



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2016-5592; Directorate Identifier 2016-NM-040-AD; Amendment 39-18488; AD 2016-08-12]**

**RIN 2120-AA64**

**Airworthiness Directives; The Boeing Company Airplanes**

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

**ACTION:** Final rule; request for comments.

**SUMMARY:** We are adopting a new airworthiness directive (AD) for The Boeing Company Model 787-8 and 787-9 airplanes powered by General Electric (GE) GENx-1B engines. This AD requires revising the airplane flight manual (AFM) to provide the flight crew a revised fan ice removal procedure and a new associated mandatory flight crew briefing to reduce the likelihood of engine damage due to fan ice shedding. This AD also removes certain dispatch relief. For airplanes with certain engines, this AD also requires reworking or replacing at least one engine. This AD was prompted by a recent engine fan blade rub event that caused an in-flight non-restartable power loss. We are issuing this AD to prevent susceptibility to heavy fan blade rubs, which could result in engine damage and a possible in-flight non-restartable power loss of one or both engines.

**DATES:** This AD is effective [INSERT DATE 15 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 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain other publication listed in this AD as of March 18, 2016 (81 FR 14704, March 18, 2016).

We must receive comments on this AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- Hand Delivery: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this final rule, contact General Electric Company, GE Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215; phone: 513-552-3272; email: [aviation.fleetsupport@ge.com](mailto:aviation.fleetsupport@ge.com). You may view this referenced service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call

425-227-1221. It is also available on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2016-5592.

### **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-2016-5592; 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 street address for the Docket Office (phone: 800-647-5527) is in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

**FOR FURTHER INFORMATION CONTACT:** Sue Lucier, Aerospace Engineer, Propulsion Branch, ANM-140S, FAA, Seattle Aircraft Certification Office (ACO), 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6438; fax: 425-917-6590; email: Suzanne.Lucier@faa.gov.

### **SUPPLEMENTARY INFORMATION:**

#### **Discussion**

On March 14, 2016, we issued AD 2016-06-08, Amendment 39-18439 (81 FR 14704, March 18, 2016) (“AD 2016-06-08”), for Boeing Model 787-8 and 787-9 airplanes powered by GE GEnx engines. AD 2016-06-08 was prompted by a report of a significant fan rub event involving a GEnx-1B Performance Improvement Program (PIP) 2 engine, apparently caused by partial fan ice shedding and a resulting fan imbalance that in turn caused substantial damage to the engine and an in-flight non-restartable power loss. GEnx-1B PIP1 engines have model designators GEnx-1B( )/P1. GEnx-1B PIP2 engines have model designators GEnx-1B( )/P2.

We continue to investigate this issue with Boeing and GE; however, the engine damage appears to be a result of susceptibility to heavy fan blade rubs common to the GENx-1B PIP2 engine. The other engine on the event airplane was an older design GENx-1B PIP1 configuration that incurred expected wear and minor damage during the icing event and continued to operate normally. The event occurred in icing conditions at an altitude of 20,000 feet.

The urgency of this issue stems from the safety concern over continued safe flight and landing for airplanes that are powered by two GENx-1B PIP2 engines operating in a similar environment to the event airplane. In this case both GENx-1B PIP2 engines may be similarly damaged and unable to be restarted in flight. The potential for common cause failure of both engines in flight is an urgent safety issue.

AD 2016-06-08 requires revising the airplane flight manual (AFM) to provide the flight crew a new fan ice removal procedure to reduce the likelihood of engine damage due to fan ice shedding. AD 2016-06-08 also requires, for certain airplanes, reworking the fan stator module assembly on GENx-1B PIP2 engines.

Susceptibility to heavy fan blade rubs, if not corrected, could result in engine damage and a possible in-flight non-restartable power loss of one or both engines. We are issuing this AD to correct the unsafe condition on these products.

The preamble to AD 2016-06-08 explains that we regard the requirements “interim action” and were considering further rulemaking. We now have determined that further rulemaking is indeed necessary, and this AD follows from that determination.

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

We reviewed GE GENx-1B Service Bulletins 72-0309 R00, dated March 11, 2016; and 72-0314 R00, dated April 1, 2016. The service information describes procedures for reworking the fan stator module assembly on GENx-1B PIP2 engines. 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 the ADDRESSES section.

### **FAA's Determination**

We are issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

### **AD Requirements**

This AD requires revising the AFM to provide the flight crew a revised fan ice removal procedure and a new associated mandatory flight crew briefing to reduce the likelihood of engine damage due to fan ice shedding. This AD also removes certain dispatch relief. For an airplane with two GENx-1B PIP2 engines having specified model and part numbers, this AD also requires reworking or replacing at least one engine.

### **Interim Action**

We consider this AD interim action. This action addresses rework of a single engine on any airplane that has two GENx-1B PIP2 engines having certain model and part numbers. We may consider issuing further rulemaking to require rework of the remainder of the GENx-1B PIP2 engines in this fleet.

### **FAA's Justification and Determination of the Effective Date**

An unsafe condition exists that requires the immediate adoption of this AD. The FAA has found that the risk to the flying public justifies waiving notice and comment prior to adoption of this rule because susceptibility to heavy fan blade rubs could result in engine damage and a possible in-flight non-restartable power loss of one or both engines. Therefore, we find that notice and opportunity for prior public comment are impracticable and that good cause exists for making this amendment effective in less than 30 days.

## **Explanation of Compliance Times**

The FAA has evaluated the safety risk associated with this condition and has determined that in the interest of safety it is necessary to mandate three actions:

- Revise the Boeing Model 787 AFM to provide the flight crew a revised fan ice removal procedure and a new daily flight crew briefing on the existing engine ice shed procedure. The compliance time is 7 days.
- Removes certain dispatch relief, effective within 7 days.
- Rework or replacement of at least one engine, for airplanes with two GENx-1B PIP2 engines. The compliance time is about 150 calendar days after issuance of this AD. Boeing and the engine manufacturer, GE, have developed a maintenance plan to support this compliance schedule.

The FAA has determined that allowing for notice and public comment through a notice of proposed rulemaking (NPRM) prior to mandating these actions is neither practicable nor in the public interest.

Recognizing the urgency of this safety issue, this AD represents a compressed schedule to rework a large number of airplanes located around the world. Both specialized tooling and trained personnel are required on-site to perform the rework at various maintenance facilities around the world. To complete the work, 29 airlines will need to reallocate 176 airplanes from revenue service to maintenance in order to conduct the (on-wing) rework. The FAA has determined that 150 days is the minimum time to rework one engine per airplane on the entire fleet.

Issuing an NPRM would require time to allow for public comment, and time for the FAA to consider and respond to those comments. As a result, the time allowed for the operators to perform the engine rework would be significantly reduced from 150 days, owing to the time that elapsed during the notice and comment period.

As a result, the considerable reduction in allowable compliance time would require operators to perform the rework significantly out of sequence with the maintenance schedule plan. In some cases, airplanes could be grounded. Thus, the reduced compliance time could substantially disrupt certain operators. The FAA considers that this is neither practicable nor in the public interest.

**Comments Invited**

This AD is a final rule that involves requirements affecting flight safety and was not preceded by notice and an opportunity for public comment. However, we invite you to send any written data, views, or arguments about this AD. Send your comments to an address listed under the ADDRESSES section. Include the docket number FAA-2016-5592 and Directorate Identifier 2016-NM-040-AD at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this AD. We will consider all comments received by the closing date and may amend this AD because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this AD.

**Costs of Compliance**

We estimate that this AD affects 43 airplanes of U.S. registry. We estimate 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>
AFM revisions	1 work-hour X \$85 per hour = \$85	\$0	\$85	\$3,655
Rework	40 work-hours X \$85 per hour = \$3,400	\$0	\$3,400	\$146,200

### **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, 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):

**2016-08-12 The Boeing Company:** Amendment 39-18488; Docket No. FAA-2016-5592; Directorate Identifier 2016-NM-040-AD.

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

This AD is effective [INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

This AD affects AD 2016-06-08, Amendment 39-18439 (81 FR 14704, March 18, 2016) (“AD 2016-06-08”).

#### **(c) Applicability**

This AD applies to The Boeing Company Model 787-8 and 787-9 airplanes, certificated in any category, powered by General Electric (GE) GEnx-1B engines.

#### **(d) Subject**

Air Transport Association (ATA) of America Code 72, engines.

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

This AD was prompted by a recent engine fan blade rub event that caused an in-flight non-restartable power loss. We are issuing this AD to prevent susceptibility to

heavy fan blade rubs, which could result in engine damage and a possible in-flight non-restartable power loss of one or both engines.

**(f) Compliance**

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

**(g) Airplane Flight Manual (AFM) Revision: Certificate Limitations**

Within 7 days after the effective date of this AD, revise the Certificate Limitations chapter of the applicable Boeing 787 AFM to include the statement provided in figure 1 to paragraph (g) of this AD. This may be done by inserting a copy of this AD into the AFM. Once accomplished, the AFM revision required by this paragraph terminates the requirements of paragraph (g) of AD 2016-06-08, and the AFM revision required by paragraph (g) of AD 2016-06-08 must be removed from the AFM.

**Figure 1 to Paragraph (g) of this AD**

**Engine Operational Limits**

***Cold Weather Operations Fan Ice Removal* (required by AD 2016-08-12)**

In order to avoid possible fan damage and engine failure, when an Engine Anti-Ice (EAI) EICAS indication is shown above 12,500 feet MSL, the flight crew must comply with the Cold Weather Operations Fan Ice Removal procedure contained in the Operating Procedures chapter of this manual.

**Fan Ice Removal Procedure briefing (required by AD 2016-08-12)**

The Fan Ice Removal Procedure briefing contained in the Operating Procedures chapter of this manual must be briefed before engine start for the first flight of the day, and whenever an unbriefed pilot crewmember joins the flight deck crew.

**(h) AFM Revision: Operating Procedures**

Within 7 days after the effective date of this AD, revise the Operating Procedures chapter of the Boeing 787 AFM to include the statement provided in figure 2 to paragraph (h) of this AD. This may be done by inserting a copy of this AD into the AFM. Once accomplished, the AFM revision required by this AD terminates the requirements of paragraph (h) of AD 2016-06-08, and the AFM revision required by paragraph (h) of AD 2016-06-08 must be removed from the AFM.

**Figure 2 to Paragraph (h) of this AD**

**Cold Weather Operations –  
Fan Ice Removal Procedure (required by AD 2016-08-12)**

This procedure is required when in icing conditions above 12,500 feet MSL by the Engine Operational Limits Cold Weather Operations Fan Ice Removal limitation contained in the Certificate Limitations chapter of this manual. The language below shall not be modified.

When an EAI EICAS indication is shown with N1 settings below 85%, or when fan icing is suspected due to high engine vibration, the fan blades must be cleared of any ice. Do the following procedure every 5 minutes on both engines, one engine at a time: Increase to a minimum of 85% N1 momentarily, then resume normal operation.

**Fan Ice Removal Procedure briefing (required by AD 2016-08-12)**

The following briefing is important to ensure the flightcrew understands the importance of complying with the revised Fan Ice Removal procedure. This is also necessary to remind the crew that they will need to monitor, and react to an indication not normally used for any crew action but now requires timely, mandatory crew actions.

The briefing must include the following items:

- Whenever airborne above 12,500 feet MSL and either or both Engine Anti Ice (EAI) EICAS indication show and N1 is below 85%:
  1. Immediately start a timer.
  2. At 5-minute intervals accelerate each engine to at least 85% N1 momentarily, one engine at a time.
  3. Continue this procedure as long as the EAI indication remains shown.
  4. If EAI indicator(s) blank before the 5-minute interval, perform a fan ice clearance procedure per step 2 above, then resume normal operation.
- Perform the “Fan Ice Removal” procedure any time fan ice is suspected due to high engine vibrations.

**(i) Removal of Certain Dispatch Relief**

As of 7 days after the effective date of this AD: Notwithstanding the provisions of the operator's minimum equipment list (MEL), dispatch of an airplane is prohibited unless the equipment specified in paragraph (i)(1) and (i)(2) is operational.

(1) At least one Engine Anti-Ice (EAI) Indication.

(2) At least one Ice Detector.

**(j) Engine Rework or Replacement**

For an airplane powered by two engines having any model number GENx-1B64/P2, -1B67/P2, -1B70/P2, -1B70C/P2, -1B70/75/P2, or -1B74/75/P2, and any GENx engine assembly part number 2447M10G01 or 2447M10G02: Before October 1, 2016, do the actions specified by paragraph (j)(1) or (j)(2) of this AD.

(1) Rework at least one engine in accordance with paragraph 3.B. or 3.C. of the Accomplishment Instructions of GE GENx-1B Service Bulletin 72-0309 R00, dated March 11, 2016; or paragraph 3.B. or 3.C. of the Accomplishment Instructions of GE GENx-1B Service Bulletin 72-0314 R00, dated April 1, 2016. Although GE GENx Service Bulletins GENx-1B 72-0314 R00, dated April 1, 2016; and GENx-1B 72-0309 R00, dated March 11, 2016; specify submitting certain tip clearance measurements to GE, no report is required by this AD.

(2) Remove at least one engine and replace with an engine that is eligible for installation that is not identified in the introductory text to paragraph (j) of this AD.

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

(1) The Manager, Seattle Aircraft Certification Office (ACO), 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 ACO, send it to the attention of the person identified in

paragraph (l) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@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.

(3) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration required by this AD if it is approved by the Boeing Commercial Airplanes Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

**(l) Related Information**

For more information about this AD, contact Sue Lucier, Aerospace Engineer, Propulsion Branch, ANM-140S, FAA, Seattle ACO, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6438; fax: 425-917-6590; email: Suzanne.Lucier@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.

(3) The following service information was approved for IBR on [INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(i) GE GEnx-1B Service Bulletin 72-0314 R00, dated April 1, 2016.

(ii) Reserved.

(4) The following service information was approved for IBR on March 18, 2016 (81 FR 14704, March 18, 2016).

(i) GE GENx-1B Service Bulletin 72-0309 R00, dated March 11, 2016.

(ii) Reserved.

(5) For service information identified in this AD, contact General Electric Company, GE Aviation, Room 285, 1 Neumann Way, Cincinnati, OH 45215; phone: 513-552-3272; email: aviation.fleetsupport@ge.com.

(6) You may view this service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

(7) 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, call 202-741-6030, or go to <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Burlington, Massachusetts, on April 7, 2016.

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

Issued in Renton, Washington, on April 12, 2016.

Victor Wicklund, Acting Manager,  
Transport Airplane Directorate,  
Aircraft Certification Service.  
[FR Doc. 2016-09000 Filed: 4/21/2016 8:45 am; Publication Date: 4/22/2016]