

**State of California
AIR RESOURCES BOARD**

EXECUTIVE ORDER DE-09-010-02

Pursuant to the authority vested in the Air Resources Board (ARB) by 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 38395 of the Vehicle Code, and Verification under Sections 2700 through 2710 of Title 13 of the California Code of Regulations (CCR)

ESW Canada (ESWC)
ThermaCat™ System

ARB has reviewed ESWC request for verification of the ThermaCat™ 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 ThermaCat™ system reduces emissions of diesel particulate matter (PM) consistent with a Level 3 Plus device (greater than or equal to an 85 percent reduction and meets the 2009 nitrogen dioxide emissions limit) (Title 13, CCR, sections 2702 (f) and 2708). Accordingly, the Executive Officer determines that the system merits verification and, subject to the terms and conditions specified below, classifies the ThermaCat™ system as a Level 3 Plus system for off-road vehicles using off-road diesel engines from the engine families listed in Attachment 1.

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

- The engine must not be in an auxiliary power unit for on-road trucks, transport refrigeration unit, gantry crane, stationary application, marine vessel, or locomotive.
- The engine must be model year 1996 through 2010 and have an engine family name listed in Attachment 1.
- Some engines within an approved engine family may not meet the horsepower (hp) requirements. These are not appropriate for the ThermaCat™ system.
- The engine must meet all the terms and specifications of this Executive Order and belong to the engine family listed in Attachment 1.
- The engine must be certified for off-road applications.
- The application must have a duty cycle with an average temperature profile greater than 210 degrees Celsius for no less than 15 percent of the operating cycle.

- The engine must have a displacement of no more than 15.2 liters and at least 5 liters.
- The engine must be rated to at least 100 hp and no more than 350 hp.
- The engine must be certified to a PM emission level of at most 0.2 grams per brake horsepower hour (g/bhp-hr), and greater than 0.01 g/bhp-hr.
- The engine must not be certified by ARB as having exhaust gas recirculation.
- The engine must not have a pre-existing original equipment manufacturer (OEM) diesel particulate filter (DPF).
- The engine may or may not have a pre-existing OEM oxidation catalyst.
- The engine must remain in its original certified configuration, except that if an OEM oxidation catalyst is present, it may be removed if the ThermaCat™ system is installed. Should the ThermaCat™ system be removed, the OEM oxidation catalyst must be re-installed, returning the engine to its original certified configuration.
- The engine must have a four-stroke combustion cycle.
- The engine can be turbocharged or naturally aspirated.
- The engine can be electronically or mechanically controlled.
- 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.
- The engine must be operated on fuel that has a sulfur content of no more than 15 parts per million by weight.
- The product must not be operated with a fuel additive, as defined in Title 13, CCR, Section 2701, unless explicitly verified for use with the fuel additive.
- The product must not be used with any other systems or engine modifications without ARB and manufacturer approval.
- The ThermaCat™ system is appropriate for component swapping (the DPF section only) and system re-designation pursuant to CCR Sections 2701 and 2706, provided that the terms and conditions of this Executive Order and Attachment 4 are satisfied.
- The other terms and conditions specified below.

IT IS ALSO ORDERED AND RESOLVED: That installation of the ThermaCat™ system, manufactured by ESWC of 335 Connie Crescent, Concord, Ontario LK4 5R2, Canada has been found not to reduce the effectiveness of the applicable vehicle pollution control system, and therefore, the ThermaCat™ system is exempt from the prohibitions in Sections 38390 and 38391 of the Vehicle Code for installation on off-road vehicles using engines listed in Attachment 1.

This exemption is only valid provided the engines meet the aforementioned conditions.

The ThermaCat™ system consists of an electronic control unit, a system warning display and includes the following additional major system components listed as installed within the exhaust stream from the exhaust manifold to the end of tailpipe: a fuel injector, a backpressure sensor, an inlet temperature sensor, a catalyzed diesel oxidation catalyst (DOC), an outlet temperature sensor, and a catalyzed silicon carbide wall-flow DPF. The major components of the ThermaCat™ system are identified in Attachment 2. The engine and device label are shown in Attachment 3.

The ThermaCat™ system is comprised of a single silicon carbide wall-flow DPF and a single wire mesh DOC designed to filter the exhaust from a single engine. ThermaCat™ systems with multiple DPFs and/or multiple DOCs, including designs with two or more filter components canned together or multiple individually canned filter components deployed in parallel or series (or any combination thereof), are not valid under this Executive Order. Channeling exhaust from a single engine through multiple ThermaCat™ systems, deployed in parallel or series or any combination thereof, is also not valid under this Executive Order.

This Executive Order is valid provided that installation instructions for the ThermaCat™ 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 ThermaCat™ system, as exempted by ARB, which adversely affect the performance of the vehicle's pollution control system shall invalidate this Executive Order.

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

ESWC must ensure that the installation of the ThermaCat™ system conforms to all applicable industrial safety requirements.

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

Marketing of the ThermaCat™ system using identification other than that shown in this Executive Order or for an application other than that listed in this Executive Order is prohibited unless prior written approval is obtained from ARB.

Identification must include both device and engine labels consistent with the requirements of Title 13, CCR, Section 2706 and Attachment 3 of this Executive Order. Changes or modifications to the label or label placement are prohibited without prior written approval from ARB.

This Executive Order does not apply to any ThermaCat™ system 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 must be provided to the ultimate purchaser at the time of sale.

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

CA/ESW/2009/PM3+/N00/OF/DPF01

As stated in the Procedure, ESWC is responsible for complying with 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 and/or operator 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 particulate matter.

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

In addition to the foregoing, 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 Title 13 CCR, Section 2222, et. Seq., and Title 13 CCR, Sections 2700 through 2710.

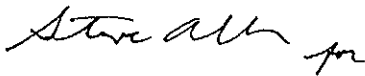
Systems verified under this Executive Order shall conform to all applicable California emissions regulations.

This Executive Order does not release ESWC 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 DE-09-010-02 hereby supersedes Executive Order DE-09-010 dated April 28, 2009, and Executive Order DE-09-010-01 dated September 17, 2009, for this diesel emission control strategy.

Executed at El Monte, California, and effective this the 21st day of December 2010.



Robert H. Cross, Chief
Mobile Source Control Division

Attachment 1: ARB-Approved Engine Families for the ESW Canada Off-Road
ThermaCat™ System

Attachment 2: Parts List for the ESW Canada Off-Road ThermaCat™ System

Attachment 3: Device and Engine Label for the ESW Canada (ESWC) ThermaCat™
System, and

Diesel Oxidation Catalyst (DOC) and DPF Labels for the ESWC
ThermaCat™ System

Attachment 4: Conditions for Diesel Particulate Filter (DPF) Swapping for the ESW
Canada (ESWC) ThermaCat™ System