

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-714

Relating to Exemptions under
Section 27156 of the Vehicle Code

DEEC, Inc.
Oxygen Plasma Generator

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 Oxygen Plasma Generator device, manufactured by DEEC, Inc. (235 North Hill Boulevard, Burlington, Washington 98233), has been found not to reduce the effectiveness of the applicable vehicle pollution control systems, and therefore, the Oxygen Plasma Generator device is exempt from the prohibitions in Section 27156 of the Vehicle Code for all 1980-2009 model year light/medium/heavy heavy-duty on-road diesel engines between 4.0 liters to 20.0 liters.

The Oxygen Plasma Generator device consists of a 6-quart water reservoir, an electrolysis generator cell, various electrical components, electrical wiring and connectors, an electrolyte, and plastic supply hose for the hydrogen gas.

This Executive Order is based on emission test results using Heavy-Duty Federal Test Procedure Transient Cycle test submitted by DEEC, Inc. with the Oxygen Plasma Generator device.

If evidence provides the Air Resources Board with reasons to suspect that the Oxygen Plasma Generator device will affect the durability of the emission control system, DEEC, 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 Oxygen Plasma 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 Oxygen Plasma 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 Oxygen Plasma 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 Oxygen Plasma 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 Oxygen Plasma 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 Oxygen Plasma 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 DEEC, INC.'S OXYGEN PLASMA 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 29th day of August 2013.


Erik White, Chief
Mobile Source Operations Division

EVALUATION SUMMARY

Manufacturer Name: DEEC, Inc.

Name of Device: Oxygen Plasma Generator

Background:

DEEC, Inc. of 235 North Hill Boulevard, Burlington, Washington 98233 has applied for exemption from the prohibitions in Section 27156 of the California Vehicle Code for its Oxygen Plasma Generator device. The device is designed for all 1980-2009 model year (MY) light/medium/heavy heavy-duty on-road diesel engines between 4.0 liters to 20.0 liters.

Recommendation:

Grant exemption to DEEC, Inc. as requested and issue Executive Order D-714.

Device Description:

The Oxygen Plasma Generator device produces hydrogen through an electrolysis process by supplying water from a reservoir containing distilled water and an activator (potassium hydroxide) to an electrolysis dry cell containing stainless steel plates that are supplied electricity from the vehicle's battery. The device consists of a 6-quart water reservoir, an electrolysis dry cell (which contains the positive, negative, and neutral stainless steel plates), various electrical components, electrical wiring and connectors, and a superthane ether supply hose for the hydrogen gas. The device is connected to the vehicle's battery through a power controller so that hydrogen gas is only produced when the engine is operating.

Discussion/Basis for the Recommendation:

This exemption is based on the following emission tests conducted on two heavy-duty diesel engines with DEEC, Inc.'s Oxygen Plasma Generator device installed:

1. FTP transient cycle test on a 1999 MY Mack E7 Series 11.9 liter diesel engine.
2. FTP transient cycle, Euro III ESC 13-mode steady-state, and NTE tests on a 2007 MY Caterpillar C15 Series 11.9 liter diesel engine.

The emission test results are shown below:

Hot-Start FTP Transient Cycle Emission Test
1999 MY Mack E7 Series 11.9 liter Diesel Engine
Engine Family XMKXH11.9E54

	FTP Transient Cycle Emissions (grams/bhp-hr)			
	HC	NOx	CO	PM
FTP baseline results for engine	0.188	4.08	0.77	0.075
FTP results w/DEEC Oxygen Plasma Generator installed	0.165	4.19	0.69	0.072
Percentage change	-12.2%	+2.7%	-10.4%	-4.0%

Hot-Start FTP Transient Cycle Emission Test
2007 MY Caterpillar C15 Series 11.9 liter Diesel Engine
Engine Family 7CPXH0928E1K

	FTP Transient Cycle Emissions (grams/bhp-hr)				
	NMHC	NOx	NMHC+NOx	CO	PM
FTP baseline results for engine	0.0	1.35	1.35	0.28	0.0044
FTP results w/DEEC Oxygen Plasma Generator installed	0.0	1.43	1.43	0.27	0.0037
Percentage change	0%	+5.9%	+5.9%	-3.6%	-15.9%

Euro III ESC 13-Mode Steady-State Emission Test
2007 MY Caterpillar C15 Series 11.9 liter Diesel Engine
Engine Family 7CPXH0928E1K

	Euro III ESC Emissions (grams/bhp-hr)				
	NMHC	NOx	NMHC+NOx	CO	PM
ESC Emission Standards	0.14	1.16	1.3	15.5	0.01
ESC Test Results w/ Oxygen Plasma Generator Installed	0.0	0.99	0.99	0.11	0.0065
Pass/Fail	Pass	Pass	Pass	Pass	Pass

NTE Emission Test
2007 MY Caterpillar C15 Series 11.9 liter Diesel Engine
Engine Family 7CPXH0928E1K

	Euro III ESC Emissions (grams/bhp-hr)				
	NMHC	NOx	NMHC+NOx	CO	PM
NTE Emission Standards	0.21	1.74	2.0	19.4	0.02
Point 1 NTE Test Results w/ Oxygen Plasma Generator Installed	0.02	0.75	0.77	0.16	0.0041
Point 2 NTE Test Results w/ Oxygen Plasma Generator Installed	0.01	1.03	1.04	0.10	.0028
Point 3 NTE Test Results w/ Oxygen Plasma Generator Installed	0.00	0.67	0.67	0.05	.0033
Pass/Fail	Pass	Pass	Pass	Pass	Pass

Notes: 1. NTE Point 1 is 50% Torque/90% RPM

NTE Point 2 is 85% Torque/80% RPM

NTE Point 3 is 65% Torque/70% RPM

2. All testing was conducted at Olson-EcoLogic Engine Testing Laboratories in Fullerton, California

FTP transient cycle testing on the 1999 MY Mack E7 Series engine and 2007 MY Caterpillar C15 Series engine modified with the DEEC Oxygen Plasma Generator device showed that all comparative exhaust emission test results were no more than 10 percent above baseline exhaust emissions which is acceptable for exemption. EURO III ESC and NTE emission testing on the 2007 MY Caterpillar C15 Series engine modified with the DEEC Oxygen Plasma Generator device showed that the modified engine met the exhaust emission standards. Similar results are expected when DEEC, Inc.'s Oxygen Plasma Generator device is used on the 1980-2009 MY light/medium/heavy heavy-duty on-road diesel engines between 4.0 liters to 20.0 liters as stated in this application.

RESCINDED 7/3/2015