

# **Emission Standards and Test Procedures for Aircraft and Aircraft Engines**

## **Summary and Analysis of Comments**

EPA420-R-05-004  
November 2005

# **Emission Standards and Test Procedures for Aircraft and Aircraft Engines**

## Summary and Analysis of Comments

Assessment and Standards Division  
Office of Transportation and Air Quality  
U.S. Environmental Protection Agency



























































































In addition, Bluewater network indicated that the Agency has gone beyond its authority by excluding military aircraft and aircraft engines since only the President may provide such exemptions under section 118 of the CAA (Control of Pollution from Federal Facilities). This section directs federal agencies to comply with air pollution control requirements “in the same manner, and to the same extent as any nongovernmental entity.” If exemptions for the military could be carried out at the rulemaking level, the necessity for a presidential exemption would become meaningless. Furthermore, Congress’ intent that the military follow the same requirements that apply to non-governmental entities would be easily frustrated if EPA were permitted to exclude military in this rule.

Also, Bluewater Network commented that emissions from exempted aircraft engines – from 1 to 26 percent of emissions from all aircraft engines – are considerable; therefore, EPA has to explain its rationale for the exemption. In the NPRM, the Agency did not describe why these emissions would be exempted. “EPA’s failure to regulate these sources is thus arbitrary and capricious.”

In addition, as described earlier SCAQMD expressed that the 2003 Proposed State and Federal Strategy for the California SIP calls for EPA to assess options for decreasing aircraft emissions, including the application of standards for commercial aircraft engines to non-tactical military aircraft.

*Our Response:*

The promulgated NO<sub>x</sub> standards apply to commercial aircraft engines of rated thrust greater than 26.7 kilonewtons, and general aviation and military aircraft can use commercial aircraft engines subject to these standards (e.g., small regional jet engines are also utilized in executive general aviation aircraft and larger commercial aircraft engines may also be used in military transport aircraft). In the NPRM, we stated that no general aviation or military engines are covered by the proposal. However, this statement may need some clarification (and was revised in the preamble of the final rule). For general aviation, EPA’s 1982 aircraft final rule withdrew emission standards “for all gas turbine engines used only for general aviation applications” (and for all gas turbine engines of rated thrust less than or equal to 26.7 kilonewtons), but emission standards for aircraft gas turbine engines used for commercial transport by air carriers or commercial operators remained (although the standards were revised).<sup>24</sup> Currently, some engines used in commercial transport also power general aviation aircraft (e.g., business jets), and because such engines are used in commercial applications (and not merely general aviation operation), they must comply with EPA’s aircraft engine emission standards – including the standards promulgated in this final rule. Therefore, it is more appropriate to state that the promulgated NO<sub>x</sub> emission standards do not apply to aircraft engines used only for general aviation or military applications.

---

<sup>24</sup>U.S. EPA, “Control of Air Pollution from Aircraft and Aircraft Engines; Emission Standards and Test Procedures,” Final Rule, 47 FR 58462, December 30, 1982.



















A commenter stated that these spraying operations were intentionally carried out to produce cloudy sky conditions on what commenced as a clear day. Another commenter claimed observing a jetliner dumping jet fuel (apparently not for emergency purposes) through spray nozzles. Some commenters advanced the theory that persistent contrails are abnormal and offered this as evidence to support their allegations of chemical spraying, while another stated that this was a “secret” government program, its scope and purpose withheld from the general public.

*Our Response:*

EPA is unaware of any program to spray U.S. population centers with chemicals or other substances from jets or any another type of aircraft. What we can do is provide an explanation of how jet exhaust occasionally forms contrails.

Jet aircraft engines operating at high altitudes emit tiny particles that serve as condensation nuclei. High-altitude water vapor collects on these particles, crystallizes, and forms streaks of frozen water vapor otherwise known as contrails. Some contrails join with other contrails and expand into large, natural-looking clouds of cirrus characteristics that can cover large areas of the sky. (Cirrus clouds are wispy white, usually a natural phenomenon, consisting of minute ice crystals formed at high altitudes of 20,000 to 40,000 feet.) Research by the National Aeronautics and Space Administration (NASA) has recognized jet aircraft cloud formation as a potential problem for blocking sunlight, but not solar heat reaching the earth, thereby acting as a thermal blanket and perhaps contributing to global warming.

In September 2000, EPA published a document entitled, *Aircraft Contrails Factsheet*, EPA430-F-00-005, in conjunction with NASA, the National Oceanic and Atmospheric Administration (NOAA), and the Federal Aviation Administration (FAA). This fact sheet describes the formation, occurrence, and effects of "condensation trails" or contrails, and it is located on EPA's web site at: [www.epa.gov/otaq/aviation.htm](http://www.epa.gov/otaq/aviation.htm). Information from the Air Force about military aircraft and their atmospheric and environmental effects can be found at: <http://www.af.mil/shared/media/document/AFD-051013-001.pdf>.

Also, a 1999 report issued by the Intergovernmental Panel on Climate Change, entitled, *Aviation and the Global Atmosphere*, discusses contrail formation and its effects in detail. The influence of contrails on cirrus clouds is noted as a key area of scientific uncertainty that limits the ability to project aviation impacts on climate and ozone. Further work is required to reduce scientific and other uncertainties of aviation impacts. EPA fully supports continued research to address these issues.<sup>36</sup>

---

<sup>36</sup>Intergovernmental Panel on Climate Change (IPCC), “Aviation and the Global Atmosphere,” J.E. Penner, D.H. Lister, D.J. Griggs, D.J. Dokken, and M. McFarland, editors. Cambridge University Press, 373 pp., 1999.





