

Cancelled by  
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# ADVISORY CIRCULAR

## DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

**SUBJECT:** ACCEPTABLE MEANS OF TESTING AUTOMATIC ALTITUDE REPORTING  
EQUIPMENT FOR COMPLIANCE WITH FAR 91.36(b)

1. PURPOSE. This advisory circular sets forth acceptable means of testing for compliance with Section 91.36(b) of the Federal Aviation Regulations (FARs).
2. CANCELLATION. Advisory Circular 20-58 dated June 10, 1968.
3. REFERENCES.
  - a. FAR 91.36(b);
  - b. FAR 37.197 (TSO-C88);
  - c. U.S. National Standard for Common System Component Characteristics for the IFF Mark X (SIF)/Air Traffic Control Radar Beacon System SIF/ATCRBS, as amended October 10, 1968;
  - d. International (ICAO) Standard Code for Secondary Surveillance radar (SSR) Pressure Altitude Transmission contained in ICAO International Standards and Recommended Practices, Aeronautical Telecommunications, Annex 10, Volume I, Part I, Equipment and Systems.
4. BACKGROUND.
  - a. The Air Traffic Control Radar Beacon System (ATCRBS) provides for automatic transmission of altitude information from aircraft to air traffic controller, thereby relieving the pressure on crowded voice communications channels, reducing the workload on both flight crew and air traffic controllers, and improving air traffic control service.

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- b. To ensure that this altitude information (if transmitted) would be useful for air traffic control purposes, FAA adopted the accuracy standard in FAR 91.36(b), which states that "no person may operate any automatic pressure altitude reporting equipment with a radar beacon transponder unless, as installed, the equipment was tested and calibrated to transmit altitude data corresponding within 125 feet (on a 95 percent probability basis) of the indicated or calibrated datum of the altimeter normally used to maintain flight altitude, with that altimeter referenced to 29.92 inches of mercury."
5. FACTORS AFFECTING THE ABILITY TO COMPLY WITH FAR 91.36(b). It may be assumed that the ATC transponder faithfully transmits the digital altitude signal it receives from the aircraft's automatic pressure altitude reporting equipment. Under this assumption, lack of correspondence between the transmitted altitude data and the altimeter display (normally used to maintain flight altitude) is generally caused by the following factors:
- a. The resolution of the transmitted altitude signal (100-foot increments) is coarse relative to the resolution of the altimeter.
  - b. An error may be introduced by the automatic pressure altitude digitizer equipment (digitizer). The digitizer is that element of the automatic pressure altitude reporting equipment which converts an input related to pressure altitude into digital altitude data for transmission by the ATC transponder.
  - c. If the aneroid supplying the pressure altitude input to the digitizer does not also supply the pressure altitude input to the altimeter (that is, if separate aneroids are used), a significant error may be introduced by differences in aneroid response, even when both aneroids are within performance tolerances.
  - d. Variations in environmental conditions (as, for example, in temperature, vibration, humidity) may affect the digitizer and the altimeter display differently.
  - e. Deterioration in service.
6. ACCEPTABLE MEANS OF TESTING FOR COMPLIANCE WITH FAR 91.36(b). Any means of testing the automatic pressure altitude reporting equipment (as installed) is acceptable if it takes into consideration the factors outlined in 5. above. Analysis may be used to supplement the tests. Several acceptable means of testing are described below:
- a. When the automatic pressure altitude reporting equipment is a combination device (digitizer and altitude display) fitting the description in Section 3.7.3 of the FAA Standard for Automatic Pressure Altitude Digitizer Equipment set forth in FAR 37.197 (TSO-C88), and

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bearing the "TSO-C88" marking, no testing is needed (other than a functional ground check upon installation) since the equipment manufacturer has already certified that the combination device meets the standard in Section 91.36(b).

b. Whether or not the automatic pressure altitude reporting equipment is a combination device fitting the description in Section 3.7.3 of the FAA Standard for Automatic Pressure Altitude Digitizer Equipment set forth in FAR 37.197 (TSO-C88), it may be tested -

(1) Under the test requirements (in that FAA Standard) which apply to combination devices, or

(2) In accordance with 7.

#### 7. SIMPLIFIED TEST PROCEDURE.

a. Procedure. With the aircraft on the ground -

(1) Set the altimeter normally used to maintain flight altitude to 29.92 inches of mercury (1013.2 millibars).

(2) Select 10 or more evenly-spaced altitude test points between zero (sea level) and the maximum operating altitude of the aircraft. Test each of these test points for increasing altitude and for decreasing altitude.

(3) Apply pressure to the static system. If separate static systems serve altimeter and digitizer, apply identical pressures simultaneously to each. Approach each test point slowly, decreasing pressure for increasing altitude, and vice versa, until a transition to the test point value occurs in the digital output. Record the pilot's altimeter reading at the instant of transition in the digitizer.

\* (4) The installation is acceptable if the altimeter normally used to maintain flight altitude corresponds with the output of the digitizer within  $\pm 125$  feet at each test point and within  $\pm 87$  feet at not less than 70 percent of the test points. \*

b. Equipment. A means should be provided to determine the altitude corresponding to the coded digital output of the digitizer. The digital coding is specified in references 2c. and 2d.

  
Acting Director  
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