



U.S. Department
of Transportation
**Federal Aviation
Administration**

SAFO

Safety Alert for Operators

SAFO 10021
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Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

Subject: Adverse Levels of Porous Coke for All Engine and Oil Combinations

Purpose: This SAFO provides safety information related to engine problems associated with potentially hazardous porous-coke conditions to airplane operators in general and with emphasis to Title 14 Code of Federal Regulations (14 CFR) part 121 Extended-Range Operations (ETOPS) airplane operators.

Background: The Federal Aviation Administration (FAA) issued Airworthiness Directive (AD) 2007-02-05 requiring initial and repetitive borescope inspections of the high pressure and intermediate pressure turbine internal and external oil vent tubes for coking and carbon buildup, and cleaning or replacing the vent tubes if necessary. The AD resulted from an incident where an RB211 Trent 700 series turbofan engine had an oil vent tube rupture as a result of blockage, leading to significant loss of engine oil and uncontained engine failure. Contributing to the cause was the absence of measures to adequately monitor and evaluate risk of in service performance of engine/oil combinations.

Discussion: The Federal Aviation Administration (FAA) issued Airworthiness Directive (AD) 2007-02-05 requiring initial and repetitive borescope inspections of the high pressure and intermediate pressure turbine internal and external oil vent tubes for coking and carbon buildup, and cleaning or replacing the vent tubes if necessary. The AD resulted from an incident where an RB211 Trent 700 series turbofan engine had an oil vent tube rupture as a result of blockage, leading to significant loss of engine oil and uncontained engine failure. Contributing to the cause was the absence of measures to adequately monitor and evaluate risk of in service performance of engine/oil combinations. After further analysis revealed that the cleaning of the vent tubes required by AD 2007-02-05 could lead to loosened carbon fragments, causing a blockage downstream in the vent flow restrictor, the FAA issued AD 2010-07-09, which supersedes AD 2007-02-05. AD 2010-07-09 was issued to prevent internal oil fires due to coking and carbon buildup that could cause uncontained engine failure and damage to the airplane.

Recommended Action: Operators should review their Continuous Analysis and Surveillance System (CASS) measures for all engine and oil combinations currently in service, with particular emphasis on the evaluation of airplanes approved for ETOPS with two engines, to determine that they have gathered and evaluated sufficient data, including operational experience and engine hardware disassembly inspection findings, to ensure that these combinations are not at risk of producing potentially hazardous porous-coke conditions. If such data is insufficient, develop and implement appropriate CASS measures, including periodic inspections, to collect and evaluate the necessary data until the risk associated with the presence of porous coke is either ruled out or properly controlled.

Contact: Questions or comments regarding this SAFO should be directed to Aircraft Maintenance Division, AFS-300, at (202) 267-1675.