



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2014-0521; Directorate Identifier 2014-NE-11-AD; Amendment 39-18104; AD 2015-04-02]**

**RIN 2120-AA64**

**Airworthiness Directives; CFM International S.A. Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** We are adopting a new airworthiness directive (AD) for all CFM International S.A. (CFM) CFM56-7B series turbofan engines. This AD was prompted by a dual engine thrust instability event that resulted in the overspeed and in-flight shutdown (IFSD) of one engine. This AD requires modification of the engine by removing full authority digital engine control (FADEC) software, version 7.B.V4 or earlier, installed in the electronic engine controls (EECs) on CFM56-7B engines. We are issuing this AD to prevent a thrust instability event, which could lead to overspeed and IFSD of one or more engines, loss of thrust control, damage to the engine, and damage to the airplane.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** For service information identified in this AD, contact CFM International Inc., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45125; phone: 877-432-3272; fax: 877-432-3329; email: [gae.aoc@ge.com](mailto:gae.aoc@ge.com). You may view this service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125. It is also available on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2014-0521.

## **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2014-0521; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Kyle Gustafson, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7183; fax: 781-238-7199; email: [kyle.gustafson@faa.gov](mailto:kyle.gustafson@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to all CFM CFM56-7B series turbofan engines. The NPRM published in the Federal Register on October 2, 2014 (79 FR 59467). The NPRM was prompted by reports of dual-engine thrust instability events on CFM56-7B turbofan engines that resulted in overspeed and IFSD of one engine. These resulted from water-borne contamination of the fuel being supplied to the engine which had an adverse effect on the response of the fuel metering valve (FMV) in the hydro-mechanical unit (HMU). CFM has modified its FADEC software to compensate for compromised fuel within the HMU and improved the response of the FMV, thereby mitigating these thrust instability events. The NPRM proposed to require modification of the engine by removing FADEC software, version 7.B.V4 or earlier, installed in the EECs on CFM56-7B engines. We are

issuing this AD to prevent a thrust instability event, which could lead to overspeed and IFSD of one or more engines, loss of thrust control, damage to the engine, and damage to the airplane.

### **Comments**

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the NPRM (79 FR 59467, October 2, 2014) and the FAA's response to each comment.

### **Request to Change Emphasis from Software Removal to Software Installation**

Delta Air Lines (DAL) and American Air Lines (AAL) requested that we change wording in the AD to emphasize installation of an eligible software standard rather than removal of the ineligible software standard. They suggested that we add this sentence to compliance paragraph (e): "Within 6 months of the effective date of this AD, modify the engine by installing FADEC software version 7.B.W, released by CFM Service Bulletins 73-0203 and 73-0204, or later approved software versions." DAL and AAL state that the Boeing 737NG Aircraft Maintenance Manual does not contain a removal step but rather guides how to overwrite previous software with eligible software.

We disagree. The purpose of this AD is to require removal of software standard 7.B.V4, or earlier, to correct the unsafe condition. Overwriting a previously installed software standard with a software standard eligible for installation is an acceptable method for removing an affected software standard. We did not change this AD.

### **Request to Require Use of Software EEC Software Standard 7.B.W or Later**

DAL and AAL requested that we revise paragraph (h)(2) of FAA AD 2012-05-02 (77 FR 20511, April 5, 2012) ("AD 2012-05-02") to state that EEC software standard 7.B.W or later is required. AD 2012-05-02 requires inspection and modification to the Boeing 737NG thrust reversers, and also requires, in paragraph (h)(2), installation of software standard 7.B.R3 on affected engines. Since AD 2012-05-02 was issued, new

versions of software have been released, requiring alternative methods of compliance (AMOCs) to allow installation of versions later than software standard 7.B.R3. The requested change to AD 2012-05-02 would bring AD 2012-05-02 and this AD into agreement on the required airplane configuration.

We disagree. The current version of the software standard, 7.B.W, also addresses the thrust reverser unsafe condition and is approved as an AMOC for AD 2012-05-02.

We did not change this AD.

#### **Request to Change Description of the Unsafe Condition**

The Boeing Company (Boeing) and CFM requested that we change the wording of the unsafe condition to “We are proposing this AD to mitigate characteristics of a thrust instability event; without mitigation, thrust instability events could potentially lead to engine overspeed and IFSD of one or more engines, loss of thrust control, and damage to the airplane.” The commenters state that the EEC cannot prevent the occurrence of the events, but it can effectively mitigate the characteristics of the events.

We disagree. While the work to prevent the root cause of fuel contamination continues, the purpose of the FADEC software and this AD is to prevent the events described in the unsafe condition. We did not change this AD.

#### **Request to Change Wording in the Description Paragraph**

CFM and Boeing requested that we change the wording of two sentences in the Description paragraph to “These resulted from water-borne contamination of the fuel being supplied to the engine which had an adverse effect on the response of the FMV in the HMU. CFM has modified its FADEC software to compensate for compromised fuel within the HMU and improve the response of the fuel control valve, thereby mitigating these thrust instability events.”

We agree. We changed the wording of the two sentences in the Description paragraph to be more correct and accurate.

### **Request to Clarify a Sentence in the Relevant Service Information Paragraph**

Boeing requested, for clarity, that in the Relevant Service Information paragraph of the preamble we add the words “post 7.B.V4” to describe the FADEC software.

Boeing requested that the changed sentence read: “The SBs describe the procedures for the introduction of new FADEC software, post 7.B.V4, for the EECs.”

We disagree. The information in this AD provides the necessary information for compliance. No additional clarification is required. Furthermore, the Relevant Service Information paragraph, which appeared in the preamble of the NPRM (79 FR 59467, October 2, 2014), does not appear in this AD. We did not change this AD.

### **Request that We Correct Our References to the FADEC Software Standard**

CFM requested that we change all references to the software standard throughout this AD from “7BV4” to “7.B.V4” because that is the correct way to reference the software standard.

We agree. We changed all references to the software standard throughout this AD to the correct nomenclature.

### **Request to Add a Table Specifying the Software Versions to Remove**

Boeing requested that for clarity we include in this AD a table that would show the software versions, by part number, that should be removed as a result of this AD.

We disagree. The information in this AD provides the necessary information for compliance. No additional clarification is required. We did not change this AD.

### **Additional Changes**

In our review of the NPRM, we found that we failed to include the prohibition against operating any aircraft configured with one engine with FADEC software version 7.B.V4 or earlier, installed, and the other engine with an eligible FADEC software version installed. This prohibition is in SB CFM Service Bulletin (SB) No. CFM56-7B

S/B 73-0203, dated June 9, 2014 and CFM No. SB CFM56-7B S/B 73-0204, dated June 9, 2014. We added the prohibition to this AD.

### **Agreement with the Proposed AD**

One anonymous commenter expressed agreement with this AD.

### **Conclusion**

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the changes described previously. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM (79 FR 59467, October 2, 2014) for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM (79 FR 59467, October 2, 2014).

We also determined that these changes will not increase the economic burden on any operator or increase the scope of this AD.

### **Costs of Compliance**

We estimate that this AD would affect about 2,921 engines installed on airplanes of U.S. registry. We also estimate that it would take about 1 hour per engine to comply with this AD. The average labor rate is \$85 per hour. Parts cost is zero. Based on these figures, we estimate the cost of this AD on U.S. operators to be \$248,285.

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress

charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska to the extent that it justifies making a regulatory distinction, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **Adoption of the Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

**§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

**2015-04-02 CFM International S.A.:** Amendment 39-18104; Docket No. FAA-2014-0521; Directorate Identifier 2014-NE-11-AD.

**(a) Effective Date**

This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to all CFM International S.A. (CFM) CFM56-7B series turbofan engines.

**(d) Unsafe Condition**

This AD was prompted by a dual engine thrust instability event that resulted in the overspeed and in-flight shutdown (IFSD) of one engine. We are issuing this AD to prevent a thrust instability event, which could lead to overspeed and IFSD of one or more engines, loss of thrust control, damage to the engine, and damage to the airplane.

**(e) Compliance**

(1) Comply with this AD within the compliance times specified, unless already done.

(2) Within 6 months after the effective date of this AD, modify the engine by removing full authority digital engine control (FADEC) software, version 7.B.V4 or earlier, installed in the electronic engine control (EEC).

(3) Do not return to service any aircraft configured with one engine with FADEC software, version 7.B.V4 or earlier, installed, and the other engine with an eligible FADEC software version, installed.

**(f) Alternative Methods of Compliance (AMOCs)**

The Manager, Engine Certification Office, FAA, may approve AMOCs to this AD. Use the procedures found in 14 CFR 39.19 to make your request. You may email your request to: ANE-AD-AMOC@faa.gov.

**(g) Related Information**

(1) For more information about this AD, contact Kyle Gustafson, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7183; fax: 781-238-7199; email: kyle.gustafson@faa.gov.

(2) CFM Service Bulletin (SB) No. CFM56-7B S/B 73-0203, dated June 9, 2014, and CFM No. SB CFM56-7B S/B 73-0204, dated June 9, 2014, which are not incorporated by reference in this AD, can be obtained from CFM using the contact information in paragraph (g)(3) of this AD.

(3) For service information identified in this AD, contact CFM International Inc., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45125; phone: 877-432-3272; fax: 877-432-3329; email: geae.aoc@ge.com.

(4) You may view this service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call (781) 238-7125.

**(h) Material Incorporated by Reference**

None.

Issued in Burlington, Massachusetts, on February 10, 2015.

Ann C. Mollica,  
Acting Directorate Manager, Engine & Propeller Directorate,  
Aircraft Certification Service.

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