



## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

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

**[Docket No. FAA-2023-2234; Project Identifier AD-2023-00963-T]**

**RIN 2120-AA64**

#### **Airworthiness Directives; The Boeing Company Airplanes**

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

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The FAA proposes to adopt a new airworthiness directive (AD) for all The Boeing Company Model 737-600, -700, -700C, -800, -900, and -900ER series airplanes. This proposed AD was prompted by two engine fan blade-out (FBO) events that resulted in the separation of engine inlet cowl and fan cowl parts from the airplane. In one event, fan cowl parts damaged the fuselage, which caused loss of pressurization and subsequent emergency descent. This proposed AD would require replacing the fasteners on the fan cowl support beam hinge fittings for certain airplanes and, for all airplanes, would require modifying the radial restraint assembly and installing an external doubler at the starter vent, or as an option, installing a serviceable fan cowl. This proposed AD would also require revising the existing maintenance or inspection program, as applicable, to incorporate new airworthiness limitations. The FAA is proposing this AD to address the unsafe condition on these products.

**DATES:** The FAA must receive comments on this proposed 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 [regulations.gov](https://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: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

*AD Docket:* You may examine the AD docket at [regulations.gov](https://www.regulations.gov) under Docket No. FAA-2023-2234; 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 NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

*Material Incorporated by Reference:*

- For service information identified in this NPRM, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; website [myboeingfleet.com](https://myboeingfleet.com).

- You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195. It is also available at [regulations.gov](https://www.regulations.gov) by searching for and locating Docket No. FAA-2023-2234.

**FOR FURTHER INFORMATION CONTACT:** Luis Cortez-Muniz, Aviation Safety Engineer, FAA, 2200 South 216th St., Des Moines, WA 98198; telephone: 206-231-3958; email: [luis.a.cortez-muniz@faa.gov](mailto:luis.a.cortez-muniz@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Comments Invited**

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include “Docket No. FAA-2023-2234; Project Identifier AD-2023-00963-T” at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to regulations.gov, including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

### **Confidential Business Information**

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Luis Cortez-Muniz, Aviation Safety Engineer, FAA, 2200 South 216th St., Des Moines, WA 98198; telephone: 206-231-3958; email: [luis.a.cortez-muniz@faa.gov](mailto:luis.a.cortez-muniz@faa.gov). Any commentary that the

FAA receives that is not specifically designated as CBI will be placed in the public docket for this rulemaking.

## **Background**

The FAA received two reports of engine events that resulted in the separation of engine inlet cowl and fan cowl parts from the airplane. One event occurred in August 2016 on a Boeing Model 737-700 series airplane powered by a CFM56-7B engine. The left engine failed due to the FBO but the airplane landed successfully. The second event occurred on April 17, 2018, on a Boeing Model 737-700 series airplane powered by a CFM56-7B engine. In that event, an FBO occurrence resulted in the release of fan cowl parts and the engine cowling departing the airplane. The fan cowl parts damaged the fuselage, which caused loss of pressurization and subsequent emergency descent. Although the airplane landed safely, there was one passenger fatality. In that event, the suspected cause of the FBO occurrence was a low-cycle fatigue crack in the dovetail of fan blade number 13 of engine number 1. The broken fan blade hit the engine fan case at a critical location causing a significant impulse, displacement, and imbalance of the fan rotor effecting the structural integrity of the engine cowling.

In response to these events, the FAA issued two AD actions for the CFM International S.A. (CFM) Model CFM56-7B engines. The FAA issued emergency AD 2018-09-51, Amendment 39-19287 (83 FR 23794, May 23, 2018) (AD 2018-09-51), which requires a one-time ultrasonic inspection of the concave and convex sides of the fan blade dovetail. The FAA also issued AD 2018-26-01, Amendment 39-19531 (83 FR 66090, December 26, 2018) (AD 2018-26-01), which requires initial and repetitive inspections of the concave and convex sides of the fan blade dovetail to detect cracking and replacement of any blades found. The FAA issued AD 2018-09-51 to address fan blade failure due to cracking, which could result in an engine in-flight shutdown (IFSD), uncontained release of debris, damage to the engine, damage to the airplane, and possible

airplane decompression. The FAA issued AD 2018-26-01 to address failure of the fan blade, which could result in the engine inlet cowl disintegrating and debris penetrating the fuselage, causing a loss of pressurization, and prompting an emergency descent.

Since AD 2018-09-51 and AD 2018-26-01 were issued, the FAA has determined further rulemaking is necessary to reduce the probability of unsecured nacelle components, should an engine fan blade failure occur. As evidenced by Exemption No. 19212, dated July 13, 2022 (Docket No. FAA-2023-2234), Boeing developed modifications to the inlet cowl, fan cowl, and exhaust nozzle that must be accomplished prior to July 31, 2028. Boeing petitioned and the FAA later agreed to amend Exemption No. 19212 to 19212A, which added a requirement that solutions to address potential maintenance errors must be incorporated prior to December 31, 2029. However, to implement these design changes, the FAA must issue rulemaking to address the unsafe condition.

This proposed AD would address fan cowls that are not strengthened, which could, in the event of an FBO occurrence, depart the nacelle potentially damaging a stabilizer, or the fan cowl could strike the fuselage and window. The unsafe condition, if not addressed, could result in loss of control of the airplane, or in a rapid decompression and hazard to window-seated passengers aft of the wing.

### **FAA's Determination**

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

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

The FAA reviewed Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023. This service information specifies procedures for replacing, for certain airplanes, the fasteners on the fan cowl support beam hinge fittings

on the left and right engine strut, and, for engine 1 and engine 2 for all airplanes, modifying the radial restraint assembly and installing an external doubler at the starter vent, or as an option, installing a serviceable fan cowl.

The service information also requires revision of the operator's maintenance or inspection program, as applicable, by incorporating certain airworthiness limitations (AWLs).

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.

### **Proposed AD Requirements in this NPRM**

This proposed AD would require accomplishing the actions specified in the service information already described, except as discussed under "Differences Between this Proposed AD and the Service Information" and except for any differences identified as exceptions in the regulatory text of this proposed AD. For information on the procedures and compliance times, see this service information at regulations.gov under Docket No. FAA-2023-2234.

This proposed AD would require revisions to certain operator maintenance documents to include new airworthiness limitations. Compliance with these limitations is required by 14 CFR 91.403(c). For airplanes that have been previously modified, altered, or repaired in the areas addressed by this proposed AD, the operator may not be able to accomplish the actions described in the revisions. In this situation, to comply with 14 CFR 91.403(c), the operator must request approval for an alternative method of compliance according to paragraph (j) of this proposed AD.

### **Differences Between this Proposed AD and the Service Information**

Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023, identifies "System Airworthiness Limitation NO. 2 - Fan Blade Out Conditions,"

and “System Airworthiness Limitation NO. 3 - Fan Blade Out Conditions” as the airworthiness limitations that must be incorporated. In addition to those system limitations, the FAA has determined that “System Airworthiness Limitation NO. 4 - Engine Nacelle Maintenance Errors” must also be incorporated as specified in paragraph (h) of this proposed AD. System Airworthiness Limitation NO. 4 specifically provides the limitation that mandates solutions to maintenance errors that must be accomplished prior to December 31, 2029, as required by Exemption No. 19212A.

**Costs of Compliance**

The FAA estimates that this AD, if adopted as proposed, would affect 1,979 airplanes of U.S. registry. The FAA estimates the following costs to comply with this proposed 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>
Modification and Installation	140 work-hours X \$85 per hour = \$11,900	\$1,400	\$13,300	\$26,320,700
Fastener replacement	Up to 8 work-hour X 85 per hour = 680	Up to 2,300	Up to 2,980	Up to 5,897,420

\* The option to install a serviceable fan cowl would cost up to \$16,280 per product.

The FAA has determined that revising the existing maintenance or inspection program takes an average of 90 work-hours per operator, although the agency recognizes that this number may vary from operator to operator. Since operators incorporate maintenance or inspection program changes for their affected fleet(s), the FAA has determined that a per-operator estimate is more accurate than a per-airplane estimate. Therefore, the agency estimates the average total cost per operator to be \$7,650 (90 work-hours x \$85 per work-hour).

## **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**

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would 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 this proposed regulation:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Would not affect intrastate aviation in Alaska, and
- (3) Would 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 Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 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:

**The Boeing Company:** Docket No. FAA-2023-2234; Project Identifier AD-2023-00963-T.

#### **(a) Comments Due Date**

The FAA must receive comments on this airworthiness directive (AD) by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

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

None.

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

This AD applies to all The Boeing Company Model 737-600, -700, -700C, -800, -900, and -900ER series airplanes, certificated in any category.

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

Air Transport Association (ATA) of America Code 71, Powerplant.

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

This AD was prompted by two engine fan blade-out (FBO) events that resulted in the separation of engine inlet cowl and fan cowl parts from the airplane. In one event, fan cowl parts damaged the fuselage, which caused loss of pressurization and subsequential emergency descent. The FAA is issuing this AD to address fan cowls that are not strengthened, which, in the event of an FBO occurrence, could depart the nacelle

potentially damaging a stabilizer, or the fan cowling striking the fuselage and window. The unsafe condition, if not addressed, could result in loss of control of the airplane, or in a rapid decompression and hazard to window-seated passengers aft of the wing.

**(f) Compliance**

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

**(g) Required Actions**

Except as specified by paragraph (h) of this AD: At the applicable times specified in the “Compliance” paragraph of Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023, do all applicable actions identified in, and in accordance with, the Accomplishment Instructions of Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023.

Note 1 to paragraph (g): Guidance for accomplishing the actions required by this AD can be found in Boeing Special Attention Service Bulletin 737-71-1937, dated July 27, 2023, which is referred to in Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023.

**(h) Exceptions to Service Information Specifications**

(1) Where the service information referenced in paragraph (g) of this AD specifies contacting Boeing or Collins Aerospace for repair instructions: This AD requires doing the repair before further flight using a method approved in accordance with the procedures specified in paragraph (j) of this AD.

(2) Where Tables 1 through 4 of Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023, specify incorporating 737-600/700/700C/800/900/900ER Airworthiness Limitations (AWLs) document D626A001-9-01 “System Airworthiness Limitation NO. 2 - Fan Blade Out Conditions” and “System Airworthiness Limitation NO. 3 - Fan Blade Out Conditions” into the operators’ maintenance program, this AD requires revising the existing maintenance or inspection

program, as applicable, by incorporating the information specified in Figure 1 to the introductory text of paragraph (h) of this AD into the airworthiness limitations within 90 days after the effective date of this AD, or before further flight after accomplishing the (Option 1) or (Option 2) actions in Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023, whichever occurs first.

**Figure 1 to the introductory text of paragraph (h) – System Airworthiness Limitations**

**SYSTEM AIRWORTHINESS LIMITATION No. 2**  
**FAN BLADE OUT CONDITIONS**  
All aircraft must install the following modifications: (1) engine inlets with new spacer design and increased fastener capability (2) fan cowls with new radial restraint fitting hooks, new radial restraint clips, and an external doubler at the starter vent (3) fan cowl support beam fastener changes (except for 737-900ER aircraft, because the fan cowl support beam fastener changes are already incorporated). All aircraft that have not incorporated these modifications cannot operate past July 31, 2028 unless upgraded to new hardware that is fully compliant to §§25.901(c) and Appendix K25.1.1 to Part 25. Boeing will release all service data to allow retrofit of hardware updates to the CFM56-7B nacelle prior to that date.

**SYSTEM AIRWORTHINESS LIMITATION No. 3**  
**FAN BLADE OUT CONDITIONS**  
All aircraft delivered without the Performance Improvement Package (PIP) must install engine exhaust nozzle structural stiffening elements. All aircraft that have not incorporated these modifications cannot operate past July 31, 2028 unless upgraded to new hardware that is fully compliant to §§25.901(c) and Appendix K25.1.1 to Part 25. Boeing will release all service data to allow retrofit of hardware updates to the CFM56-7B nacelle prior to that date.

**SYSTEM AIRWORTHINESS LIMITATION No. 4**  
**ENGINE NACELLE MAINTENANCE ERRORS**  
All aircraft must incorporate solutions to address potential maintenance errors, e.g., the failure to completely latch the fan cowl or the fan cowl integrated drive generator (IDG) door. All aircraft that have not incorporated changes to become fully compliant with §§25.901(c) and Appendix K25.1.1 to Part 25 cannot be operated past December 31, 2029.

**(i) No Alternative Actions**

After the existing maintenance or inspection program has been revised as required by paragraph (h)(2) of this AD, no alternative actions may be used unless the actions are approved as an alternative method of compliance (AMOC) in accordance with the procedures specified in paragraph (j) of this AD.

**(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 responsible Flight Standards Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (k) 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 responsible Flight Standards 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 Company Organization Designation Authorization (ODA) that has been authorized by the Manager, AIR-520, Continued Operational Safety Branch, FAA, 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.

**(k) Related Information**

For more information about this AD, contact Luis Cortez-Muniz, Aviation Safety Engineer, FAA, 2200 South 216th St., Des Moines, WA 98198; telephone: 206-231-3958; email: luis.a.cortez-muniz@faa.gov.

**(l) 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) Boeing Special Attention Requirements Bulletin 737-71-1937 RB, dated July 27, 2023.

(ii) [Reserved]

(3) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; website [myboeingfleet.com](http://myboeingfleet.com).

(4) You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195.

(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 December 1, 2023.

Victor Wicklund,  
Deputy Director, Compliance & Airworthiness Division,  
Aircraft Certification Service.  
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