-84	All	Screw type
Shadow		
1990-87	All	Screw type
Spirit		
1990-88	All	Screw type
400		
1983-82	All	Screw type
600		
1988-83	All	Screw type

DODGE (TRUCKS)

Raider		
1989-87	All	Screw type
Ramcharger		
1990-81	All	Screw type
Rampage		
1984-82	All	Screw type
D-50, Ram 50, Power Ram 50 (Pickup)		
1990-85	All	Screw type
Dakota		
1990-87	All	Screw type
D, W-100, 150, 200, 250, 300, 350, Sweptline, Utiline Pickups (4x2, 4x4)		
1990-88	All	Screw type
1987-82	Sweptline	Screw type
1987-82	Utiline	Cam type
1981	All	Screw type
Caravan, Ram Van (Mini Vans)		
1990-84	All	Screw type
B-Series, Tradesman Van, Sportsman Wagon (Incl. Maxi Vans & Wagons)		
1990-82	All	Screw type

EAGLE

Medallion		
1989-88	All	Screw type
Premier		
1990-88	All	Screw type
Summit		
1990-89	All	Screw type
Talon		
1990	Exc. All Wheel Drive	Screw type

FORD (CARS)

Country Sedan, Country Squire, Crestline, Crown Victoria, Custom, Custom 500, Customline, Galaxie, Galaxie 500, LTD, Mainline, Ranchwagon, Starliner, Sunliner, XL		
1988-86	All (thru 6/88)	Screw type
1985-83	Crown Vict., Coun. Sq. Wag.	Cam type
1985-83	LTD (exc. Propane Fuel)	Screw type
1982-71	All	Cam type
1990-89	Crown Vict., Coun. Sq. Wag.	Screw type
Escort		
1990	All	Screw type
Granada		
1982	Station Wagon	Cam type
1981	All	Cam type
1980-75	All w/concealed gas cap	Cam type

FUELEZ™

1990-91 APPLICATION CHART

INCOLN

Size, Continental, Capri, Cosmopolitan,

Custom, Premiere

1989-92 All

1981-71 All

Mark III, IV, V, VI, VII

1989-84 All

1983-71 All

Town Car

1990-86 All

1985-82 All

Versailles

1980-77 All

Continental, Mark VII

1990 All

MAZDA (CARS)

1990 Miata

MAZDA (TRUCKS)

Pickups

1990 B2600

1989 B2600 w/EFI

1984-79 B2000, B2200 Diesel

1978-77 B1800

1976-73 B1600

MERCEDES BENZ

190 Series

1988-84 190D, 190E

220 Series

1975-71 220, 220D

230 Series

1978-74 230

240D

1983-74 All

250 Series

1973-71 250, 250C

260E

1988-87 All

280 Series

1981-71 All

300 Series

1988 300E, 300CE, 300TE, 300SEL

1987-86 300D, 300E, 300SDL

1985-75 300D, 300CD, 300SD, 300TD

1973-71 300SEL

350SL

1972 All

380 Series

1985-84 380SE, 380SL

1983-81 380SEC, 380, 380SL, 380SLC

420SEL

1988-86 All

450 Series

1980-75 All

1974-73 All

500SEC, 500SEL

1985-84 All

560SL, 560SEC, 560SEL

1988-86 All

Screw type

Cam type

Screw type

Cam type

Screw type

Cam type

Cam type

Screw type

Screw type

Screw type

Screw type

Cam type

RENAULT

Alliance, Encore, GTA

1987-83 All

Medallion

1988 All

Screw type

Screw type

SAAB

99

1980 Sedan

900, 9000

1980 All

Cam type

Cam type

STERLING

1990-87 All

Cam type

SUBARU

Hatchback, Brat, Sedan, Sta. Wag.

1987-85 All w/threaded cap

Screw type

SUZUKI

Samurai

1990-86 All

Screw type

Swift

1990-89 All

Screw type

TOYOTA (CARS)

Camry

1988-83 All

Screw type

Celica (exc. Supra)

1988-84 All

Screw type

Supra

1988-84 All

Screw type

Corolla

1988-83 All

Screw type

Cressida

1988-83 All

Screw type

MR2

1988-85 All

Screw type

Starlet

1984-83 All

Screw type

Tercel

1988-83 All

Screw type

TOYOTA (TRUCKS)

Hi-Lux, Pickup, Chassis Cab, 4-Runner

1988-85 All

Screw type

Land Cruiser

1988-87 All

Screw type

Van

1988-84 All

Screw type

VOLKSWAGEN

Quantum, Syncro

1988-84 All

Cam type

Scirocco

1984 All w/Cam type

Cam type

1983-82 All

Cam type

Corrado, Golf, Jetta

1990-89 All

Screw type

West Coast
MOTORSPORT MARKETING

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East Coast
MECROM USA

4144 Haywood Road
Horse Shoe, North Carolina 28742
Tel (704) 891-3919
Fax (704) 891-4305

#12-Application of the tank cover to fuel tank neck. #16-Clips on fuel filler cap which, when inserted through center of
 a. #40-Complete fuel cap. #15-Chamber area, where as when applied with #16 creates seal.

The self sealing fuel door (#21) is accompanied with the two outer hinges (#20) supported by the axle (#30) secured to the
 base (#17). When joined by the two clips (#19) anchors itself to main body (#15).

The washer (#23) of the fuel door (#21) is held in place by the fiber outer shell (#22). The outer washer to outer shell
 (#40). Complete seal is accomplished when fuel nozzle is inserted through self sealing fuel door (#21).

