
AIRWORTHINESS DIRECTIVE

On the effective date specified below, and for the reasons set out in the background section, the CASA delegate whose signature appears below revokes Airworthiness Directive (AD) AD/RAD/47 Amdt 1 and issues the following AD under subregulation 39.001(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.

Radio Communication and Navigation Equipment

AD/RAD/47 **Periodic Testing of ATC Transponders** **1/2011**
Amdt 2

Applicability: All Air Traffic Control transponders.

Requirement: 1. For all transponders, perform a system test in accordance with the requirements of United States of America Federal Aviation Regulations (FAR) Part 43 Appendix F.

2. For transponders utilising electron tube technology (ETT) perform the following tests to confirm:

- (a) the duration of all reply pulses (pulse width) is between 0.35 to 0.55 microseconds; and
- (b) the amplitude variation between one reply pulse and any other reply pulse is not greater than 1 dB.

Note 1: Transponders utilising ETT include, but are not limited to, Honeywell (Bendix-King) KT76A, Narco AT150 and ARC RT859.

Note 2: For the purposes of this Directive, ETT is defined as the technology that utilises physical and electrical characteristics of a physical body to oscillate and amplify a signal at its resonant frequency for subsequent broadcast. This includes thermionic valves, klystrons or cavity oscillators etc. As these components age the characteristics which provide the signal stability vary which affects the output signal.

Mode A code 2100 is to be used when carrying out the transponder tests.

3. Repair or replace any transponder that fails any of the Requirement 1 or 2 tests.

Compliance: For Requirement 1 - Within 24 calendar months after the effective date of this Amendment or within 24 calendar months after a system test was last accomplished in accordance with AD/RAD/47 Amdt 1, whichever occurs first, and thereafter at either:

- a. intervals not exceeding 24 calendar months; or
- b. intervals approved in accordance with a System of Maintenance for the aircraft pursuant to Civil Aviation Regulation 42M.

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AD/RAD/47 Amdt 2 (continued)

Note 3: Consideration should be given to aligning this inspection/test with that required by AD/RAD/43.

Note 4: Generic guidance on the testing of transponders is available in AWB 34-013 Issue 3 and AWB 34-09 Issue 1.

For Requirement 2 - Concurrently with Requirement 1 commencing at the first scheduled test after 10 January 2012.

For Requirement 3 - Before further flight after the Requirement 1 or 2 tests.

This Amendment becomes effective on 10 January 2011.

Background: This Directive was originally issued to introduce a procedure additional to the transponder self check prescribed in Civil Aviation Regulations, Schedule 5, Section 5 sub-paragraph (4)(k) and to align with the requirements of overseas civil aviation regulatory authorities.

Amendment 1 advised of a new code, compatible with air traffic control requirements, that was to be used when testing transponder systems.

Following the deployment of new Mode S radar interrogators in Australia, it was discovered that variation in the height of reply pulses transmitted by the transponder could be misinterpreted by the interrogator and this may cause the Mode A code to appear to spontaneously change during flight. This may generate short term conflict alerts to be displayed to air traffic controllers.

This amendment introduces serviceability checks to confirm that transponders utilising ETT are performing to the specifications to which they were originally certified.

The original issue of this Directive became effective on 23 July 1992.

Amendment 1 of this Directive became effective on 13 October 1994.



Mike Higgins
Delegate of the Civil Aviation Safety Authority

21 December 2010