

Pilot Visibility From The Flight Deck

1. SCOPE:

This document recommends criteria to assure adequate visibility from the flight deck. The flight deck windshield must provide sufficient external vision to permit the pilot to perform any maneuvers within the operating limits of the aircraft safely and at the same time afford an unobstructed view of the flight instruments and other critical components and displays from the same eye position.

2. REFERENCES:

2.1 Documentation:

- SAE S-7 ARP4101, Flight Deck Layout and Facilities
- SAE S-7 ARP4102, Flight Deck Panels, Controls and Displays
- SAE S-7 ARP4105, Nomenclature and Abbreviations for Use on the Flight Deck
- SAE S-7 ARP4102/8, Flight Deck, Head-Up Displays

2.2 Definitions:

2.2.1 Design Eye Position: The design eye position shall be in accordance with ARP4102. Means within the aircraft shall be provided to facilitate and guide the pilot to the design eye position. For the right seat pilot, all dimensions are opposite.

Visual field and angle measurements shall utilize ambinocular vision (total vision of both eyes).
(See Fig. 1.)

- The two eye points are placed 31.8 mm (1-1/4 in) on each side of the design eye position.

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2.2.1 (Continued):

- The eye positions are rotated in the horizontal plane from a central (vertical) axis located 84 mm (3-5/16 in) aft of the design eye position. (See Fig. 1.)
- The horizontal and vertical vision angles shall be measured from (1) a vertical plane running fore and aft through the design eye point and central axis and (2) a horizontal plane that passes through the design eye point and central axis. The horizontal and vertical reference plane shall be parallel to those corresponding to zero pitch and yaw angles.

3. OPERATIONAL REQUIREMENTS:

3.1 Clear Areas of Vision:

With the design eye position located per paragraph 2.2.1 the vision through the transparent areas shall provide the following minimum viewing angles: (See Fig. 2.)

- 3.1.1 Forward and up 35 degrees from the horizon at 40 degrees left diminishing linearly to 15 degrees up at 20 degrees right.
- 3.1.2 Forward and down 17 degrees from the horizon between 30 degrees left and 10 degrees right diminishing linearly to 10 degrees down at 20 degrees right.
- 3.1.3 Forward and up 35 degrees from the horizon between 40 degrees left and 80 degrees left diminishing linearly up to 15 degrees up at 120 degrees left.
- 3.1.4 Increasing linearly from forward and down 17 degrees from the horizon at 30 degrees left to forward and down 27 degrees from the horizon at 70 degrees left.
- 3.1.5 Forward and down 27 degrees from the horizon between 70 degrees left and 95 degrees left diminishing linearly to 15 degrees down at 120 degrees left.

3.2 Landing Vision:

In addition to the requirements of paragraph 3.1, the view angle forward and down shall be sufficient to allow the pilot to see a length of approach and/or touch down zone lights which would be covered in three seconds at landing approach speed when the aircraft is:

- (a) on a 2-1/2 degree glide slope
- (b) at a decision height which places the lowest part of the aircraft at 30.5 m (100 ft) above the touch-down zone extended horizontally
- (c) yawing to the left to compensate for ten knots crosswind
- (d) loaded to the most critical weight and center of gravity
- (e) making the approach with 366 m (1200 ft) RVR