
AIRWORTHINESS DIRECTIVE

For the reasons set out in the background section, the CASA delegate whose signature appears below revokes Airworthiness Directive (AD) AD/B747/277 Amdt 1 and issues the following AD under subregulation 39.1 (1) of CASR 1998. The AD requires that the action set out in the requirement section (being action that the delegate considers necessary to correct the unsafe condition) be taken in relation to the aircraft or aeronautical product mentioned in the applicability section: (a) in the circumstances mentioned in the requirement section; and (b) in accordance with the instructions set out in the requirement section; and (c) at the time mentioned in the compliance section.

Boeing 747 Series Aeroplanes

AD/B747/277 Thrust Reverser Inspections and Tests 1/2004 **Amdt 2**

Applicability: Boeing Model B747-400 series aeroplanes powered by Pratt & Whitney PW 4000 series engines, General Electric CF6-80C2 series engines or Rolls Royce RB211-524G/H series engines.

Requirement: *Note 1: See “Terminating Action” section of AD/B747/230 Amdt 1 and AD/B747/250 Amdt 1.*

1. Pratt & Whitney PW4000 series engines:
 - a. Carry out an inspection to detect damage to the bullnose seal on the translating sleeve of the thrust reverser, and perform a test of the lock mechanism of the centre locking actuator, in accordance with the Accomplishment Instructions contained in:
 - Boeing Service Bulletin (SB) 747-78-2112, dated 11 November 1993, or
 - Boeing Alert SB 747-78A2112 Revision 1, dated 7 March 1994.
 - b. Repeat the inspection and tests of Requirement 1(a).
 - c. Carry out inspections and functional tests of the thrust reverser control and indication systems in accordance with the Accomplishment Instructions in Service Bulletins listed in Requirement 1(a).
 - d. Repeat the inspection and tests of Requirement 1(c).

Compliance with AD/B747/250 Amdt 1 is terminating action for Requirement 1.

2. General Electric CF6-80C2 series engines:
 - a. Carry out an inspection to detect damage to the bullnose seal on the translating sleeve of the thrust reverser, and a continuity test of the position switch module of the Centre Drive Unit (CDU) and a cone brake test of the CDU, in accordance with the Accomplishment Instructions contained in:
 - Boeing Service Bulletin (SB) 747-78-2113, dated 11 November 1993, or

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Boeing Alert SB 747-78A2113 Revision 1, dated 10 March 1994.

- b. Repeat the inspection and tests of Requirement 2(a).
- c. Carry out inspections and functional tests of the thrust reverser control and indication systems in accordance with the Accomplishment Instructions in Service Bulletins listed in Requirement 2(a).
- d. Repeat the inspections and functional tests of Requirement 2(c).

Compliance with AD/B747/298 functional test of CDU cone break is terminating action for cone break tests in this Requirement.

Alternative Means of Compliance (AMOC):

For aeroplanes on which the intent of Boeing SB 747-78- 2151 Revision 2, dated 13 January 2000, was accomplished during production, or retrofitted subsequently, and implementing the periodic checks of both the electro-mechanical brake/lock and Centre Drive Unit (CDU) cone brake as detailed in FAA Alternative Means of Compliance (AMOC) document, reference 99-140S-295, dated 13 August 1999, is an alternative means of compliance to Requirement 2 of this Directive.

3. Rolls-Royce RB211-524G/H series engines:
 - a. Carry out inspections and functional tests of the thrust reverser control and indication systems in accordance with paragraphs III.D. to III.K. of the Accomplishment Instructions of Boeing Service Bulletin 747-78-2115, dated 28 October 1993; or paragraphs III.D. to III.L. of the Accomplishment Instructions of Boeing Alert Service Bulletin 747-78A2115 Revision 1, dated 4 March 1994.

- b. Repeat the inspections and functional tests of Requirement 3(a).

Compliance with AD/B747/230 Amdt 1 is terminating action for all of Requirement 3.

4. If any of the inspections and/or functional tests required by this Airworthiness Directive cannot be successfully carried out, or if any discrepancy is found during those inspections and/or functional tests, correct the discrepancy found in accordance with:
 - a. For Pratt & Whitney PW4000 series engines: Boeing Service Bulletin (SB) 747-78-2112, dated 11 November 1993, or Boeing Alert SB 747-78A2112 Revision 1, dated 7 March 1994.

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- b. For General Electric CF6-80C2 series engines: Boeing Service Bulletin 747-78-2113, dated 11 November 1993, or Boeing Alert Service Bulletin 747-78A2113 Revision 1, dated 10 March 1994.
 - c. For Rolls-Royce RB211-524G/H series engines: Boeing Service Bulletin 747-78-2115, dated 28 October 1993, or Boeing Alert Service Bulletin 747-78A2115 Revision 1, dated 4 March 1994.
5. If unable to comply with the requirements of Requirement 4:
- a. Operate the aeroplane in accordance with the conditions and limitations of the Minimum Equipment List (MEL), applicable to the registration mark of the aeroplane, provided the MEL only approves dispatch with:
 - (i) no more than one thrust reverser on the aeroplane inoperative; and
 - (ii) the thrust reverser is deactivated in accordance with approved maintenance data; **AND**
 - b. If the aeroplane is operated in accordance with Requirement 5(a), repair the thrust reverser in accordance with the applicable Service Bulletins listed in Requirement 4; **AND**
 - c. Repeat the inspections and tests after repair under Requirement 5(b) that were not carried out under Requirement 4; **AND**
 - d. Carry out Requirement 4 if any inspection or test carried out under Requirement 5(c) was unsuccessful.

Note 2: FAA AD 94-15-05 and FAA Alternative Means of Compliance (AMOC) document reference 99-140s-295, dated 13 August 1999, issued by the FAA Transport Airplane Directorate, Aircraft Certification Section, Renton, Washington, refer.

Compliance: For Requirement 1(a): Prior to issue of Certificate of Airworthiness.

For Requirement 1(b): At intervals of 1,000 hours time-in-service after accomplishment of Requirement 1(a).

For Requirement 1(c): Prior to issue of Certificate of Airworthiness.

For Requirement 1(d): At intervals not to exceed 18 months after accomplishment of Requirement 1(c).

For Requirement 2(a): Remains unchanged as: Within 90 days after the effective date of amendment 1 of this Directive.

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For Requirement 2(b): At intervals not to exceed 1,000 hours time-in-service after accomplishment of Requirement 2(a).

For Requirement 2(c): Remains unchanged as: Within 90 days after the effective date of amendment 1 of this Directive.

For Requirement 2(d): At intervals not exceeding 18 months after accomplishment of Requirement 2(c).

For Requirement 3(a): Remains unchanged as: Within 90 days after the effective date of amendment 1 of this Directive.

For Requirement 3(b): At intervals not exceeding 18 months after accomplishment of Requirement 3(a).

For Requirement 4: Prior to further flight.

For Requirement 5(a): Prior to further flight.

For Requirement 5(b): Within 10 days after deactivation in accordance with the provisions of Requirement 5(a).

Requirement 5(c) and (d): Prior to further flight.

This Amendment becomes effective on 22 January 2004.

Background: This amendment changes the reference to terminating actions for the CDU cone brake functional test from AD/B747/231 Amdt 1 to AD/B747/298.

This Directive was prompted by a FAA/Boeing investigation to determine the controllability of model 747 series aeroplanes following in-flight thrust reverser deployment. The actions specified in this Directive are intended to ensure the integrity of the fail-safe features of the thrust reverser system by preventing possible failure modes in the thrust reverser control system that could result in inadvertent deployment of a thrust reverser during flight.

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AD/B747/277 Amdt 2 (continued)

Amendment 1 of this Directive was issued to correct an error in the Alternate Means of Compliance paragraph of this Directive.

The original issue of this Airworthiness Directive became effective on 5 September 2002.



Jim Coyne
Delegate of the Civil Aviation Safety Authority

4 December 2003