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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2021-0102; Project Identifier AD-2020-01270-E; Amendment 39-21621; AD 2021-13-16]**

**RIN 2120-AA64**

### **Airworthiness Directives; General Electric Company Turbofan Engines**

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

**ACTION:** Final rule.

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**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for certain General Electric Company (GE) GENx-2B67, GENx-2B67/P, and GENx-2B67B model turbofan engines. This AD was prompted by a report of a crack in the lower fuel manifold causing fuel leakage. This AD requires an ultrasonic inspection (USI) or a fluorescent penetrant inspection (FPI) of the lower fuel manifold. Depending on the results of the USI or FPI, this AD requires replacement of the lower fuel manifold with a part eligible for installation. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective August 25, 2021.

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of August 25, 2021.

**ADDRESSES:** For service information identified in this final rule, contact General Electric Company, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: [aviation.fleetsupport@ae.ge.com](mailto:aviation.fleetsupport@ae.ge.com); website: [www.ge.com](http://www.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 (781) 238-7759. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0102.

### **Examining the AD Docket**

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0102; 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.

**FOR FURTHER INFORMATION CONTACT:** Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7178; fax: (781) 238-7199; email: Alexei.T.Marqueen@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 GE GENx-2B67, GENx-2B67/P, and GENx-2B67B model turbofan engines. The NPRM published in the Federal Register on February 26, 2021 (86 FR 11670). The NPRM was prompted by a report that a GENx-2B model turbofan engine installed on a Boeing Model 747-8 airplane was removed from service due to confirmed fuel leakage from a lower fuel manifold in May 2019. The operator observed fuel leakage during a routine borescope inspection of the high-pressure turbine and later confirmed, by ultrasonic inspection, a crack at brazed block #4 in the pilot secondary fuel circuit tube on the lower fuel manifold. The FAA received two similar reports, in March 2020 and May 2020, of a fuel leak from the lower fuel manifold at brazed block #4. The manufacturer has identified the root cause of this cracking as low-cycle fatigue due to the abrupt transition created by the brazed support block pad and its inability to slide due to thermal loads as intended. In the NPRM, the FAA proposed to require an USI or an FPI of the lower fuel manifold. Depending on the results of the USI or FPI, the NPRM proposed to require replacement of the lower fuel manifold with a part eligible for installation. 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 five commenters. The commenters were Air Line Pilots Association, International (ALPA); Boeing Commercial Airplanes (Boeing); Cathay Pacific Airways Limited (Cathay); GE; and United Parcel Service (UPS). The following presents the comments received on the NPRM and the FAA's response to each comment.

#### **Request for Confirmation That Alternate Ultrasonic Probes Are Approved**

UPS requested confirmation of whether the alternate probes listed in Appendix–A, paragraph 4.1.1. of GE GENx-2B Service Bulletin (SB) 73-0089 R01, dated January 11, 2021 (SB 73-0089 R01), are approved alternate ultrasonic probes to inspect the lower fuel manifold. UPS reasoned that Appendix–A, paragraph 4.1.1. of SB 73-0089 R01 indicates that ultrasonic probes part number (P/N) 00-010012 and P/N 00-010013 are approved alternates for ultrasonic probes P/N 389-085-151 and P/N 389-085-161, respectively. However, the inspection procedure, figures, and record log in SB 73-0089 R01 only list ultrasonic probe P/N 389-085-151 and P/N 389-085-161.

The FAA confirms that alternate ultrasonic probes, P/N 00-010012 and P/N 00-010013, are approved alternates, and this AD does not prohibit their use.

## **Request for Allowance of Alternative Probe Application Tool**

UPS requested that the FAA allow alternative, locally manufactured probe application tools to aid in the installation of the ultrasonic probes on the lower fuel manifold. UPS reasoned that during the installation of the ultrasonic probes on the lower fuel manifold using probe application tool P/N SGP-156, which is included with the GE Aircraft Engines Inspection Kit P/N GE-FQAP-677, maintenance noted that in certain locations, modifying the GE probe application tool provides easier installation of the ultrasonic probes. UPS commented that all locally manufactured probe application tools would be removed before the USI, similar to using probe application tool P/N SGP-156.

This AD does not address requests for specific tool modifications. However, the FAA will consider requests for alternative methods of compliance requests in accordance with paragraph (k) of this AD that include a request for the modifications to the probe application tool.

## **Request for Add Credit for Previous Action**

Cathay requested that this AD provide credit for previous performance of inspections of the fuel manifold before the effective date of this AD in accordance with both GE GENx-2B SB 73-0089 R01, dated January 11, 2021, and R00, dated May 8, 2020.

The FAA agrees. The instructions for accomplishing the on-wing USI and FPI have not changed between R00, dated May 8, 2020, and R01, dated January 11, 2021, of GE GENx-2B SB 73-0089. The FAA added a Credit for Previous Actions paragraph to this AD.

## **Support for the AD**

ALPA, Boeing, and GE expressed support for the AD as written.

## **Conclusion**

The FAA reviewed the relevant data, considered any 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 minor editorial changes and any other 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 GE GENx-2B SB 73-0089 R01, dated January 11, 2021. The service information specifies procedures for performing an initial on-wing visual inspection, a USI, or an FPI of the top main fuel manifold and the lower fuel manifold. The service information also specifies procedures for performing repetitive in-shop visual inspection and FPI for GENx-2B model turbofan engines. The service information also provides instructions for replacing the top main fuel manifold and lower fuel manifold if a crack is found that exceeds the manufacturer's criteria or if a leak is detected during inspection. 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.

## **Interim Action**

The FAA considers this AD to be an interim action. The design approval holder is currently developing a modification to address the unsafe condition identified in this AD. Once this modification is developed, the FAA might consider additional rulemaking.

## Costs of Compliance

The FAA estimates that this AD affects 156 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
FPI or USI of the lower fuel manifold	16 work-hours × \$85 per hour = \$1,360	\$0	\$1,360	\$212,160

The FAA estimates the following costs to do any necessary replacements that would be required based on the results of the inspection. The agency has no way of determining the number of aircraft that might need this replacement:

### On-Condition Costs

Action	Labor cost	Parts cost	Cost per product
Replace the lower fuel manifold	2 work-hours × \$85 per hour = \$170	\$47,730	\$47,900

The FAA has included all known costs in its cost estimate. According to the manufacturer, however, some of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals.

## 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:



**2021-13-16 General Electric Company:** Amendment 39-21621; Docket No. FAA-2021-0102; Project Identifier AD-2020-01270-E.

**(a) Effective Date**

This airworthiness directive (AD) is effective August 25, 2021.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to General Electric Company (GE) GEnx-2B67, GEnx-2B67/P, and GEnx-2B67B model turbofan engines with lower fuel manifold, part number (P/N) 2619M58G01, installed.

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7310, Engine Fuel Distribution.

**(e) Unsafe Condition**

This AD was prompted by a report of a crack in the lower fuel manifold. The FAA is issuing this AD to detect cracking of the lower fuel manifold. The unsafe condition, if not addressed, could result in failure of the fuel manifold, engine fire, and damage to the airplane.

**(f) Compliance**

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

**(g) Required Actions**

(1) Within the compliance time specified in Table 1 to paragraph (g)(1) of this AD, perform either an ultrasonic inspection (USI), an on-wing spot fluorescent penetrant inspection (FPI), or an in-shop FPI of the lower fuel manifold, P/N 2619M58G01, in accordance with paragraph (g)(1)(i), (ii), or (iii) of this AD, as applicable.

**Table 1 to Paragraph (g)(1)—Compliance Time**

Lower fuel manifold cycles since new (CSN)	Compliance time
Less than 1,700 CSN	After the lower fuel manifold has accumulated 1,700 CSN, but before it exceeds 2,200 CSN

1,700 CSN or more	Within 500 engine flight cycles (FCs) after the effective date of this AD
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(i) Perform a USI of the lower fuel manifold at the locations adjacent to the five support block pads to detect cracks in accordance with paragraph 4. Appendix–A of GENx-2B Service Bulletin (SB) 73-0089 R01, dated January 11, 2021.

(ii) Perform an on-wing spot FPI of the lower fuel manifold at the five brazed block joints to detect cracks. Guidance on performing the spot FPI can be found in paragraph 3.B.(6)(a) of GENx-2B SB 73-0089 R01, dated January 11, 2021.

(iii) Perform an in-shop FPI of the lower fuel manifold at the five brazed block joints to detect cracks. Guidance on performing the FPI can be found in paragraph 3.C.(4) of GENx-2B SB 73-0089 R01, dated January 11, 2021.

(2) If a crack or rejectable indication is found during the USI, on-wing spot FPI, or in-shop FPI required by paragraphs (g)(1)(i), (ii), and (iii) of this AD, before further flight, remove the lower fuel manifold from service and replace it with a part eligible for installation.

#### **(h) Definition**

For the purpose of this AD, a part eligible for installation is:

- (1) Any serviceable lower fuel manifold, P/N 2619M58G01, with less than 1,700 CSN, or
- (2) Any lower fuel manifold, P/N 2619M58G01, with 1,700 CSN or more that has been inspected in accordance with paragraph (g)(1)(i), (ii), or (iii) of this AD and a crack or rejectable indication was not found, or
- (3) Any approved lower fuel manifold with a part number other than P/N 2619M58G01.

#### **(i) No Reporting Requirements**

The reporting requirements specified in paragraph 4. Appendix–A of GE GENx-2B SB 73-0089 R01, dated January 11, 2021, are not required by this AD.

#### **(j) Credit for Previous Actions**

You may take credit for the actions required by paragraph (g)(1) of this AD if you performed these actions before the effective date of this AD using GE GENx-2B SB 73-0089 R00, dated May 8, 2020.

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

(1) The Manager, ECO 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 certification office, send it to the attention of the person identified in Related Information. You may email your request 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**

For more information about this AD, contact Alexei Marqueen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7178; fax: (781) 238-7199; email: Alexei.T.Marqueen@faa.gov.

## **(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) GE GENx-2B Service Bulletin 73-0089 R01, dated January 11, 2021.

(ii) [Reserved]

(3) For General Electric Company service information identified in this AD, contact General Electric Company, 1 Neumann Way, Cincinnati, OH 45215; phone: (513) 552-3272; email: aviation.fleetsupport@ae.ge.com; website: www.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 (781) 238-7759.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: fedreg.legal@nara.gov, or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on June 17, 2021.

Lance T. Gant,

Director, Compliance & Airworthiness Division, Aircraft Certification Service.

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