



CAT® EMISSION UPGRADES FOR SELECT 3500 MARINE ENGINES

PRODUCT AND BENEFITS
REGULATION, FUNDING AND AWARENESS
VALIDATION AND LABELS

PRODUCT AND BENEFITS

Q: What is an emissions upgrade kit?

A: An emission upgrade kit upgrades your existing engine using new Cat parts and components to reduce certain exhaust emissions. Existing parts are replaced with new components that deliver lower emissions.

Q: What is a Cat® emissions upgrade kit?

A: A Cat engine emissions upgrade kit is a core group of parts that are engineered by Caterpillar and capable of achieving various requirements when combined with the installation of specific parts. The core parts are packaged and shipped together in order to improve the ease of installation and ensure that the correct parts are used. The result is an engine that is equipped with components equivalent to those used in proven newer model designs. Additionally, a Cat emissions upgrade kit might be designed to meet specific emission levels but may also have significant performance improvements like fuel savings. Cat emissions upgrade kits reduce one or more engine emission constituents (NOx, PM, HC, CO) and carry a compliance status (verification label).

Q: What are the general features and benefits of an engine emissions upgrade kit?

A: This Caterpillar engineered solution uses proven technology to:

- Achieves the benefits of a newer engine design.
- In-hull overhaul eliminates the burden of engine removal.
- Offers possible regulatory compliance.
- Improves time between overhauls.
- Enhanced operational display updates with mechanical to electronic engine upgrade.
- Potential reduction in fuel consumption.
- Reduces engine related vibration and noise.
- Improved electronic engine diagnostics.

Q: What parts are required for a Cat engine upgrade kit installation?

A: Core components include electronic controls, camshafts, cylinder heads, aftercooler, turbochargers, flywheel housing, fuel injectors, air lines, engine oil lines, fuel injection lines, turbocharger oil lines, water lines, exhaust manifolds, valve mechanism, pistons and wiring groups.

Q: What modifications will need to be made to the vessel?

A: Modifications are serial number specific to each upgrade. They can include, but are not limited to, cooling, air, fuel and electrical systems. Caterpillar provides a required and optional parts list as well as a reference serial number for accessing application and installation guides. An emissions upgrade is not much different from a new engine installation and requires what many refer to as a full engine room audit.

REGULATION, FUNDING AND AWARENESS

Q: What is the difference between factory certification and other certifications?

A: Factory certification is required by the U.S. EPA to test for engine emissions prior to leaving the factory. Manufacturers must demonstrate the engine meets emission standards through a variety of emission testing methods. Other government rules can require different certifications, like the U.S. EPA rule 40cfr1042, which outline requirements for upgrades on engines already in operation.



ENGINE UPGRADE KIT



ELECTRONIC
OPTIONS/ DISPLAY
AND CONTROL PANEL*

*Panel options only available
for electronic engines



HEAT SHIELDS
(WHEN NECESSARY)



NON-UPGRADE
OVERHAUL PARTS

REGULATION, FUNDING AND AWARENESS (CONT'D.)

Q: What is the difference between factory certification and other certifications?

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Q: What is verification?

A: The U.S. EPA uses a verification program that evaluates technologies to support their use in the market while providing customers with confidence that the verified technologies will provide emission reductions as listed. This verification process evaluates the emission reduction performance of retrofit technologies, including their durability, and identifies engine operating criteria and conditions that must exist for these technologies to achieve those reductions. The importance of verification is that regulators often allow it as a compliance and it qualifies the product as a funding option. There are various entities that verify products around the world. One example is the U.S. EPA (<https://www.epa.gov/cleandiesel>).

Q: What is the Marine Mitigation Trust Fund (MTF)?

A: Through a series of three partial settlements, the EPA and Volkswagen resolved allegations that VW violated the Clean Air Act, and subsequently set up two Mitigation Trust Funds. The MTF provides funding for eligible mitigation actions that are focused on reducing NO_x emissions from mobile sources of pollution, including select Marine engines.

Q: Are verified emission upgrade kits eligible for Mitigation Trust Funding (MTF)?

A: Yes, MTF eligibility is dependent on many factors. It is handled at the state level and is reviewed on a case-by-case basis. Other potential sources of funding include port authorities, state environmental protection agencies, national programs like the EPA National Clean Diesel Campaign, and supplemental environmental projects (SEPs) which include money that an individual or business distributes as part of a settlement with a regulatory body like the EPA.

The following are common characteristics of funding:

- Upgrade kits can be good candidates for funding because of the magnitudes of multiple emission reductions and cost effectiveness.
- Funding is often distributed based on local programmatic priorities so the entities that award the funds will want the majority of the emission reductions to occur within their jurisdiction.
- Funding is typically only awarded for projects that involve the use of certified or verified technology.
- It is difficult to get funding if a regulation already requires emission reductions. However, if the technology reduces more emissions than the regulation requires, it is possible to submit for funding on the incremental emission reductions.

VALIDATION AND LABELS

Q: After completing an upgrade kit, will I get a new serial number and/or engine arrangement number?

A: The serial number of an upgraded engine will not change. Your engine arrangement number (which defines the bill of materials for your engine) will change to reflect the new performance and emissions level of the engine. The new engine arrangement number can be used in the future to order parts and will have to be associated. Your Cat dealer and Caterpillar internal systems will be updated with this new engine arrangement number, indicating the upgrade has occurred. A new label will be installed on the engine to provide the new emissions level obtained.

Q: Where can I find out more information about Cat emissions solutions?

A: Please visit our website at:

<https://dealer.cat.com/en/ps/parts/parts-mktg/engine/c/industry/emissions-solutions/machine.html>.

For additional information on the Volkswagen Mitigation Trust Fund, see the EPA FAQ at:

<https://www.epa.gov/sites/production/files/2017-10/documents/faq-ben.pdf>

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