



# Environmental Fact Sheet

---

## Emission Standards for New Spark-Ignition Marine Engines

### Information for the Marine Industry

*The cooperative efforts of marine engine manufacturers has led the U.S. Environmental Protection Agency (EPA) to issue cost-effective regulations for achieving an unprecedented 75 percent reduction in hydrocarbon (HC) emissions from new gasoline marine engines by the year 2025. These emission standards, which will affect outboard and personal watercraft engines, will be phased-in over a nine year period beginning in model year 1998.*

#### Overview

EPA is issuing regulations for the control of exhaust emissions from new spark-ignition (SI) gasoline marine engines, including outboard engines, personal watercraft engines, and jet boat engines. Both domestic and foreign manufacturers producing engines for sale in the United States are potentially responsible for compliance with these regulations. Once the program is fully implemented, manufacturers of these engines must demonstrate to EPA that HC emissions are reduced by 75 percent from present levels, by testing engines representative of the product line before sale and after use.

HC contributes to ground level ozone which is known to cause a range of human pulmonary and respiratory health effects, including chest pain, coughing, and shortness of breath. Controlling emissions from these engines will help reduce adverse health and welfare impacts associated with ozone.

### **Study Indicates need for Action**

Until recently, emissions from nonroad engines and vehicles have been essentially uncontrolled. The Clean Air Act Amendments (CAA) of 1990, for the first time, granted EPA the authority to regulate these sources. Under the direction of the CAA, EPA completed a study of nonroad emissions which concluded that nonroad HC emissions in total are 10 percent of the urban summertime inventory of HC from all sources (see Figure 1).

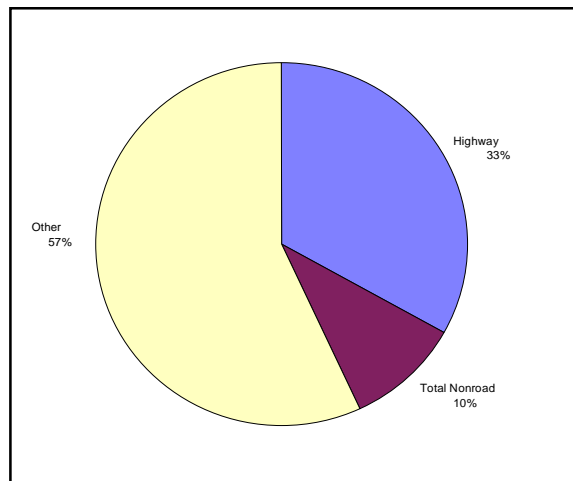
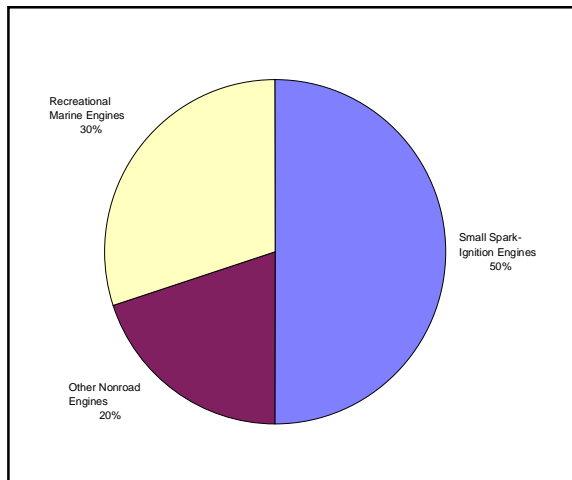


Figure 1- Urban Summertime Hydrocarbons: All Sources

Marine engines in particular contribute significantly to air quality problems throughout the United States. Of nonroad sources, EPA determined one of the largest contributors of HC emissions to be gasoline marine engines. As illustrated in Figure 2, recreational marine engines are 30 percent of the nonroad portion. With this finding, the CAA directed EPA to promulgate regulations to control air pollution from marine engines.



**Figure 2 - Nonroad Sources of Hydrocarbons**

### **Cooperative Efforts from the Marine Industry**

This rulemaking is a prime example of EPA and industry working together cooperatively to introduce regulations that achieve substantial emission reductions from nonroad engine sources while providing manufacturers with the flexibility to achieve the required reductions based on market demand. The resulting standards will encourage a wide range of new outboard and personal watercraft (OB/PWC) products. With the input and support from the marine industry, EPA has developed a program that is not expected to be overly burdensome or costly in the manufacturing and selling of these new technologies. Manufacturers will have many options for achieving compliance, which include converting current OB/PWC 2-stroke engine technology to 4-stroke, direct-injection 2-stroke, or possibly equipping engines with catalytic converters in some applications.

### **Highlights of the Regulations**

Unlike sterndrive and inboard (SD/I) gasoline marine engines, the majority of OB/PWC (including jet boat) engines currently utilize 2-stroke technology that emits high rates of HC exhaust emissions. Due to the inherent low emissions of SD/I engines, EPA is only imposing emission standards for OB/PWC engines.

#### **Emission Standards**

The OB/PWC program requires increasing stringent HC control over the course of a nine-year phase-in period beginning in model year 1998. By the end of the phase-in, each manufacturer must meet an HC+NO<sub>x</sub> (oxides of nitrogen) emission standard on a corporate average basis that represents a 75 percent reduction in HC compared to unregulated levels. The emission standard allows the manufacturers and the market to determine the best way to achieve the targeted reductions over time by allowing the manufacturer to decide the type of control technologies to be applied to each engine family. Compliance with a corporate average emission standard gives manufacturers the flexibility to build engines below and above the emission standard, provided the manufacturer's overall corporate average is at or below the standard.

These regulations only affect new gasoline OB/PWC engines sold in the future, beginning in 1998. The standards do not apply to any engine or boat already owned.

## **Administrative Programs**

EPA is finalizing some innovative administrative programs for OB/PWC appropriately designed in consideration of the unique market structure and nature of the marine engine industry. The administrative programs are designed to ensure the targeted reductions are met by making manufacturers responsible for testing engines, reporting the results to EPA, and demonstrating compliance with the emission standards.

The pre-production certification program requires all gasoline marine engine families to be certified by EPA as meeting applicable emission standards before they are introduced into commerce. EPA is introducing a proactive approach to quality control for this industry by requiring manufacturers to be responsible for ensuring that engines are produced as designed. Manufacturers will comply by testing engines as they leave the production line, at appropriate sampling rates, without EPA presence.

The manufacturers will ensure their engines are meeting applicable emission standards when actually in use by testing a portion of their fleet each year. EPA has developed an in-use credit program to provide manufacturers flexibility in addressing potential in-use noncompliance. EPA is proud to introduce unique, innovative administrative compliance programs appropriately designed for this industry.

**Extended  
Warranty**

With the introduction of new technologies comes the cautious reaction from consumers regarding the reliability of such engines. To help ensure the manufacturing of a durable emission system and to help alleviate potential concerns of consumers, EPA is introducing warranty requirements that will, in effect, double or triple the warranty time period for those items related to the emission characteristics of the engine. Major emission control components and emission related components will be covered by the consumer warranty.

**Small Volume  
Engine Families**

While manufacturers in this industry tend not to be “small,” EPA has taken measures to reduce the burden on those manufacturers with smaller volume engine families. Manufacturers can feel at ease that the regulations provide appropriate flexibility, as the testing and administrative programs have been designed with such smaller volume families in mind.

**Cost  
Effectiveness**

The program is designed to provide manufacturers with the utmost flexibility for finding the lowest cost solutions to meeting the emission reduction targets. EPA expects the average costs for OB/PWC engines will increase modestly, that is, an approximate increase of 10-15 percent per engine, or \$700 for the average power output engine. EPA is confident that consumers will see this as negligible when compared to the performance advantages to be enjoyed by the boat owner from these improved engines. The cost-effectiveness of the program is estimated at \$1000 per ton HC reduced.

**For More Information**

EPA encourages additional information be obtained electronically via the EPA Internet server or via dial-up modem on the Technology Transfer Network (TTN), an electronic bulletin board system (BBS).

World Wide Web: <http://www.epa.gov/OMSWWW>

TTN BBS: 919-541-5742 (1200-14400 bps, no parity, 8 data bits, 1 stop bit); voice helpline: 919-541-5384

Information is also available on this rulemaking by calling 313-668-4333, or writing to:

U.S. Environmental Protection Agency  
National Vehicle and Fuel Emissions Laboratory  
2565 Plymouth Road  
Ann Arbor, Michigan 48105