

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-704-1

Relating to Exemptions under  
Section 27156 of the Vehicle Code

HH2 Energy Inc.  
HH2 Hydrogen Generator Device

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-02-003;

IT IS ORDERED AND RESOLVED: That installation of the HH2 Hydrogen Generator Device, manufactured by HH2 Energy Inc. (23100 Valerio St., West Hills, CA 91307), has been found not to reduce the effectiveness of the applicable vehicle pollution control systems, and therefore, the HH2 Hydrogen Generator Device is exempt from the prohibitions in Section 27156 of the Vehicle Code for all 1900-2000 model year (MY) light/medium/heavy heavy-duty on-road gasoline or diesel engines up to 20.0 liters.

The HH2 device consists of an acrylic water reservoir, various electrical components, electrical wiring and connectors, an electrolyte (sodium citrate), and vinyl supply hoses for the hydrogen gas and oxygen gas.

This Executive Order is based on emission test results using Heavy-Duty Federal Test Procedure (FTP) Transient Cycle test submitted by HH2 Energy Inc. with the HH2 Hydrogen Generator Device.

If evidence provides the Air Resources Board with reasons to suspect that the HH2 Hydrogen Generator Device will affect the durability of the emission control system, HH2 Energy Inc. shall be required to submit durability data to show that the durability of the vehicle emission control system is not, in fact, affected and/or that the add-on or modified parts demonstrate adequate durability.

This Executive Order is valid provided that installation instructions for the HH2 Hydrogen Generator Device do not recommend tuning the vehicles to specifications different from those of the vehicle manufacturer.

Changes made to the design or operating conditions of the HH2 Hydrogen Generator Device, as exempt by the Air Resources Board, which adversely affect the performance of the vehicle's emission control system, shall invalidate this Executive Order.

Marketing of the HH2 Hydrogen Generator Device using identification other than that shown in this Executive Order or for an application other than that listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board.

Exemption of the HH2 Hydrogen Generator Device 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 shall not apply to any HH2 Hydrogen Generator 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 does not constitute any opinion as to the effect the use of the HH2 Hydrogen Generator Device 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.

In addition to the foregoing, the Air Resources Board 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 California Code of Regulations, Title 13, Section 2222, et seq.

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 HH2 ENERGY INC.'S HH2 HYDROGEN GENERATOR DEVICE.

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 the hearing that grounds for revocation exist.

Executed at El Monte, California, this 16<sup>th</sup> day of April 2013.

  
Annette Hebert, Chief  
Mobile Source Operations Division

## EVALUATION SUMMARY

Manufacturer Name: HH2 Energy Inc.

Name of Device: HH2 Hydrogen Generator Device

Background:

HH2 Energy Inc. of 23100 Valerio St., West Hills, CA 91307 has applied for exemption from the prohibitions in Section 27156 of the California Vehicle Code for its HH2 Hydrogen Generator Device. The device is designed for all 1900-2000 model year (MY) light/medium/heavy heavy-duty on-road gasoline or diesel engines up to 20.0 liters.

Recommendation:

Grant exemption to HH2 Energy Inc. as requested and issue Executive Order D-704-1.

Device Description:

The HH2 device produces hydrogen through an electrolysis process by supplying electricity from the vehicle's battery to stainless steel metal tubes submerged in a reservoir containing distilled water and an electrolyte (sodium citrate). The device is connected to the vehicle's battery through a relay switch so that hydrogen gas is only produced when the engine is operating. The device consists of an acrylic water reservoir (which contains the metal tubes), relay switches, electrical wiring and connectors, an electrolyte (sodium citrate), and vinyl supply hoses for the hydrogen gas and oxygen gas.

Discussion/Basis for the Recommendation:

This exemption is based on the following emission test conducted on a 2000 MY Cummins ISM 10.8L heavy-duty diesel engine, engine family YCEXH0661MAI, with HH2 Energy Inc.'s HH2 Hydrogen Generator Device installed:

The emission test results are shown below:

Hot-Start FTP Transient Cycle Emission Test

|                                     | FTP Transient Cycle Emissions (grams/bhp-hr) |      |     |      |
|-------------------------------------|--|------|-----|------|
|                                     | HC   | CO   | NOx | PM   |
| FTP Emission Standards              | 1.3  | 15.5 | 4.0 | 0.10 |
| FTP Results w/ HH2 device Installed | 0.1  | 1.3  | 3.9 | 0.08 |

All exhaust emission test results for FTP transient cycle emission testing on the 2000 MY Cummins ISM 10.8L heavy-duty diesel engine modified with the HH2 Hydrogen Generator Device showed that the modified engine met the exhaust emission standards. Similar results are expected when HH2 Energy Inc.'s HH2 Hydrogen Generator Device is used on the 1900-2000 MY light/medium/heavy heavy-duty on-road gasoline or diesel engines up to 20.0 liters as stated in this application.