§ 25.1421 Identification of conditions conducive to airframe icing as defined by an appropriate static or total air temperature and visible moisture for use by the flightcrew to activate the airframe ice protection system.

(f) Unless the applicant shows that the airframe ice protection system need not be operated during specific phases of flight, the requirements of paragraph (e) of this section are applicable to all phases of flight.

(g) After the initial activation of the airframe ice protection system:

(1) The ice protection system must be designed to operate continuously;

(2) The airplane must be equipped with a system that automatically cycles the ice protection system; or

(3) An ice detection system must be provided to alert the flightcrew each time the ice protection system must be cycled.

(h) Procedures for operation of the ice protection system, including activation and deactivation, must be established and documented in the Airplane Flight Manual.


§ 25.1421 Megaphones.

If a megaphone is installed, a restraining means must be provided that is capable of restraining the megaphone when it is subjected to the ultimate inertia forces specified in § 25.561(b)(3).

[Amdt. 25–41, 42 FR 36970, July 18, 1977]

§ 25.1423 Public address system.

A public address system required by this chapter must—

(a) Be powerable when the aircraft is in flight or stopped on the ground, after the shutdown or failure of all engines and auxiliary power units, or the disconnection or failure of all power sources dependent on their continued operation, for—

(1) A time duration of at least 10 minutes, including an aggregate time duration of at least 5 minutes of announcements made by flight and cabin crewmembers, considering all other loads which may remain powered by the same source when all other power sources are inoperative; and

(2) An additional time duration in its standby state appropriate or required for any other loads that are powered by the same source and that are essential to safety of flight or required during emergency conditions.

(b) Be capable of operation within 3 seconds from the time a microphone is removed from its stowage.

(c) Be intelligible at all passenger seats, lavatories, and flight attendant seats and work stations.

(d) Be designed so that no unused, unstowed microphone will render the system inoperative.

(e) Be capable of functioning independently of any required crewmember interphone system.

(f) Be accessible for immediate use from each of two flight crewmember stations in the pilot compartment.

(g) For each required floor-level passenger emergency exit which has an adjacent flight attendant seat, have a microphone which is readily accessible to the seated flight attendant, except that one microphone may serve more than one exit, provided the proximity of the exits allows unassisted verbal communication between seated flight attendants.

Federal Aviation Administration, DOT

§ 25.1433 Vacuum systems.

There must be means, in addition to the normal pressure relief, to automatically relieve the pressure in the discharge lines from the vacuum air pump when the delivery temperature of the air becomes unsafe.


§ 25.1435 Hydraulic systems.

(a) Element design. Each element of the hydraulic system must be designed to:

(1) Withstand the proof pressure without permanent deformation that would prevent it from performing its intended functions, and the ultimate pressure without rupture. The proof and ultimate pressures are defined in terms of the design operating pressure (DOP) as follows:

<table>
<thead>
<tr>
<th>Element</th>
<th>Proof (xDOP)</th>
<th>Ultimate (xDOP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tubes and fittings..........</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>2. Pressure vessels containing gas:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High pressure (e.g., accumulators)</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Low pressure (e.g., reservoirs)</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>3. Hoses</td>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>4. All other elements..........</td>
<td>1.5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

(2) Withstand, without deformation that would prevent it from performing its intended function, the design operating pressure in combination with limit structural loads that may be imposed;

(3) Withstand, without rupture, the design operating pressure multiplied by a factor of 1.5 in combination with ultimate structural load that can reasonably occur simultaneously;

(4) Withstand the fatigue effects of all cyclic pressures, including transients, and associated externally induced loads, taking into account the consequences of element failure; and

(5) Perform as intended under all environmental conditions for which the airplane is certificated.

(b) System design. Each hydraulic system must:

(1) Have means located at a flightcrew station to indicate appropriate system parameters, if

(i) It performs a function necessary for continued safe flight and landing; or

(ii) In the event of hydraulic system malfunction, corrective action by the crew to ensure continued safe flight and landing is necessary;

(2) Have means to ensure that system pressures, including transient pressures and pressures from fluid volumetric changes in elements that are likely to remain closed long enough for such changes to occur, are within the design capabilities of each element, such that they meet the requirements defined in §25.1435(a)(1) through (a)(5);

(3) Have means to minimize the release of harmful or hazardous concentrations of hydraulic fluid or vapors into the crew and passenger compartments during flight;

(4) Meet the applicable requirements of §§25.863, 25.1183, 25.1185, and 25.1189 if a flammable hydraulic fluid is used; and

(5) Be designed to use any suitable hydraulic fluid specified by the airplane manufacturer, which must be identified by appropriate markings as required by §25.1541.

(c) Tests. Tests must be conducted on the hydraulic system(s), and/or subsystem(s) and elements, except that analysis may be used in place of or to supplement testing, where the analysis is shown to be reliable and appropriate. All internal and external influences must be taken into account to an extent necessary to evaluate their effects, and to assure reliable system and element functioning and integration. Failure or unacceptable deficiency of an element or system must be corrected and be sufficiently retested, where necessary.

(1) The system(s), subsystem(s), or element(s) must be subjected to performance, fatigue, and endurance tests representative of airplane ground and flight operations.

(2) The complete system must be tested to determine proper functional performance and relation to the other systems, including simulation of relevant failure conditions, and to support or validate element design.