

# Ocean Vessels and Large Ships

Large ships such as container ships, tankers, bulk carriers, cruise ships, and Lakers are significant contributors to air pollution in many of our nation's cities and ports. There are two types of diesel engines used on large ships: main propulsion and auxiliary engines. The main propulsion engines on most large ships are "Category 3" marine diesel engines, which can stand over three stories tall and run the length of two school buses. Auxiliary engines on large ships typically range in size from small portable generators to locomotive-size engines.

This page provides general and technical information on EPA's coordinated strategy to address emissions from large ships, including ocean vessels and Lakers, flagged in the United States and in other countries. EPA's coordinated strategy includes:

- EPA domestic actions under the Clean Air Act; and
- U.S. Government action through the International Maritime Organization, including:
  - Designation of [Emission Control Areas](#) for U.S. coastal waters; and
  - Adoption of [new international standards](#) for all ships in global waters.

Combined, these actions make a comprehensive program that is expected to significantly improve U.S. air quality and public health.

For more information on EPA's requirements for marine diesel engines smaller than Category 3 installed on U.S. vessels, see [Diesel Boats and Ships](#). For information on EPA's requirements for gasoline-powered marine engines, see [Gasoline Boats and Personal Watercraft](#).

## EPA Actions

### Engine and Fuel Standards

[In a rule published on April 30, 2010](#), EPA adopted standards that apply to Category 3 (C3) engines installed on U.S. vessels and to marine diesel fuels produced and distributed in the United States. That rule added two new tiers of engine standards for C3 engines: Tier 2 standards that begin in 2011 and Tier 3 standards that begin in 2016. It also includes a regulatory program to implement Annex VI to the International Convention for the Prevention of

sulfur limits, and extends the [Emission Control Area \(ECA\)](#) engine and fuel requirements to U.S. internal waters. The rule also revised our domestic CAA diesel fuel program to allow for

the production and sale of diesel fuel with up to 1,000 ppm sulfur for use in C3 marine vessels, phasing in by 2015.

On January 18, 2012, [EPA published a Direct Final Rule](#) that adds a provision to our large marine engine program to provide an incentive to repower Great Lakes steamships with new, more efficient, diesel engines. This consists of an automatic, time-limited fuel waiver that allows the use of residual fuel in the replacement diesel engines that exceeds the global and ECA sulfur limits that otherwise apply to the fuel used in ships operating on the U. S. portions of the Great Lakes. This automatic Great Lakes steamship repower fuel waiver is valid through December 31, 2025; after that date, repowered steamships will be required to comply with the Great Lakes ECA fuel sulfur limits for diesel engines. This automatic fuel waiver is available only to steamships that operate exclusively on the Great Lakes, that were in service on October 30, 2009 and that are repowered with a Tier 2 or better diesel engine.

See the electronic [Code of Federal Regulations](#) (e-CFR) for the full text of current CAA regulations at [40 CFR part 94](#) or [40 CFR part 1042](#) that apply to marine compression-ignition engines. See [40 CFR Part 80 Subpart I](#) of the e-CFR for the full text of current regulations that apply to marine diesel fuels. See [40 CFR part 1043](#) for the full text of APPS regulations implementing MARPOL Annex VI and the [North American ECA](#).

- **Direct Final Rule:** Great Lakes Repower Incentive Program (published January 18,
  - Fact Sheet: [Great Lakes Steamship Repower Incentive Program \(PDF\)](#) (2 pp, 129K, EPA-420-F-12-003, January 2012)
  - [Direct Final Rule \(PDF\)](#) (7 pp, 181K, published January 18, 2012)
- **Final Rule: Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder** (published April 30, 2010)
  - Fact Sheet: [EPA Finalizes More Stringent Standards for Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder: Regulatory Announcement \(PDF\)](#) (6 pp, 144K, EPA-420-F-09-068, December 2009)
  - Fact Sheet: [Frequently Asked Questions about the Great Lakes Residual Fuel Availability Waiver \(PDF\)](#) (5 pp, 546K, EPA-420-F-12-008, February 2012)
  - [Facts and Figures \(PDF\)](#) (1 pp, 126K, EPA-420-F-09-075, December 2009)
  - [Final Rule \(PDF\)](#) (171 pp, 3.59M, April 2010)
  - [Summary and Analysis of Comments \(PDF\)](#) (205 pp, 1.2M, EPA-420-R-09-015, December 2009)

- [Final Regulatory Impact Analysis \(PDF\)](#) (527 pp, 9.7B, EPA-420-R-09-019, December 2009)
- See [Proposed Emission Standards](#) for the proposed rule, fact sheet and regulatory support documents, and for the separate rule establishing the deadline for the final rule.
- **Final Emission Standards: Tier 1 Marine Diesel Engines** (published February 28, 2003)
  - [Fact Sheet \(PDF\)](#) (7 pp, 427K, EPA420-F-03-001, January 2003)
  - [Final Tier 1 Rule \(PDF\)](#) (44 pp, 373K, published February 28, 2003)
  - Summary and Analysis of Comments: [Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder \(PDF\)](#) (121 pp, 337K, EPA420-R-03-003, January 2003)
  - Final Regulatory Support Document: [Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder](#) (EPA420-R-03-004, January 2003)
  - [Final Index for Docket A-2001-11 \(PDF\)](#) (35 pp, 231K)
  - See [Proposed Emission Standards](#) for the proposed rule, fact sheet and regulatory support documents.

## Emission Control Area Designation

MARPOL Annex VI contains a program that applies stringent engine emission standards and fuel that complies with the ECA standard changes over time.

The United States has obtained designation for the [North American ECA](#) and the [US Caribbean ECA](#). The effective dates of the standards for an area depend on the area's designation date. See [Annex VI Amendments](#) for more information about this international program.