



Regulatory Announcement

Emission Standards for New Marine Diesel Engines

Relationship Between EPA's Control Program and MARPOL Annex VI

The U.S. Environmental Protection Agency (EPA) is proposing emission standards for large marine diesel engines used on ocean-going vessels. These emission standards, along with EPA's other emission standards for smaller marine diesel engines, are separate from but are comparable to emission standards adopted by the International Maritime Organization (IMO) in Annex VI to the International Convention on the Prevention of Pollution from Ships. This fact sheet summarizes the main provisions of these two regulatory programs and describes how the two programs fit together.

What is MARPOL Annex VI?

The IMO, which was set up in 1948 under the United Nations to address safety, navigation, and pollution prevention for ships engaged in international trade, was responsible for drafting MARPOL: the International Convention on the Prevention of Pollution from Ships, 1973, as Modified by the Protocol of 1978 Relating Thereto. There are six annexes that address different kinds of pollution from ships: oil, noxious substances,

garbage, sewage, and air emissions. Annex VI addresses air emissions: ozone depleting substances, incinerators, and emissions from tanker operations, as well as NO_x (oxides of nitrogen) and SO_x (oxides of sulfur) emissions from ship engines. Although Annex VI was adopted by the IMO in 1997, it will not go into force internationally until 15 countries representing 50 percent of world merchant tonnage ratify it. So far, six countries representing 16 percent have ratified it.

What is the status of U.S. ratification of Annex VI?

The U.S. government is preparing the appropriate documents for the President to submit Annex VI to the Senate for its advice and consent to ratification. In transmitting Annex VI to the Senate, the Administration will work with Congress on new legislation to implement the Annex. At the same time, the United States government supports a revision of the Annex VI standards for NO_x emissions, taking into account the emission reduction potential of new control technologies. By ratifying the Annex, the United States will continue to promote environmentally responsible international emission standards at the IMO and recognize the role the IMO plays in protecting the world's marine environment from pollution. The U.S. government has already requested the Marine Environment Protection Committee of the IMO to begin consideration of more stringent NO_x emission limits for marine diesel engines. Once the Annex goes into force, amendment of NO_x standards will be made easier through the tacit amendment process that would then apply.

What is the EPA program for marine diesel engines?

EPA has set marine diesel engine standards under Section 213 of the Clean Air Act, which directs EPA to set emission standards for classes or categories of new nonroad engines and vehicles. The standards are to achieve the greatest degree of emission reduction achievable through the use of technology that is expected to be available when the emission limits go into effect, taking into account the cost of the technology and noise, energy, safety factors, and lead time.

EPA set standards for marine diesel engines below 30 liters per cylinder in 1999. The Tier 1 standards are equivalent to the Annex VI limits for these engines and are voluntary until the Tier 2 standards go into effect. The Tier 2 standards, which phase in between 2004 and 2007, reflect additional reductions that can be achieved through engine-based controls. These standards apply only to engines on US-flag vessels.

We are now proposing standards for marine diesel engines at or above 30 liters per cylinder. The Tier 1 standards are equivalent to the Annex VI NOx limits for these engines, for engines built in 2004 and later. We are considering a second tier of standards that would reflect additional reductions that can be achieved through engine-based controls and would apply to new engines built after 2006 or later. The proposed standards would apply only to engines on US-flag vessels; we are seeking comment on applying them to engines on foreign flag vessels as well.

What is the relationship between MARPOL and EPA programs?

In general, MARPOL does not prevent a country from setting standards for its ships. Annex VI specifically allows a country to set alternative standards that would apply to engines on ships that operate solely in waters under its jurisdiction. To meet its obligations under the Clean Air Act to set standards for these engines, the U.S. is exercising these MARPOL provisions. Because engines on these vessels will be subject to both programs, it is important to understand the relationship between them. Ship owners and operators as well as engine manufacturers should be familiar with these two programs because each program has requirements for both groups.

What would be the most significant differences between the two programs?

Liability for in-use compliance

We require that the engine manufacturer be responsible for ensuring compliance with the emission standards for the full useful life of the engine, while the Annex VI program makes the ship operators fully responsible for ensuring in-use compliance.

Durability demonstration

We require that the engine manufacturer demonstrate prior to production that they comply with the emission standards for the full useful life of the engine. The Annex VI program would only require that the manufacturer demonstrate that the engine meets the standards when it is installed in the vessel; there is no Annex VI durability demonstration.

Witness testing

We allow, but do not require, witness testing for U.S. compliance.

Test procedures	We are proposing to certify Category 3 marine engines using the Annex VI test procedures for diesel marine engines with modification. The modifications are required to ensure that the test data used for certification are representative of in-use operation. We expect that manufacturers would be able to use data from certification tests conducted according to the modified EPA procedures for Annex VI certification.
Test fuel	We are proposing that the official test fuel specification for C3 engines be a residual fuel. Annex VI specifies using distillate test fuels and uses distillate testing as the basis of its standards. We are proposing to allow certification testing on marine distillate fuel to be consistent with Annex VI. However, we would correct the NOx emissions, based on fuel nitrogen content, before the test results are compared to our residual fuel based standards.
Compliance date for standards	We are proposing to apply the standards based on the date of final assembly of the engine, while Annex VI generally applies the standards based on the start-date of the manufacture of the vessel.
Production testing	We are proposing a simple production testing program to ensure that certification designs would be translated into production engines that meet applicable standards. Annex VI also requires verification that engines are properly installed, but allows this to be demonstrated by either a parameter check or by testing.
Technical file	Annex VI requires that engine manufacturers provide operators with a Technical File that contains maintenance instructions, test data, and other compliance information. We are proposing only to require the manufacturer to provide maintenance instructions necessary to ensure that the engine would continue to meet the emission standards in use.
In-use compliance	To ensure that an engine in-use continues to meet the standards, we are proposing that operators be required to perform a simple field measurement test to confirm emissions after a parameter adjustment or maintenance operation. The Annex VI program would require only periodic surveys of the engine, which can take the form of a simplified onboard test or, more frequently, a parameter check.

Parameter adjustment

We are proposing to allow manufacturers to specify in their applications for certification the range of adjustment across which the engine is certified to comply with the applicable emission standards. Operators would be prohibited by the anti-tampering provisions from adjusting engines to a calibration different from the calibration specified by the manufacturer when they are within 175 miles of the U.S. coast. We are also proposing to require all new Category 3 engines be equipped with emission measurement systems and with automatic electronic-logging equipment that automatically records all adjustments to the engine and the results of the required verification tests. Annex VI would prohibit operators from adjusting engines to a calibration different from the calibration specified by the manufacturer under any circumstances.

Onboard measurement

We are proposing that simplified onboard measurements be used to confirm proper adjustment of in-use engines. Annex VI allows such systems, but does not require them.

Could a manufacturer comply with both the EPA requirements and the Annex VI requirements at the same time?

A manufacturer that complied with the proposed EPA requirements would need to do very little additional work to meet the Annex VI requirements. First, the engine manufacturer would need to provide the operator with a Technical File that contains more information than would be required by EPA. The manufacturer may also need to ensure that the relevant emission testing is witnessed appropriately.

For manufacturers that have already complied with the Annex VI, the amount of additional work that would be required to comply with the proposed EPA requirements would be dependent on how the manufacturer conducted its emission testing. Additional requirements include:

- Demonstrate prior to production that the engines would comply with the emission standards for the useful life of the engine.
- Warrant to the purchasers that the engines would comply with the EPA requirements for the useful life of the engine.
- Perform a simple production test after installation.

- Install an onboard measurement system.
- Specify how the operator should adjust the engine in use and how proper adjustment should be verified through testing.

How can I obtain additional information about these programs?

You can find additional information about the EPA marine diesel engine program at www.epa.gov/otaq/marine.htm.

You can find additional information about the IMO program on the IMO Web site at www.imo.org. Please note that the IMO does not provide copies of its programs on its Web site. You may obtain a copy from your local library, or purchase a copy of *Annex VI of MARPOL 73/78: Regulations for the Prevention of Air Pollution from Ships and NOx Technical Code* from the IMO (ISBN 92-801-6089-3) (IMO Sales Number IMO-664E).