

(b) Where the flight crew are separated from the passengers by a partition, an opening or openable window or door must be provided to facilitate communication between flight crew and the passengers; and

(c) The aerodynamic controls listed in § 23.779, excluding cables and control rods, must be located with respect to the propellers so that no part of the pilot or the controls lies in the region between the plane of rotation of any inboard propeller and the surface generated by a line passing through the center of the propeller hub making an angle of 5 degrees forward or aft of the plane of rotation of the propeller.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-14, 38 FR 31821, Nov. 19, 1973]

§ 23.773 Pilot compartment view.

(a) Each pilot compartment must be—

(1) Arranged with sufficiently extensive, clear and undistorted view to enable the pilot to safely taxi, takeoff, approach, land, and perform any maneuvers within the operating limitations of the airplane.

(2) Free from glare and reflections that could interfere with the pilot's vision. Compliance must be shown in all operations for which certification is requested; and

(3) Designed so that each pilot is protected from the elements so that moderate rain conditions do not unduly impair the pilot's view of the flight path in normal flight and while landing.

(b) Each pilot compartment must have a means to either remove or prevent the formation of fog or frost on an area of the internal portion of the windshield and side windows sufficiently large to provide the view specified in paragraph (a)(1) of this section. Compliance must be shown under all expected external and internal ambient operating conditions, unless it can be shown that the windshield and side windows can be easily cleared by the pilot without interruption of normal pilot duties.

[Doc. No. 26269, 58 FR 42165, Aug. 6, 1993]

§ 23.775 Windshields and windows.

(a) The internal panels of windshields and windows must be constructed of a nonsplintering material, such as nonsplintering safety glass.

(b) The design of windshields, windows, and canopies in pressurized airplanes must be based on factors peculiar to high altitude operation, including—

(1) The effects of continuous and cyclic pressurization loadings;

(2) The inherent characteristics of the material used; and

(3) The effects of temperatures and temperature gradients.

(c) On pressurized airplanes, if certification for operation up to and including 25,000 feet is requested, an enclosure canopy including a representative part of the installation must be subjected to special tests to account for the combined effects of continuous and cyclic pressurization loadings and flight loads, or compliance with the fail-safe requirements of paragraph (d) of this section must be shown.

(d) If certification for operation above 25,000 feet is requested the windshields, window panels, and canopies must be strong enough to withstand the maximum cabin pressure differential loads combined with critical aerodynamic pressure and temperature effects, after failure of any load-carrying element of the windshield, window panel, or canopy.

(e) The windshield and side windows forward of the pilot's back when the pilot is seated in the normal flight position must have a luminous transmittance value of not less than 70 percent.

(f) Unless operation in known or forecast icing conditions is prohibited by operating limitations, a means must be provided to prevent or to clear accumulations of ice from the windshield so that the pilot has adequate view for taxi, takeoff, approach, landing, and to perform any maneuvers within the operating limitations of the airplane.

(g) In the event of any probable single failure, a transparency heating system must be incapable of raising the temperature of any windshield or window to a point where there would be—

(1) Structural failure that adversely affects the integrity of the cabin; or

(2) There would be a danger of fire.

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(h) In addition, for commuter category airplanes, the following applies:

(1) Windshield panes directly in front of the pilots in the normal conduct of their duties, and the supporting structures for these panes, must withstand, without penetration, the impact of a two-pound bird when the velocity of the airplane (relative to the bird along the airplane's flight path) is equal to the airplane's maximum approach flap speed.

(2) The windshield panels in front of the pilots must be arranged so that, assuming the loss of vision through any one panel, one or more panels remain available for use by a pilot seated at a pilot station to permit continued safe flight and landing.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-7, 34 FR 13092, Aug. 13, 1969; Amdt. 23-45, 58 FR 42165, Aug. 6, 1993; 58 FR 51970, Oct. 5, 1993; Amdt. 23-49, 61 FR 5166, Feb. 9, 1996]

§ 23.777 Cockpit controls.

(a) Each cockpit control must be located and (except where its function is obvious) identified to provide convenient operation and to prevent confusion and inadvertent operation.

(b) The controls must be located and arranged so that the pilot, when seated, has full and unrestricted movement of each control without interference from either his clothing or the cockpit structure.

(c) Powerplant controls must be located—

(1) For multiengine airplanes, on the pedestal or overhead at or near the center of the cockpit;

(2) For single and tandem seated single-engine airplanes, on the left side console or instrument panel;

(3) For other single-engine airplanes at or near the center of the cockpit, on the pedestal, instrument panel, or overhead; and

(4) For airplanes, with side-by-side pilot seats and with two sets of powerplant controls, on left and right consoles.

(d) The control location order from left to right must be power (thrust) lever, propeller (rpm control), and mixture control (condition lever and fuel cutoff for turbine-powered airplanes). Power (thrust) levers must be at least

one inch higher or longer to make them more prominent than propeller (rpm control) or mixture controls. Carburetor heat or alternate air control must be to the left of the throttle or at least eight inches from the mixture control when located other than on a pedestal. Carburetor heat or alternate air control, when located on a pedestal must be aft or below the power (thrust) lever. Supercharger controls must be located below or aft of the propeller controls. Airplanes with tandem seating or single-place airplanes may utilize control locations on the left side of the cabin compartment; however, location order from left to right must be power (thrust) lever, propeller (rpm control) and mixture control.

(e) Identical powerplant controls for each engine must be located to prevent confusion as to the engines they control.

(1) Conventional multiengine powerplant controls must be located so that the left control(s) operates the left engine(s) and the right control(s) operates the right engine(s).

(2) On twin-engine airplanes with front and rear engine locations (tandem), the left powerplant controls must operate the front engine and the right powerplant controls must operate the rear engine.

(f) Wing flap and auxiliary lift device controls must be located—

(1) Centrally, or to the right of the pedestal or powerplant throttle control centerline; and

(2) Far enough away from the landing gear control to avoid confusion.

(g) The landing gear control must be located to the left of the throttle centerline or pedestal centerline.

(h) Each fuel feed selector control must comply with § 23.995 and be located and arranged so that the pilot can see and reach it without moving any seat or primary flight control when his seat is at any position in which it can be placed.

(1) For a mechanical fuel selector:

(i) The indication of the selected fuel valve position must be by means of a pointer and must provide positive identification and feel (detent, etc.) of the selected position.