United States
Environmental Protection
Agency

Office of Transportation
and Air Quality

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Regulatory Announcement

New Emission Standards for New Commercial Aircraft Engines

The U.S. Environmental Protection Agency (EPA) is amending the existing emission standards for nitrogen oxides (NOx) for new commercial aircraft engines. These new standards are equivalent to the NOx emission standards (adopted in 1999 for implementation beginning in 2004) of the United Nations International Civil Aviation Organization (ICAO), and will bring the United States aircraft standards into alignment with the international standards.

These standards will apply to new aircraft engines used on commercial aircraft including include small regional jets, single-aisle aircraft, twin-aisle aircraft, and 747s and larger aircraft. The standards can also apply to general aviation and military aircraft, which sometimes use commercial engines. For example, small regional jet engines are also used in executive general aviation aircraft, and larger commercial aircraft engines may also be used in military transport aircraft.

Emissions From Aircraft Engines

Aircraft engines contribute about 1 percent of the total U.S. mobile source NOx emissions. However, in some U.S. airport areas, aircraft currently can contribute up to 4 percent of mobile source NOx emissions. Commercial aircraft emissions are a growing segment of the transportation emissions inventory. This growth is occurring at a time when other significant mobile and stationary sources are drastically reducing emissions, thereby accentuating the growth in aircraft emissions. Recently, the Federal Aviation Administration

(FAA) reported that flights of commercial air carriers will increase by 9 percent from 2002 to 2010 and 34 percent from 2002 to 2020.

Health and Environmental Concerns

NOx emissions are a precursor to the formation of ground-level ozone, also called smog. Ozone affects human pulmonary and respiratory health. Also, NOx reacts in the atmosphere to form secondary particulate matter ($PM_{2.5}$), which causes detrimental health effects. In addition, NOx, ozone, and PM adversely affect the environment in various ways including visibility impairment, crop damage, and acid rain.

To protect public health and the environment, EPA has established National Ambient Air Quality Standards (NAAQS) for several air pollutants, including ozone and PM. Recent air quality data show that about 159 million people live in areas that violate air quality standards for ground-level ozone. About 88 million people live in areas that violate air quality standards for $PM_{2.5}$. Because aircraft emissions contribute to increases in these air pollutants, the aircraft engine standards may help states achieve and/or maintain compliance with the NAAQS.

History of EPA's Regulation of Aircraft Engine Emissions

The aircraft emission standards have been in place for about 30 years and essentially apply to all commercial aircraft. Over the years, emission standards have been set for different aspects of aircraft engines:

- in 1974 for engine smoke (revised several times since) and fuel venting
- in 1984 for hydrocarbon emissions
- in 1997 for NOx and carbon monoxide
- in 2005 for additional NOx emission standards included in this rulemaking

EPA's Participation in ICAO

EPA has historically worked with the FAA and ICAO in the development of international aircraft emission standards. The FAA is responsible for enforcing the aircraft emissions standards established by EPA. ICAO was established by the United Nations to ensure safety, equality, and consistency among international air transport services. One of ICAO's objectives is to lead international bodies in the development of standards and procedures for aircraft engines. The United States is one of 188 participating member States. Under the basic ICAO treaty established in 1944, a participating nation that elects not to adopt the standards must provide a written explanation describing why a given standard is impractical to comply with or not in its national interest. As long as a participating nation adopts aircraft emission standards that are equal to or more stringent than ICAO's standards, it satisfies its obligations under ICAO. In this rulemaking, EPA adopts standards equivalent to the ICAO standards.

Main Components of the Rule

This rulemaking will codify into United States law requirements equivalent to ICAO's February 1999 NOx emission standards and March 1997 test procedure amendments. The new NOx standards generally represent about a 16 percent reduction (or increase in stringency)

from the existing NOx standards. These emission standards will apply to those commercial aircraft engines with rated thrust greater than 26.7 kilonewtons (kN) that are newly certified (and designed) after the effective date of the regulations – 30 days after the date of publication of this rulemaking in the *Federal Register*.

Benefits of Adopting ICAO Standards

This rule will establish consistency between U.S. and international emission standards and test procedures. Because aircraft engines are international commodities, there is a commercial benefit to consistency between U.S. and international emission standards and control program requirements. It will be easier for manufacturers to certify products for international markets because the United States can certify engines for ICAO compliance. Emission certification tests meeting U.S. requirements will also be applicable to all ICAO requirements. In addition to the economic benefit, this rule will ensure that domestic commercial aircraft will meet the current ICAO standards, and thus, the public will be assured they are receiving the air quality benefits of the international standards.

Nearly all previously certified or in-production engine models currently meet or perform better than the standards EPA is adopting in this rulemaking. In addition, manufacturers have already been developing improved technology in response to the ICAO standards. Therefore, there are no additional costs that will be incurred by the aircraft industry as a result of this rule. In addition, the test procedures necessary to determine compliance are already being adhered to by manufacturers during current engine certification tests. Thus, the regulations will impose no additional burden on manufacturers.

For More Information

You can access the final rulemaking and related documents on EPA's Office of Transportation and Air Quality (OTAQ) Web site at:

www.epa.gov/otaq/aviation.htm

For more information, please contact EPA at:

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