

**State of California
AIR RESOURCES BOARD**

EXECUTIVE ORDER DE-05-010-05

Pursuant to the authority vested in the Air Resources Board (ARB) by the Health and Safety Code, Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Section 39515 and 39516 and Executive Order G-02-003;

Relating to Exemptions under Section 27156 of the Vehicle Code, and Verification under Sections 2700 through 2710 of Title 13 of the California Code of Regulations (CCR)

Cleaire Advanced Emission Controls, Limited Liability Corporation (LLC)
(Cleaire) Horizon™ Electric Particulate Filter (Horizon)

ARB has reviewed Cleaire's request for verification of the Horizon™ system. Based on an evaluation of the data provided, and pursuant to the terms and conditions specified below, the Executive Officer of ARB hereby finds that the Horizon™ reduces emissions of diesel particulate matter (PM) consistent with a Level 3 device (greater than or equal to 85 percent reductions) (Title 13, CCR, Sections 2702 (f) and Section 2708) and is compliant with the 2009 nitrogen dioxide emissions limit. Accordingly, the Executive Officer determines that the system merits verification and, subject to the terms and conditions specified below, classifies the Horizon™ as a Level 3 Plus system for heavy-duty on-road vehicles that use heavy-duty diesel engines of all model years up through and including 2006, except those belonging to engine families listed in Attachment 1.

The aforementioned verification is subject to the following terms and conditions:

- The engine must be model year 2006 or older, and not belong to any of the engine families listed in Table 1 of Attachment 1. The Horizon™ may be used with engines in the families listed in Table 2 of Attachment 1 provided certain conditions are met, as described below.
- The engine must be used by an on-road motor vehicle with a manufacturer's Gross Vehicle Weight Rating of over 14,000 pounds.
- The engine may have a pre-existing diesel oxidation catalyst from the original equipment manufacturer (OEM) if the engine's model year is between 1994 and 2005, inclusive.
- If the engine's model year is 2006 or if the engine's model year is 1993 or older, the engine must not have a pre-existing OEM diesel oxidation catalyst unless following conditions are met:
 - The OEM diesel oxidation catalyst is left in place and not removed.
 - The Horizon™ is installed downstream of the diesel oxidation catalyst.
 - The backpressure sensor is installed upstream of the diesel oxidation catalyst.

- The engine must not have a pre-existing OEM diesel particulate filter (DPF).
- The engine must have a displacement no greater than 15 liters.
- The engine must have a four-stroke combustion cycle.
- The engine may be mechanically or electronically controlled.
- The engine may be turbocharged or naturally aspirated.
- The engine must be well maintained and not consume lubricating oil at a rate greater than that specified by the engine manufacturer.
- Lube oil, or other oil, must not be mixed with the fuel.
- Horizon™ must not be operated with fuel additives, as defined in Section 2701 of Title 13, of the CCR, unless explicitly verified for use with the fuel additive(s).
- Horizon™ must not be used with any other systems or engine modifications without ARB and manufacturer approval.
- The system must be installed with a backpressure monitor that notifies the operator when the backpressure limit is reached. The notification must occur and be clearly visible to the operator while the vehicle or equipment is in use.
- The system may be re-designated in its entirety to other vehicles or equipment within a common ownership fleet if authorized by Cleaire. A system re-designation must be performed in accordance with Section 2706, Title 13, CCR and the policy document found here:
<http://www.arb.ca.gov/diesel/verdev/swap/swap.htm>
- The other terms and conditions specified below.

IT IS ALSO ORDERED AND RESOLVED: That installation of the Horizon™, manufactured by Cleaire Advanced Emission Controls, LLC, 14775 Wicks Boulevard, San Leandro, California 94577-6779, has been found not to reduce the effectiveness of the applicable vehicle pollution control system, and therefore, the Horizon™ is exempt from the prohibitions in Section 27156 of the Vehicle Code for installation on heavy-duty on-road vehicles. This exemption is only valid provided the engines meet the aforementioned conditions.

ARB reserves the right in the future to review this Executive Order and the exemption and verification provided herein to assure that the exempted and verified add-on or modified part continues to meet the standards and procedures of CCR, Title 13, Section 2222, et seq and CCR, Title 13, Sections 2700 through 2710.

The Horizon™ system consists of the following major system components, listed in order from exhaust inlet to outlet as they are arranged within the exhaust system of the vehicle: one inlet cone, one electric heating element, one silicon carbide wall-flow DPF, and one outlet cone. The Horizon™ system also includes a backpressure monitor and warning system. The major components of the Horizon™ system are identified in Attachment 2. Schematics of the approved product and engine labels are shown in Attachment 3.

The Horizon™ system is comprised of a single silicon carbide wall-flow DPF designed to filter the exhaust from a single engine. Horizon™ systems with multiple DPFs,

including designs with two or more filter components canned together or multiple individually-canned filter components in parallel or in series (or any combination thereof), are not valid under this Executive Order. Channeling exhaust from a single engine through multiple Horizon™ systems, deployed in parallel or in series or any combination thereof, is also not valid under this Executive Order.

No changes are permitted to the device. ARB must be notified, in writing, of any changes to any part of the Horizon™. Any changes to the device must be evaluated and approved in writing by ARB. Failure to do so shall invalidate this Executive Order.

Cleaire must ensure that the installation of Horizon™ conforms to all applicable industrial safety requirements.

Prior to sale of a Horizon™ system, Cleaire must provide each prospective owner/purchaser of the system with a written estimate of the number of hours of vehicle operation that will typically elapse before regeneration is required. Cleaire must also provide, in writing, the length of time of a typical regeneration event.

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

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

Marketing of the Horizon™ 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 written approval is obtained from ARB.

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

A copy of this Executive Order must be provided to the ultimate purchaser at the time of sale.

ARB estimates that the Horizon™ has no significant effect on average fuel economy.

As specified in Section 2706 (j) (Title 13, CCR) of the Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines (Procedure), ARB assigns each Diesel Emission Control Strategy a family name. The designated family name for the verification as outlined above is:

CA/CLE/2005/PM3+/N00/ON/DPF01

As stated in the Procedure, Cleaire is responsible for recordkeeping requirements (Section 2702), honoring the required warranty (Section 2707), and conducting in-use compliance testing (Section 2709).

Proper engine maintenance is critical for the proper functioning of the diesel emission control strategy. The owner of the vehicle on which the diesel emission control strategy is installed is strongly advised to adhere to all good engine maintenance practices. Failure to document proper engine maintenance, including keeping records of the engine's oil consumption, may be grounds for denial of a warranty claim.

This Executive Order is valid provided that the diesel fuel used in conjunction with the device complies with Title 13, CCR, Sections 2281 and 2282, and if biodiesel is used, the biodiesel blend shall be 20 percent or less subject to the following conditions:

- The biodiesel portion of the blend complies with the American Society for Testing and Materials specification D6751 applicable for 15 parts per million sulfur content;
- The diesel fuel portion of the blend complies with Title 13, CCR, Sections 2281 and 2282; and
- The use of biodiesel applies to devices verified to reduce only diesel PM.

Other alternative diesel fuels such as, but not limited to, ethanol diesel blends and water emulsified diesel fuel are excluded from this Executive Order.

Systems verified under this Executive Order shall conform to all applicable California emissions regulations.

This Executive Order does not release Cleaire from complying with all other applicable regulations.

Violation of any of the above conditions shall be grounds for revocation of this Executive Order.

This Executive Order hereby supersedes Executive Order DE-05-010-04 (dated December 30, 2009), Executive Order DE-05-010-03 (dated June 12, 2007), Executive Order DE-05-010-02 (dated February 14, 2007), Executive Order DE-05-010-01 (dated May 16, 2006), and Executive Order DE-05-010 (dated December 7, 2005).

Executed at El Monte, California, and effective this 18th day of January 2011.



Robert H. Cross, Chief
Mobile Source Control Division

Attachments: See next page.

Attachments:

- Attachment 1: Engine Families Excluded from the Cleaire Horizon™ Diesel Particulate Filter Verification
- Attachment 2: Parts List for the Cleaire Horizon™ Electric Particulate Filter
- Attachment 3: Label for the Cleaire Horizon™ System