



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2024-2325; Project Identifier AD-2024-00412-E; Amendment 39-22927; AD 2025-01-03]

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 certain CFM International, S.A. (CFM) Model LEAP-1A and LEAP-1C engines. This AD was prompted by an investigation of an in-flight shut down event that revealed the aft arm of the high-pressure turbine (HPT) rotor interstage seal had failed. This AD requires removal from service and replacement of the HPT rotor interstage seal for LEAP-1A engines. Since the HPT rotor interstage seal part number is interchangeable between LEAP-1A and LEAP-1C engines, this AD also prohibits installation of these affected parts onto any LEAP-1A or LEAP-1C engine. 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 certain publications 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-2024-2325; 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 CFM material identified in this AD, contact CFM, 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 material 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-2024-2325.

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 certain CFM Model LEAP-1A and LEAP-1C engines. The NPRM published in the *Federal Register* on October 2, 2024 (89 FR 80155). The NPRM was prompted by a report of an in-flight shutdown caused by turbine blades that had broken and metal that entered the exhaust. A manufacturer investigation later revealed that the aft arm of the HPT rotor interstage seal had failed due to a non-conforming surface condition in the fillet area coupled with higher-than-expected operating stress due to friction. In the NPRM, the FAA proposed to require removal from service and replacement of the HPT rotor interstage seal. Since the HPT rotor interstage seal part number is interchangeable between LEAP-1A and LEAP-1C engines, the NPRM also proposed to prohibit installation of these affected parts onto any LEAP-1A or LEAP-1C engine. The FAA is issuing this AD to address the unsafe condition on these products.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from Airline Pilots Association International (ALPA), StandardAero, an individual commenter, and an anonymous commenter. All commenters supported the NPRM without change.

Conclusion

The FAA reviewed the relevant data, considered the comments received, and determined that air safety requires adopting the AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, this AD is adopted as proposed in the NPRM.

Material Incorporated by Reference under 1 CFR Part 51

The FAA reviewed the following CFM material:

- CFM Service Bulletin (SB) LEAP-1A-72-00-0525-01A-930A-D, Issue 002-00, dated June 28, 2024, which provides the serial numbers (S/Ns) of the affected HPT rotor interstage seals for LEAP-1A engines.

- CFM SB LEAP-1C-72-00-0124-01A-930A-D, Issue 001-00, dated September 5, 2024, which provides the S/Ns of the affected HPT rotor interstage seals that are excluded from installation onto LEAP-1C engines.

This material also includes instructions for removal and installation of the HPT rotor interstage seal. This material is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

Costs of Compliance

The FAA estimates that this AD affects 56 engines installed on airplanes of U.S. registry.

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

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
Replace HPT rotor interstage seal	12 work-hours x \$85 per hour = \$1,020	\$195,000	\$196,020	\$10,977,120

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:

2025-01-03 CFM International, S.A.: Amendment 39-22927; Docket No. FAA-2024-2325; Project Identifier AD-2024-00412-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 the following CFM International, S.A. (CFM) engines:

(1) Model LEAP-1A23, LEAP-1A24, LEAP-1A24E1, LEAP-1A26, LEAP-1A26CJ, LEAP-1A26E1, LEAP-1A29, LEAP-1A29CJ, LEAP-1A30, LEAP-1A32, LEAP-1A33, LEAP-1A33B2, and LEAP-1A35A engines.

(2) Model LEAP-1C28, LEAP-1C30, and LEAP-1C30B1 engines.

(d) Subject

Joint Aircraft System Component (JASC) Code 7250, Turbine Section.

(e) Unsafe Condition

This AD was prompted by an investigation of an in-flight shut down event that revealed the aft arm of the high-pressure turbine (HPT) rotor interstage seal had failed. The FAA is issuing this AD to prevent failure of the HPT rotor interstage seal. The unsafe condition, if not addressed, could result in failure of one or more engines, loss of thrust control, and loss of the airplane.

(f) Compliance

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

(g) Required Actions

(1) For LEAP-1A engines having an HPT rotor interstage seal installed with a part number (P/N) and serial number (S/N) listed in Table 1 of CFM Service Bulletin (SB) LEAP-1A-72-00-0525-01A-930A-D, Issue 002-00, dated June 28, 2024 (CFM SB LEAP-1A-72-00-0525-01A-930A-D Issue 002-00), at the next engine shop visit or before exceeding the applicable cyclic threshold in table 1 to paragraph (g)(1) of this AD, whichever occurs first after the effective date of this AD, remove the affected HPT rotor interstage seal from service and replace with a part eligible for installation.

Table 1 to Paragraph (g)(1)—Removal Thresholds for Each Engine Model

Engine Model	Removal Cyclic Threshold
LEAP-1A23, LEAP-1A24, LEAP-1A24E1, LEAP-1A26, LEAP-1A26E1, LEAP-1A29, LEAP-1A30, LEAP-1A32, LEAP-1A33, LEAP-1A33B2, and LEAP-1A35A	11,100 cycles since new (CSN) accumulated on the affected part
LEAP-1A26CJ and LEAP-1A29CJ	9,700 CSN accumulated on the affected part

(2) For LEAP-1A engines having an HPT rotor interstage seal installed with a P/N and S/N listed in Table 2 of CFM SB LEAP-1A-72-00-0525-01A-930A-D Issue 002-00, at the next piece part exposure or before exceeding the applicable cyclic threshold in table 1 to paragraph (g)(1) of this AD, whichever occurs first after the effective date of this AD, remove the affected HPT rotor interstage seal from service and replace with a part eligible for installation.

(h) Installation Prohibition

(1) After the effective date of this AD, do not install an HPT rotor interstage seal having a P/N and S/N listed in Table 1 or Table 2 of CFM SB LEAP-1A-72-00-0525-01A-930A-D Issue 002-00, in any LEAP-1A engine.

(2) After the effective date of this AD, do not install an HPT rotor interstage seal having a P/N and S/N listed in Table 1 of CFM SB LEAP-1C-72-00-0124-01A-930A-D, Issue 001-00, dated September 5, 2024, in any LEAP-1C engine.

(i) Definitions

For the purpose of this AD:

(1) “LEAP-1A engines” are CFM Model LEAP-1A23, LEAP-1A24, LEAP-1A24E1, LEAP-1A26, LEAP-1A26CJ, LEAP-1A26E1, LEAP-1A29, LEAP-1A29CJ, LEAP-1A30, LEAP-1A32, LEAP-1A33, LEAP-1A33B2, LEAP-1A35A engines.

(2) “LEAP-1C engines” are CFM Model LEAP-1C28, LEAP-1C30, and LEAP-1C30B1 engines.

(3) A “part eligible for installation” is any HPT rotor interstage seal having a P/N and S/N that is not listed in Table 1 or Table 2 of CFM SB LEAP-1A-72-00-0525-01A-930A-D Issue 002-00.

(4) An “engine shop visit” is the induction of an engine into the shop for maintenance involving the separation of major mating engine flanges, except for the separation of engine flanges solely for the purposes of transportation without subsequent engine maintenance.

(5) A “piece-part exposure” is when the HPT rotor interstage seal is separated from the HPT rotor assembly.

(j) 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 AIR-520 Continued Operational Safety Branch, send it to the attention of the person identified in paragraph (k) of this AD and email to: 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.

(k) Additional Information

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.

(I) Material Incorporated by Reference

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

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

(i) CFM Service Bulletin LEAP-1A-72-00-0525-01A-930A-D, Issue 002-00, dated June 28, 2024.

(ii) CFM Service Bulletin LEAP-1C-72-00-0124-01A-930A-D, Issue 001-00, dated September 5, 2024.

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

(4) You may view this material 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.

(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 or email fr.inspection@nara.gov.

Issued on January 30, 2025.

Suzanne Masterson,
Deputy Director, Integrated Certificate Management Division,
Aircraft Certification Service.

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