

**OFFICE OF AIR AND RADIATION
OFFICE OF MOBILE SOURCES**

Nonroad Diesel Engine Standards

Questions and Answers

What Is Being Regulated?

The new standards are for mobile nonroad diesel engines and equipment of all sizes, except for locomotives, marine engines above 50 hp, underground mining equipment, and engines with displacements under 50 cubic centimeters that are typically used in model airplanes. Over 500,000 of these regulated engines are sold each year in hundreds of diverse equipment applications, including:

- Farm tractors
- Excavators
- Diesel lawn tractors
- Bulldozers
- Logging equipment
- Portable generators
- Road graders
- Forklifts
- Sailboat auxiliary propulsion units

When Will the New Standards Take Effect?

The final rule has a 3-tiered progression to low emission standards. Each tier involves a phase in (by horsepower rating) over several years. Tier 1 standards were adopted in 1994 for engines over 50 hp and are phasing in from 1996 to 2000. This final rule sets Tier 1 standards for engines under 50 hp, phasing in from 1999 to 2000. It also phases in more stringent Tier 2 standards for all engine sizes from 2001 to 2006, and yet more stringent Tier 3 standards for engines rated over 50 hp from 2006 to 2008.

What Harm Does Diesel Exhaust Do?

The oxides of nitrogen (NOx) and hydrocarbons in diesel exhaust react in the atmosphere to form ground-level ozone, sometimes called smog. Ozone causes a range of health problems related to breathing, including chest pain, coughing, and shortness of breath. The sooty particulate matter (PM) in diesel exhaust can become deposited deep in the lungs and result in premature death, increased emergency room visits, and increased respiratory symptoms and disease. In addition, ozone, NOx, and PM adversely affect the environment in various ways, including through crop damage, acid rain, and reduction in visibility.

Why Are New Standards Needed?

A study performed by EPA in 1991 found that nonroad diesel engines emit on the order of 10% of the nation's NOx, and that this percentage is even higher in many U.S. cities with air quality problems. California's State Implementation Plan projects that, with existing controls, nonroad diesel engines will contribute about one-quarter of the total NOx emissions in the Los Angeles area by 2010. In addition, these engines are a major source of diesel PM. EPA projects that, without new standards, as much as three-quarters of all diesel PM will come from nonroad engines by 2010, nationwide.

Is This Rule a Response To EPA's New Ozone and PM NAAQS?

No. Though likely to be of great benefit in areas not meeting the new National Ambient Air Quality Standards, this program is a response to the needs of states with nonattainment areas designated as such under the previously existing NAAQS.

What Are the Environmental Benefits?

The new controls will reduce emissions from each engine by as much as two-thirds from the levels of previous standards. Analyses show that nationwide NOx inventories will be reduced by about a million tons per year by 2010, with benefits increasing annually as the new cleaner equipment replaces older machines in the field.

Does the Final Rule Meet California's Air Quality Goals?

Yes. According to analyses performed by the California Air Resources Board staff, the benefits of this program are equivalent to those expected from California's State Implementation Plan measures for these engines.

Are There Other Benefits?

Yes. This nationwide program will help hold down equipment costs by avoiding the need for manufacturers to meet separate standards in California, as is currently the case. What's more, the European Commission is proposing new standards that are harmonized with EPA's new standards, thus allowing manufacturers to design a single product for both markets. This will provide a further cost savings to U.S. buyers, because most U.S. manufacturers also have large markets in Europe.

Are These Emission Controls Technologically Feasible?

The diesel engine industry has expressed confidence that the new standards, though challenging, can be met without disruptive impacts on power output, reliability, ease of maintenance, safety, costs, fuel economy, and other factors important to users. Much of the new technology will be made available in highway engine markets several years prior to the implementation of these standards for nonroad engines. Furthermore, EPA plans to reassess the feasibility of the most stringent tier of standards in 2001, and to make any needed adjustments to them at that time.

How Will Equipment Costs Be Affected?

The costs of meeting the new emission standards are expected to add well under 1 percent to the purchase price of typical new nonroad diesel equipment, although for some equipment the standards may cause price increases on the order of 2 or 3 percent. Increases on this order are not expected to reduce the demand for new machines or to result in measurable impacts on ultimate cost indicators such as construction costs and farm product prices.

Why Does Farm Equipment Need Emission Controls?

Ozone and PM are regional problems in many parts of the U.S. Airborne pollutants generated in rural areas with good air quality can be blown hundreds of miles and contribute to air quality problems elsewhere. Furthermore, there are many farms located close to urban areas, making it likely that most farm equipment models would need to be designed for low emissions anyway.

Will Existing Equipment Be Affected?

No. Only equipment with engines built after the implementation dates will be regulated under the new standards.

Is This a Cost-Effective Way To Reduce Pollution?

Very much so. The program is estimated to cost about \$600 per ton of NOx reduced. Programs to reduce NOx from other sources have cost several thousand dollars per ton.

What is Being Done To Help Small Businesses Comply?

Hundreds of small U.S. companies make equipment containing diesel engines. Though not directly involved in the design of low-emission engines, these companies may have to redesign their products to accommodate the new cleaner engines. EPA has discussed the issue with representatives of this industry segment and has included several innovative provisions to ease the transition, such as gradual phase-ins, exemptions for low-volume models, and hardship relief appeals.

What Is EPA Doing To Encourage Alternatives To Diesel Engines?

The final rule includes an innovative program of voluntary standards for very low emitting engines—Blue Sky Series Engines. These engines could include those using such fuels as natural gas and propane, or diesel engines employing high-technology clean-up devices such as particulate traps. Incentives for these engines would be created by state, municipal, and business incentive programs, such as a construction company labor relations program aimed at reducing the exposure of its workers to diesel exhaust.

Does EPA Have Further Plans For Nonroad Engines?

Ongoing health studies are increasingly implicating diesel particulate matter as a potentially severe health hazard. Although the final rule does not set new PM standards beyond Tier 2, EPA plans to propose appropriately stringent PM standards and test procedures for the Tier 3 portion of this program when it re-evaluates the program in 2001. Other EPA initiatives are also underway to regulate emissions from other types of nonroad engines, such as locomotives, marine vessel engines, and all sizes of nonroad gasoline engines.