



Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE STANDARD

AS 290B

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SEATS FOR FLIGHT DECK CREWMEN-TRANSPORT AIRCRAFT

1. PURPOSE

This Aerospace Standard (AS) establishes the minimum requirements for, and provides for standardization of, seats for flight deck crewmen in transport-type aircraft. In the preparation of this standard, consideration was given to the requirements of the FAA, the military specifications, and the recommendations of the airline operators and the aircraft manufacturers.

2. SCOPE

The requirements listed in Section 4 shall apply to all regularly assigned flight crew members. Due to limitations that it would place upon basic airplane design, it is not considered practical for these requirements to apply fully to the so-called jump seat. However, it should be emphasized that every effort should be made to provide the jump seat position with an equivalent level of comfort and safety.

In drawing up the requirements for the crew members' seats, the following items should be considered at all times:

- 2.1 If the crew member is comfortable in flight, he will be less susceptible to fatigue and can perform his duties in a safer and better manner.
- 2.2 It is to be considered that when the crew member is occupying his seat, he is on duty. Therefore, all seat adjustments are for the purpose of fitting the seat to the different sizes and shapes of personnel in order to enable the occupant to do his work in the most efficient and comfortable manner. Seat designs in general should be designed for 5 to 95 percentile population of airline pilots. HUMAN SCALE 1, 2, 3 (Calculator and Booklet), MIT PRESS 1975 CAMBRIDGE, MA, HENRY DREYFUSS ASSOC.

3. DEFINITIONS

- 3.1 Seat Reference Point: The term "seat reference point", as used in this text and figures, is defined as the intersection of a line tangent to the surface of the seat bottom cushion and a line through the seat back cushion representative of a back tangent line, when in a compressed state under a load of a 50th percentile person.

4. REQUIREMENTS

4.1 Vertical Adjustment:

- 4.1.1 Pilot Seats: The pilot seats shall be adjustable vertically through a range of at least 179 mm (7 in.) in increments of no greater than 12.7 mm (1/2 in.) throughout the entire range. The lowest adjustment shall place the neutral seat reference point at least 876 mm (34.5 in.) below the reference eye point as shown in Fig. 1, and the highest adjustment point no more than 699 mm (27.5 in.) below the eye reference point. It must be possible to achieve the eye level position equivalent adjustment with the seat cushion depressed.

The vertical adjustment shall incorporate a means of raising the seat freely to the maximum up-position. If a mechanical system is employed, it shall not require a lifting force of greater than 22.7 kg. (50 lb) (less is desirable) to lift a 91 kg (200 lb) person, and no additional force to lower a 57 kg (125 lb) person. Up and down travel shall be free with no binding and the mechanism shall be of such a design that it is easy to keep free.

- 4.1.2 Other Flight Crew Seats: For crew members, such as a flight engineer and navigator seated at a desk, the vertical adjustment may be reduced to 127 mm (5 in.), with the lowest position such that the reference point is 330.2 mm (13 in.) above the footrest level. Seats which move to serve more than one area in the flight deck shall have adequate vertical adjustment range to permit crew members to sit comfortably at any assigned location.
- 4.2 Angular Adjustment of Back: The seat back shall be adjustable throughout an angle of from at least 95° from seat bottom to 115° as shown in Fig. 1. The back shall be adjustable in no greater than 2° increments from the most erect position to the 105° position, and in no greater than 5° increments for the remainder for the total aft adjustment range. If the seat is to be used for rest purposes, the incline shall be 135°.
- 4.3 Angular Adjustment of Seat: The seat pan angle shall be installed to a fixed position so that the bottom shall be inclined upward with its forward edge high at an angle of 7° from a plane parallel to the visual ref. plane as defined by ARP 268E.
- 4.4 Fore and Aft Adjustment:
- 4.4.1 Pilot Seats: The seat shall be adjustable in the fore and aft direction for a distance of not less than 152 mm (6 in.) (10 in. is desirable) in increments of not more than 25.4 mm (1 inch). In all cases, the travel shall be sufficient to permit easy access to the seat and clearance with normal control movements in cruise for a 305 mm (12 in.) flight manual place on the lap. Inbd-outbd adjustment may be included to improve access to the seat. Such adjustment will occur only at the most aft position.
- 4.4.2 Other Crew Members' Seats: Seats for crew members seated at a desk with no instrument dials, etc., in front of them need not be furnished with any fore and aft adjustment provided that easy access to the seat is possible. It is desirable to provide 203 mm (8 in.) of fore and aft adjustment, perpendicular to the operator's main instrument panel, for crew members who are seated at a desk having an instrument panel and/or controls before them. The minimum acceptable adjustment shall be 102 mm (4 in.).
- 4.5 Power Operated Seats: The speed of movement should not exceed 42 mm (1.65 in.) per sec. when motorized. An immediately accessible master on/off or stall force clutch switch should be provided or other means to rapidly stop a runaway seat.
- 4.6 Arm Rests: Arm rests shall be provided on each side of the seat and shall fold to a position and remain where they will minimize interference with egress or ingress of the occupant. When in the folded position, the arm rests shall not interfere with the normal movements of the pilot in the operation of the aircraft.
- 4.6.1 Arm Rest Adjustment: The arm rest adjustment shall be a facile one-hand operation.
- 4.7 Head Rest: None required, but provisions should be made for a vertically adjustable head rest for recline angles > 30°. A head rest should be installed if the seat is to be used for crew rest.