

**State Of California
AIR RESOURCES BOARD**

EXECUTIVE ORDER DE-14-003

The diesel emissions control strategy (DECS) described herein qualifies as a potential compliance option for Air Resources Board's (ARB) in-use Transport Refrigeration Unit (TRU) rule.

Pursuant to the authority vested in the California 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 39616 and Executive Order G-14-012;

Relating to Exemptions under section 38391 of the Vehicle Code and Verification under sections 2700 through 2711 of title 13 of the California Code of Regulations (13 CCR)

Carrier Transicold
Engine Emissions System™

ARB has reviewed Carrier's request for verification of the Carrier Transicold Engine Emissions System™ (Carrier EES). 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 Carrier EES reduces emissions of diesel particulate matter (PM) consistent with a Level 3 Plus DECS (greater than or equal to 85 percent reduction of and compliant with the 2009 nitrogen dioxide emissions limit) (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 Carrier EES as a Level 3 Plus DECS. The engines for which the Carrier EES is verified, the verified parts list, the system and engine labels, swapping and re-designation information, and other product information can be found here:

http://www.arb.ca.gov/diesel/verdev/companies/carrier/carrier_ees.htm

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

- The Carrier EES shall only be installed on Carrier X4-series and Vector 8500 or 8600 MT TRU models, or Carrier type UG or RG TRU generator sets;
- The engine must be certified in California for off-road applications;
- The engine must be in its original certified configuration;
- The engine must not employ exhaust gas recirculation;
- The engine must not have a pre-existing diesel oxidation catalyst;
- The engine must not have a pre-existing diesel particulate filter (DPF);
- The engine must not have a pre-existing turbocharger;
- The engine must have a four-stroke combustion cycle;
- The engine must be naturally aspirated;

- The engine must be well maintained and not consume lubricating oil at a rate greater than one quart per 200 hours of engine operation;
- The engine must be operated on fuel that has a sulfur content of no more than 15 parts per million by weight;
- Lube oil, or other oil, must not be mixed with the fuel;
- The system 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);
- The product must not be used with any other systems or engine modifications without ARB and manufacturer written approval;
- Carrier or their authorized installer must review actual operating conditions and perform engine checks to determine the engine is in good mechanical working order prior to retrofitting an engine with a Carrier EES to ensure compatibility;
- The DECS must be installed with a backpressure monitor to notify the operator when backpressure limit is reached;
- Swapping of the DPF module within a common ownership fleet is allowed after ARB has approved Carrier's practices for swapping DPF modules, in accordance with 13 CCR section 2706(i). Upon approval, ARB will post the approved practices for swapping the Carrier EES DPF module at:
http://www.arb.ca.gov/diesel/verdev/companies/carrier/carrier_ees.htm
- Re-designating an entire Carrier EES to another TRU within a common ownership fleet is allowed after ARB has approved Carrier's practices for re-designating the EES, in accordance with 13 CCR section 2706(i). Upon approval, ARB will post the approved practices for re-designating the Carrier EES DPF module at:
http://www.arb.ca.gov/diesel/verdev/companies/carrier/carrier_ees.htm
- And, the other terms and conditions specified below.

The Carrier EES consists of a wall-flow diesel particulate filter, air control valve, diesel oxidation catalyst, and electronic control system. The Carrier EES also includes a backpressure monitoring and warning system. System labels are shown at:
http://www.arb.ca.gov/diesel/verdev/companies/carrier/carrier_ees.htm

The Carrier EES may be installed on both "new" and "in-use" TRU engines; however, retrofits on "new" TRU engines are only allowed concurrent with sale or lease. Installation of the Carrier EES on "new" TRUs or TRU gensets prior to sale to an ultimate purchaser or prior to lease to lessee is prohibited.

Carrier must provide all authorized installers with specific criteria that must be used to determine the compatibility of the Carrier EES with the candidate engine pursuant to 13 CCR section 2706(t). Depending on the number of hours an engine has accrued at the time of EES installation, the items indicated by "X" in Table 1 below must be performed and any out-of-specification conditions shall be repaired prior to EES installation.

Table 1

Checks to Perform	Engine Hours at EES Installation				
	<100 hrs	100 to <1,500 hrs	1,500 to 3,000 hrs	3,000 to 4,000 hrs	>4,000 hrs
Perform Pre-Trip visual inspection	X	X	X	X	X
Run TRU Pre-Trip	X	X	X	X	X
Check for abnormal exhaust smoke	X	X	X	X	X
Review service records	X	X	X	X	X
Check lube oil consumption*		X	X	X	X
Check injectors (pop test and spray pattern)			X	X	X
Check injection pump				X	X
Check and adjust engine valve clearance (intake and exhaust)					X

*Maximum lube oil consumption shall not exceed 1 quart per 200 hours of engine operation.

Proper engine maintenance is critical to the proper functioning of the DECS. The owner of the equipment on which the DECS is installed is strongly advised to adhere to the engine maintenance schedules in the Carrier EES owner's manual. Additionally, the owner is advised that: failure to maintain the engine so that emissions control systems are in operating condition may be grounds for citation and penalty; and failure to document engine maintenance, including keeping records of oil consumption, may be grounds for denial of a warranty claim.

Use of system parts or replacement parts not authorized by Carrier may be grounds for denial of a warranty claim.

This verification is valid provided that the diesel fuel used in conjunction with the device complies with 13 CCR, sections 2281 and 2282, and if biodiesel is used, it shall be a blend of 20 percent or less subject to the following conditions:

- The biodiesel portion of the blend complies with the American Society for Testing and Materials (ASTM) specification D6751 applicable for 15 ppm sulfur content;
- The diesel fuel portion of the blend complies with 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 verification.

This verification is valid provided that installation instructions for the Carrier EES do not recommend tuning the equipment to specifications different from those of the engine manufacturer.

IT IS ALSO ORDERED AND RESOLVED: That installation of the Carrier EES has been found not to reduce the effectiveness of the applicable engine pollution control system, and therefore, the Carrier EES is exempt from the prohibitions in section 38391 of the Vehicle code for installation on the TRU engines listed in the Engine Family List at: http://www.arb.ca.gov/diesel/verdev/companies/carrier/carrier_ees.htm. This exemption is only valid provided the engine meets the aforementioned conditions. Changes made to the design or operating conditions of the Carrier EES, as exempted by ARB, which adversely affect the performance of the engine's pollution control system, shall invalidate this verification.

No changes are permitted to the Carrier EES. ARB must be notified in writing of any changes to parts of the Carrier EES. Any changes to the system, components, applicable engine models, or software must be evaluated and approved in writing by ARB. Failure to do so shall invalidate this verification.

Marketing of the Carrier EES using identification other than that shown in this verification or for an application or operating conditions other than that listed in this verification shall be prohibited unless prior approval is obtained from ARB.

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

CA/CAR/2013/PM3+/N00/TR/DPF01

Additionally, as stated in the Verification Procedure, Carrier is responsible for recordkeeping requirements (13 CCR section 2702) honoring the required warranty (13 CCR section 2707) and conducting in-use compliance testing (13 CCR section 2709).

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

ARB reserves the right in the future to review this verification and the conditions provided herein to assure that the verified add on or modified part continues to meet the standards and procedures of 13 CCR, sections 2222, et seq and 13 CCR sections 2700 through 2711.

The terms and conditions of this verification must be satisfied regardless of where the system is sold in order for the DECS to be considered verified.

Systems verified under this verification shall conform to all applicable California emissions regulations. This verification does not release Carrier from complying with all other applicable regulations.

Systems sold as verified, or which carry an ARB-approved label, must satisfy all the terms and conditions of this Executive Order.

Violation of any of the above conditions shall be grounds for revocation of the verification.

Executed at Sacramento, California this 24th day of April, 2014.



Cynthia Marvin, Chief
Stationary Source Division

