

procedure amendments. Today's proposed emission standards and test procedure amendments apply to commercial aircraft engines; no general aviation or military engines are covered by today's proposal. The commercial aircraft engines subject to today's proposed NO_x standards are those gas turbine engines that are newly certified (and designed) after the effective date of the proposed regulations. (Newly manufactured or already certified engines built after the effective date of the proposed regulations would not have to meet these standards.) For the sake of consistency and harmonization, the effective dates below for the proposed NO_x standards are identical with those of the ICAO 1999 NO_x standards. The proposed NO_x emission standards, test procedure amendments, and their effective dates are described below.

A. What Emission Standards Are Under Consideration?

As discussed earlier in sections II and III of today's notice, section 231(a)(2)(A) of the CAA authorizes EPA to establish emission standards for aircraft engine emissions " * * * which in [her] judgment causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare." The Administrator may revise such standards from "time to time." CAA section 231(b) requires that any emission standards provide sufficient lead time "to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period."

Today's rule proposes near-term standards that would go into effect in 2004 to ensure future engines do not jeopardize recent or past technology gains. These standards are equivalent to the CAEP/4 NO_x international consensus emissions standards for aircraft engines adopted by ICAO's CAEP in 1998.⁷⁴ EPA intends to promulgate these standards by January 2004 in order to be consistent with U.S. obligations under ICAO. At the same time, EPA anticipates establishing more stringent NO_x standards in the future. EPA will participate at CAEP/6 (sixth meeting of CAEP), which is scheduled in February 2004, to establish more stringent international consensus emission standards for aircraft engines. Such standards would likely be a

central consideration in a future EPA regulation of aircraft engine emissions.

We believe this two-step approach is the most appropriate means to address emissions from aircraft engines in this rulemaking. It would codify current practice, with no significant lead time, as a near-term approach.⁷⁵ EPA has authority to revise emission standards from "time to time". EPA intends to address more stringent emission standards requiring more lead time in a future rulemaking (see section IV.A.5. for further discussion of future standards).

1. Today's Proposed NO_x Standards

EPA proposes to adopt standards equivalent to ICAO's 1999 NO_x emission standards for newly certified aircraft gas turbine engines (turboprop and turbojet engines) of rated thrust or output greater than 26.7 kilonewtons (kN) with compliance dates as follows:⁷⁶

For engines of a type or model of which that date of manufacture of the first individual production model was after December 31, 2003:

(a) for engines with a pressure ratio of 30 or less:

(i) for engines with a maximum rated output of more than 89.0 kN:

$$NO_x = (19 + 1.6(\text{rated pressure ratio}))g/kN(\text{rated output})$$

(ii) for engines with a maximum rated output of more than 26.7 kN but not more than 89.0 kN:

$$NO_x = (37.572 + 1.6(\text{rated pressure ratio}) - 0.2087(\text{rated output}))g/kN(\text{rated output})$$

(b) for engines with a pressure ratio of more than 30 but less than 62.5:

(i) for engines with a maximum rated output of more than 89.0 kN:

$$NO_x = (7 + 2.0(\text{rated pressure ratio}))g/kN(\text{rated output})$$

(ii) for engines with a maximum rated output of more than 26.7 kN but not more than 89.0 kN:

$$NO_x = (42.71 + 1.4286(\text{rated pressure ratio}) - 0.4013(\text{rated output}) + 0.00642(\text{rated pressure ratio} \times \text{rated output}))g/kN(\text{rated output})$$

(c) for engines with a pressure ratio of 62.5 or more:

$$NO_x = (32 + 1.6(\text{rated pressure ratio}))g/kN(\text{rated output}).$$

The NO_x emission standards presented above are equivalent to the ICAO NO_x standards that have an

⁷⁵ As described later, more information and greater lead time would be necessary to require more stringent standards.

⁷⁶ This proposal includes standards for low-, mid-, and high-thrust engines (see below for further discussion of the different standards based on the thrust of the engines).

implementation date of December 31, 2003.⁷⁷

2. Proposed NO_x Standards for Newly Certified Mid- and High-Thrust Engines

EPA is proposing to adopt NO_x standards for newly certified mid- and high-thrust engines (those engines designed and certified after the effective date of the proposed regulations, which have a rated output or thrust greater than 89 kN) that generally represent about a 16 percent reduction (or increase in stringency) from the existing standard. (See section IV.A.1(a)(i) and IV.A.1(b)(i) above for the standards for mid- and high-thrust engines.) More specifically, at a rated pressure ratio of 30 the proposed NO_x standards represent a 16 percent reduction from the existing standard. At rated pressure ratios of 10 and 20, the proposed standards correspond to 27 and 20 percent reductions, respectively. In addition, at rated pressure ratios of 40 and 50, the proposed NO_x standards signify 9 and 4 percent reductions, respectively. Also, the proposed and existing standards are equivalent at a rated pressure ratio of 62.5. See Figure IV.B-1 in section IV.B. for a comparison of the proposed NO_x standards (equivalent to CAEP/4 standards) to the existing standards (equivalent to CAEP/2 standards).

3. Proposed NO_x Standards for Newly Certified Low-Thrust Engines

For newly certified low-thrust engines (engines with a thrust or rated output of more than 26.7 kN but not more than 89.0 kN), EPA is today proposing to adopt near-term NO_x standards that are different than the standards proposed for mid- and high-thrust engines (engines with thrust greater than 89.0 kN).⁷⁸ In addition to rated pressure ratio, the proposed standards for low-

⁷⁷ ICAO's CAEP/4 NO_x standards became effective July 19, 1999, and applicable as of November 4, 1999. December 31, 2003 is the implementation date for these standards. However, for the purpose of this Notice the effective date is considered the implementation date. (ICAO, "Aircraft Engine Emissions," International Standards and Recommended Practices, Environmental Protection, Annex 16, Volume II, Second Edition, July 1993—Amendment 4, July 19, 1999.)

⁷⁸ Today's proposed NO_x standards for low thrust or small engines specify that engines with a rated output or thrust at 26.7 kN meet the existing standard, and engines with a rated output at 89 kN meet the proposed (or CAEP/4) standards. For engines with rated outputs or thrust levels between 26.7 and 89 kN, a linear interpolation was made between the low range of the existing standard and the high range of the proposed standard based upon the rated output to determine the proposed NO_x limits for such engines. Thus, thrust dependent standards are being proposed for engines with rated output or thrust between 26.7 kN and 89 kN.

⁷⁴ ICAO, CAEP, Fourth Meeting, Montreal, Quebec, April 6-8, 1998, Report, Document 9720, CAEP/4. Copies of this document can be obtained from the ICAO Web site located at <http://www.icao.int>.