

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-461-3

Relating to Exemptions under
Section 27156 of the Vehicle Code

Independent Mobility Systems, Inc.
Replacement Fuel Tank System

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 installation of the replacement fuel tank system, manufactured by Independent Mobility Systems, Inc. (IMS) of 4100 W. Piedras Street, Farmington, New Mexico 87401, has been found not to reduce the effectiveness of the applicable vehicle pollution control system, and therefore, the replacement fuel tank system is exempt from the prohibitions of Section 27156 of the Vehicle Code for installation on 2001 and 2002 model-year DaimlerChrysler Corporation 2.4, 3.3, and 3.8 liter gasoline and flexible fuel ethanol minivans, originally equipped with a 20-gallon plastic fuel tank.

This exemption is based on On-Board Refueling Vapor Recovery (ORVR) and On-Board Diagnostic II (OBD II) system test results submitted by IMS. Based on evaluation of ORVR emission data and OBD II system test results, it was concluded that IMS's replacement fuel tank system does not adversely affect the vehicle's refueling emissions or reduce the effectiveness of its OBD II system. In addition, based on engineering evaluation of previous fuel tank temperature data, it was also concluded that the replacement fuel tank system would not adversely affect the vehicle's evaporative emissions.

Exemption of the replacement fuel tank system shall not be construed as an exemption to sell, offer for sale, or advertise any component of the replacement fuel tank system as individual devices.

This Executive Order shall not apply to any device advertised, offered for sale, sold with, or installed on a motor vehicle prior to or concurrent with transfer to an ultimate purchaser.

This Executive Order is valid provided that installation instructions for the replacement fuel tank system do not recommend tuning the vehicle to specifications different from those of the vehicle manufacturer.

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

Marketing of the replacement fuel tank system 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.

In addition to the foregoing, the ARB reserves the right in the future to review this Executive Order and the exemption provided herein to assure that the exempted add-on or modified part continues to meet the standards and procedures of Title 13, California Code of Regulations, Section 2222 et seq.

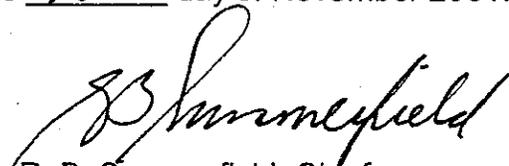
This Executive Order does not constitute any opinion as to the effect the use of the replacement fuel tank system may have on any warranty either expressed or implied by the vehicle manufacturer.

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 CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF INDEPENDENT MOBILITY SYSTEMS, INC.'S REPLACEMENT FUEL TANK SYSTEM.

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 is made after a hearing that grounds for revocation exist.

Executed at El Monte, California, this 13th day of November 2001.


R. B. Summerfield, Chief
Mobile Source Operations Division

EVALUATION SUMMARY

Manufacturer Name: Independent Mobility Systems, Inc.

Name of Device: Replacement Fuel Tank System

Background:

Independent Mobility Systems, Inc. (IMS) of 4100 W. Piedras Street, Farmington, New Mexico 87401 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for its replacement fuel tank system. The replacement fuel tank is designed for use on 2001 and 2002 model-year DaimlerChrysler Corporation 2.4, 3.3, and 3.8 liter gasoline and flexible fuel ethanol minivans. These vehicles are certified to low and ultra-low emission vehicle exhaust emission standards, enhanced evaporative emission standards, and On-Board Refueling Vapor Recovery (ORVR) emission standard. They are also subject to the On-Board Diagnostic II (OBD II) system regulations.

Recommendation:

Grant exemption to IMS as requested and issue Executive Order D-461-3.

Device Description:

IMS's replacement fuel tank system allows lowering of the van floor for wheel chair access. Installation of IMS's fuel tank requires replacing the stock 20-gallon mid-ship plastic (high density polyethylene) fuel tank with IMS's 22-gallon aft-of-axle HDPE plastic fuel tank. IMS's replacement fuel tank system also includes replacement fuel and emission lines with a pressure and permeation rating equivalent to that of the stock lines (high pressure/low permeation SAE 30-R9). The rollover valve and ORVR emission control valves are replaced with OEM-quality valves. The stock emission canister assembly is retained but moved forward from under the driver's seat to directly underneath the rack and pinion steering rack. The stock fuel pump/sending unit, filler tube, and gas cap are also retained. Installation of the replacement fuel tank does not require any modifications to the stock motor or exhaust emission control systems.

Discussion/Basis for the Recommendation:

The exemption is based on ORVR emissions and OBD II system test results submitted by IMS. The exemption is also based on engineering evaluation of the impact on exhaust and evaporative emissions. Since no modification is made to the vehicle's exhaust emission control system, the staff concluded that installation of the replacement fuel tank would not have any adverse effect on the exhaust emissions of the applicable vehicles (gasoline or flexible fuel ethanol vehicles).

To evaluate the impact on evaporative emissions, the staff considered the fuel tank temperature profile IMS previously generated on its replacement fuel tank using gasoline. On a 1998 model-year 3.8 liter Town and Country minivan, IMS generated the liquid fuel temperature profile of its 20-gallon replacement fuel tank and compared it to the temperature profile of the stock fuel tank (obtained from DaimlerChrysler). The data showed that the liquid fuel temperatures in the replacement fuel tank were slightly lower than the temperatures in the stock fuel tank (the difference in temperatures (0-9 degrees Fahrenheit) was attributed to the different fuel tank locations, mid-ship for stock tank and aft-of-axle for replacement tank). As a result, the amount of vapor generated

in the two tanks was expected to be comparable. Based on this, the staff concluded that IMS's replacement fuel tank would have a negligible effect on the vehicle's gasoline evaporative emissions. No major changes have been made to either the stock or IMS's fuel tank systems (fuel tank material or location; an increase in tank capacity from 20 to 22 gallons is not expected to cause an increase in fuel tank temperature) since the 1998 model. Therefore, the same result is expected on the 2001 and 2002 model-year gasoline minivans.

With all fuel tank components remaining the same except the change in fuel from gasoline to ethanol, the same trend in fuel tank temperature profiles is expected—temperature of ethanol in the replacement fuel tank is expected to remain below the temperature of ethanol in the stock fuel tank. Therefore, IMS's replacement fuel tank is not expected to have any adverse effect on the evaporative emissions of the ethanol minivans.

To evaluate the impact on refueling emissions, a 2001 model-year Grand Caravan (test group 1CRXT03.32DT; evaporative family 1CRXR0165XAA; fuel type E85 ethanol or gasoline; 174 miles) with IMS's replacement fuel tank was tested at Automotive Testing Laboratories, Inc. (ATL) in Mesa, Arizona. The vehicle was tested using Phase II Cleaner Burning Gasoline. ATL reported the following refueling emission results:

ORVR Emissions	Test	DF	Standard
Grams/Gallon of Dispensed Fuel	0.01	0.02	0.20

The gasoline refueling emission results showed that the vehicle modified with IMS's replacement fuel tank would not exceed the applicable standard over the useful life of the vehicle. Since the test vehicle had less than 4,000 miles, there was a concern that the emission canisters had not gone through a sufficient number of vapor load and purge cycles and might not be stable. Prior to testing, IMS replaced the emission canisters on the test vehicle with canisters that had been in use for over 17,000 miles on another 2001 Grand Caravan. All testing was conducted with the replacement canisters.

To evaluate the impact on ethanol refueling emissions, the staff compared IMS's test data to DaimlerChrysler's certification emission data. The table below compares the emissions:

No.		Fuel	ORVR Emissions	ORVR Standard
1	IMS	Gasoline	0.03	0.20
2	DaimlerChrysler	Gasoline	0.03	0.20
3	DaimlerChrysler	Ethanol	0.04	0.20

IMS's gasoline refueling emissions are the same as DaimlerChrysler's certification emissions for gasoline minivans. With all the emission-related fuel tank components remaining the same except the change in fuel from gasoline to ethanol, a similar result can be expected. Using DaimlerChrysler's certification emissions for ethanol minivans, ethanol refueling emissions for IMS's system are expected to be approximately 0.04

grams/gallon, far below the standard. The staff concludes that IMS's fuel tank would not have any adverse impact on the refueling emissions of the ethanol minivans.

Using the same 2001 Grand Caravan, ATL tested the OBD II system leak diagnostics. The testing required ATL to place a 0.020-inch diameter leak in the vehicle's evaporative system and operate the vehicle to ensure that the leak is detected by the OBD II system. The leak test was required in two locations – once in the filler tube gas cap and once in the purge line between the purge solenoid and the emission canister. ATL reported that the system detected the 0.020-inch leak when it was introduced into both the gas cap and the purge line. The leak tests were performed with the fuel level at approximately 50 percent. ATL verified leak detection by checking for the P0456 (small leak) diagnostic trouble code (DTC) in the on-board computer using a scantool. All readiness indicators had set to complete and no other DTC's were set throughout testing.

The gasoline minivans use the same OBD II monitoring strategies as the ethanol minivans; therefore, gasoline minivans modified with IMS's fuel tank are also expected to detect a small leak in their evaporative systems.

Based on the above, the staff concludes that IMS's replacement fuel tank system would not have any adverse impact on the exhaust emissions, evaporative emissions, refueling emissions, or the OBD II system of 2001 and 2002 (carry-over from 2001) model-year 2.4, 3.3, and 3.8 liter DaimlerChrysler gasoline and flexible fuel ethanol minivans, originally equipped with a 20-gallon plastic fuel tank. Therefore, the staff concludes that IMS's replacement fuel tank system meets the requirements for a VC 27156 exemption for the vehicles listed in the Executive Order.