



## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2023-1216; Project Identifier AD-2023-00502-E; Amendment 39-22614; AD 2023-23-12]

RIN 2120-AA64

#### Airworthiness Directives; CFM International, S.A. Engines

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

**ACTION:** Final rule.

**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for all CFM International, S.A. (CFM) Model LEAP-1B21, LEAP-1B23, LEAP-1B25, LEAP-1B27, LEAP-1B28, LEAP-1B28B1, LEAP-1B28B2, LEAP-1B28B2C, LEAP-1B28B3, LEAP-1B28BBJ1, and LEAP-1B28BBJ2 (LEAP-1B) engines. This AD was prompted by a manufacturer investigation that revealed that certain high-pressure turbine (HPT) rotor stage 1 disks (HPT stage 1 disks) and a certain compressor rotor stages 6-10 spool were manufactured from material suspected to have reduced material properties due to iron inclusion. This AD requires replacing certain HPT stage 1 disks and a certain compressor rotor stages 6-10 spool. The FAA is issuing this AD to address the unsafe condition on these products.

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

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **ADDRESSES:**

*AD Docket:* You may examine the AD docket at [regulations.gov](https://www.regulations.gov) under Docket No. FAA-2023-1216; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S.

Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

*Material Incorporated by Reference:*

- For service information identified in this final rule, contact CFM International, S.A., GE Aviation Fleet Support, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45215; phone: (877) 432-3272; email: aviation.fleetsupport@ge.com.

- You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110. It is also available at regulations.gov under Docket No. FAA-2023-1216.

**FOR FURTHER INFORMATION CONTACT:** Mehdi Lamnyi, Aviation Safety Engineer, FAA, 2200 South 216th Street, Des Moines, WA 98198; phone: (781) 238-7743; email: Mehdi.Lamnyi@faa.gov.

**SUPPLEMENTARY INFORMATION:**

**Background**

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to CFM International, S.A. (CFM) Model LEAP-1B21, LEAP-1B23, LEAP-1B25, LEAP-1B27, LEAP-1B28, LEAP-1B28B1, LEAP-1B28B2, LEAP-1B28B2C, LEAP-1B28B3, LEAP-1B28BBJ1, and LEAP-1B28BBJ2 engines. The NPRM published in the *Federal Register* on July 24, 2023 (88 FR 47404). The NPRM was prompted by a manufacturer investigation that detected iron inclusion in three non-LEAP-1B HPT rotor disks. Further investigation determined that the iron inclusion is attributed to deficiencies in the manufacturing process. The manufacturer also determined that certain LEAP-1B HPT stage 1 disks and a certain compressor rotor stages 6-10 spool manufactured using the same process may have reduced material properties and a lower fatigue life capability due to iron inclusion, which may cause premature fracture and subsequent uncontained failure of certain HPT stage 1 disks and a certain compressor rotor stages 6-10 spool.

In the NPRM, the FAA proposed to require replacement of certain HPT stage 1 disks and a certain compressor rotor stages 6-10 spool and also prohibit installation of an

HPT stage 1 disk or compressor rotor stages 6-10 spool that has a part number and serial number identified in the service information onto any engine. The FAA is issuing this AD to address the unsafe condition on these products.

### **Discussion of Final Airworthiness Directive**

The FAA received comments from five commenters. Commenters included CFM International, United Air Lines (United), The Boeing Company (Boeing), Air Line Pilots Association, International (ALPA) and Lynx Air (Lynx). United, Boeing, and ALPA supported the NPRM without change. The following presents the comments received on the NPRM from CFM and Lynx and the FAA's response to each comment.

### **Request to Update Service Information**

CFM advised that updated service information for replacement of the HPT Stage 1 disks and high-pressure compressor (HPC) Stage 6-10 spool has been published. This updated service information provides certain corrections, identifies Required by Compliance annotations, and updated cost information to adequately address this unsafe condition. CFM recommends the latest revision to be utilized in this final rule.

The FAA agrees with CFM's recommendation to utilize the updated service information and has updated this final rule to reflect the service information that is to be incorporated by reference in this final rule.

### **Request to Issue Separate AD Actions**

Lynx stated that the reference of HPC Stage 6-10 spool should be removed from the manufacturer service information; and additional removal instruction should be provided to address the unsafe condition as it pertains to this affected part. Lynx pointed out that issuing a single AD addressing HPC Stage 6-10 spools and HPT Stage 1 disks, could cause a certain level of uncertainty when maintaining maintenance records and incorporating these applicable engines into the operator's maintenance programs. Lynx suggested separate ADs should be issued to minimize the risk of confusion as it pertains to ensuring this unsafe condition has been addressed on these engines.

The FAA disagrees with the request to require the manufacturer to revise their service information and issue separate ADs for each affected part. Since the applicability, unsafe condition, required action, and corrective action, are consistent among the affected

parts and the FAA has determined that the content of the service bulletin addresses the unsafe condition, there is no need for separate service bulletins or separate ADs.

### **Conclusion**

The FAA reviewed the relevant data, considered the comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for any changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

### **Related Service Information under 1 CFR Part 51**

The FAA reviewed CFM Service Bulletin LEAP-1B-72-00-0392-01A-930A-D, Issue 002, dated September 5, 2023. This service information identifies the part numbers and serial numbers of HPT stage 1 disks and a compressor rotor stages 6-10 spool with potentially reduced material properties and specifies procedures for replacement of these parts. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES section.

### **Costs of Compliance**

The FAA estimates that this AD affects 39 engines installed on airplanes of U.S. registry. These 39 engines require replacement of the HPT stage 1 disk. The FAA estimates that there are no engines installed on airplanes of U.S. registry that require replacement of the compressor rotor stages 6-10 spool.

The FAA estimates the following costs to comply with this AD:

#### **Estimated costs**

<b>Action</b>	<b>Labor Cost</b>	<b>Parts Cost</b>	<b>Cost per product</b>	<b>Cost on U.S. operators</b>
Replace HPT stage 1 disk	8 work-hours x \$85 per hour = \$680	\$215,635 (pro-rated)	\$216,315	\$8,436,285
Replace compressor rotor stages 6-10 spool	8 work-hours x \$85 per hour = \$680	\$37,660 (pro-rated)	\$38,340	\$0

## **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.

The FAA is 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) Will not affect intrastate aviation in Alaska, and
- (3) 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.

## **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:  
**2023-23-12 CFM International, S.A.:** Amendment 39-22614; Docket No. FAA-2023-1216; Project Identifier AD-2023-00502-E.

### **(a) Effective Date**

This airworthiness directive (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 CFM International, S.A. (CFM) Model LEAP-1B21, LEAP-1B23, LEAP-1B25, LEAP-1B27, LEAP-1B28, LEAP-1B28B1, LEAP-1B28B2, LEAP-1B28B2C, LEAP-1B28B3, LEAP-1B28BBJ1, and LEAP-1B28BBJ2 engines.

### **(d) Subject**

Joint Aircraft System Component (JASC) Code 7230, Turbine Engine Compressor Section; 7250, Turbine Section.

### **(e) Unsafe Condition**

This AD was prompted by a manufacturer investigation that revealed that certain high-pressure turbine (HPT) rotor stage 1 disks (HPT stage 1 disks) and a certain compressor rotor stages 6-10 spool were manufactured from material suspected to have reduced material properties due to iron inclusion. The FAA is issuing this AD to prevent fracture and subsequent uncontained failure of certain HPT stage 1 disks and a certain compressor rotor stages 6-10 spool. The unsafe condition, if not addressed, could result in uncontained debris release, damage to the engine, and damage to the aircraft.

### **(f) Compliance**

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

### **(g) Required Actions**

(1) For engines with an installed HPT stage 1 disk having a part number (P/N) and serial number (S/N) identified in Compliance, paragraph 3.E., Tables 1 through 2, of CFM Service Bulletin (SB) LEAP-1B-72-00-0392-01A-930A-D, Issue 002, dated

September 5, 2023 (CFM SB LEAP-1B-72-00-0392-01A-930A-D, Issue 2): At the next piece-part exposure of the HPT stage 1 disk, or before exceeding the applicable cycles since new (CSN) threshold identified in Compliance, paragraph 3.E., Tables 1 through 2, of CFM SB LEAP-1B-72-00-0392-01A-930A-D, Issue 2, whichever occurs first after the effective date of this AD; or if the applicable CSN threshold has been exceeded as of the effective date of this AD, within 50 flight cycles (FCs) from the effective date of this AD; remove the HPT stage 1 disk from service and replace with a part eligible for installation.

(2) For engines with an installed compressor rotor stages 6-10 spool having a P/N and S/N identified in Compliance, paragraph 3.E., Table 3, of CFM SB LEAP-1B-72-00-0392-01A-930A-D, Issue 2: At the next piece-part exposure of the compressor rotor stages 6-10 spool, or before exceeding the applicable CSN threshold identified in Compliance, paragraph 3.E., Table 3, of CFM SB LEAP-1B-72-00-0392-01A-930A-D, Issue 2, whichever occurs first after the effective date of this AD; or if the applicable CSN threshold has been exceeded as of the effective date of this AD, within 50 FCs from the effective date of this AD; remove the compressor rotor stages 6-10 spool from service and replace with a part eligible for installation.

**(h) Definition**

For the purpose of this AD, a “part eligible for installation” is an HPT stage 1 disk or compressor rotor stages 6-10 spool that does not have a P/N and S/N identified in Compliance, paragraph 3.E., Tables 1 through 3 of CFM SB LEAP-1B-72-00-0392-01A-930A-D, Issue 2.

**(i) Installation Prohibition**

After the effective date of this AD, do not install an HPT stage 1 disk or compressor rotor stages 6-10 spool that has a P/N and S/N identified in Compliance, paragraph 3.E., Tables 1 through 3 of CFM SB LEAP-1B-72-00-0392-01A-930A-D, Issue 2 on any engine.

**(j) Credit For Previous Actions**

This paragraph provides credit for the actions required by paragraph (g) of this AD, if those actions were performed prior to the effective date of this AD by following

the Accomplishment Instructions specified in CFM SB LEAP-1B-72-00-0392-01A-930A-D, Issue 001, dated March 7, 2023.

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

(1) The Manager, AIR-520 Continued Operational Safety Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the AIR-520 Continued Operational Safety Branch, send it to the attention of the person identified in paragraph (l)(1) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(l) Related Information**

(1) For more information about this AD, contact Mehdi Lamnyi, Aviation Safety Engineer, FAA, 2200 South 216th Street, Des Moines, WA 98198; phone: (781) 238-7743; email: mehdi.lamnyi@faa.gov.

(2) Service information identified in this AD that is not incorporated by reference is available at the addresses specified in paragraphs (m)(3) and (4) of this AD.

**(m) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) CFM International, S.A. Service Bulletin LEAP-1B-72-00-0392-01A-930A-D, Issue 002, dated September 5, 2023.

(ii) [Reserved]

(3) For service information identified in this AD, contact CFM International, S.A., GE Aviation Fleet Support, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45215; phone: (877) 432-3272; email: [aviation.fleetsupport@ge.com](mailto:aviation.fleetsupport@ge.com).

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

(5) You may view this material at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, visit [www.archives.gov/federal-register/cfr/ibr-locations](http://www.archives.gov/federal-register/cfr/ibr-locations) or email [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov).

Issued on November 20, 2023.

Ross Landes, Deputy Director for Regulatory Operations,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

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