

## Federal Aviation Administration, DOT

## § 23.301

and when takeoffs and landings are performed on unpaved runways having the roughest surface that may reasonably be expected in normal operation.

[Doc. No. 27807, 61 FR 5192, Feb. 9, 1996]

### § 23.237 Operation on water.

A wave height, demonstrated to be safe for operation, and any necessary water handling procedures for seaplanes and amphibians must be established.

[Doc. No. 27807, 61 FR 5192, Feb. 9, 1996]

### § 23.239 Spray characteristics.

Spray may not dangerously obscure the vision of the pilots or damage the propellers or other parts of a seaplane or amphibian at any time during taxiing, takeoff, and landing.

#### MISCELLANEOUS FLIGHT REQUIREMENTS

### § 23.251 Vibration and buffeting.

There must be no vibration or buffeting severe enough to result in structural damage, and each part of the airplane must be free from excessive vibration, under any appropriate speed and power conditions up to  $V_D/M_D$ . In addition, there must be no buffeting in any normal flight condition severe enough to interfere with the satisfactory control of the airplane or cause excessive fatigue to the flight crew. Stall warning buffeting within these limits is allowable.

[Doc. No. 26269, 58 FR 42159, Aug. 6, 1993]

### § 23.253 High speed characteristics.

If a maximum operating speed  $V_{MO}/M_{MO}$  is established under § 23.1505(c), the following speed increase and recovery characteristics must be met:

(a) Operating conditions and characteristics likely to cause inadvertent speed increases (including upsets in pitch and roll) must be simulated with the airplane trimmed at any likely speed up to  $V_{MO}/M_{MO}$ . These conditions and characteristics include gust upsets, inadvertent control movements, low stick force gradients in relation to control friction, passenger movement, leveling off from climb, and descent from Mach to airspeed limit altitude.

(b) Allowing for pilot reaction time after occurrence of the effective inher-

ent or artificial speed warning specified in § 23.1303, it must be shown that the airplane can be recovered to a normal attitude and its speed reduced to  $V_{MO}/M_{MO}$ , without—

(1) Exceeding  $V_D/M_D$ , the maximum speed shown under § 23.251, or the structural limitations; or

(2) Buffeting that would impair the pilot's ability to read the instruments or to control the airplane for recovery.

(c) There may be no control reversal about any axis at any speed up to the maximum speed shown under § 23.251. Any reversal of elevator control force or tendency of the airplane to pitch, roll, or yaw must be mild and readily controllable, using normal piloting techniques.

[Amdt. 23-7, 34 FR 13087, Aug. 13, 1969; as amended by Amdt. 23-26, 45 FR 60170, Sept. 11, 1980; Amdt. 23-45, 53 FR 42160, Aug. 6, 1993; Amdt. 23-50, 61 FR 5192, Feb. 9, 1996]

## Subpart C—Structure

### GENERAL

### § 23.301 Loads.

(a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads.

(b) Unless otherwise provided, the air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the airplane. These loads must be distributed to conservatively approximate or closely represent actual conditions. Methods used to determine load intensities and distribution on canard and tandem wing configurations must be validated by flight test measurement unless the methods used for determining those loading conditions are shown to be reliable or conservative on the configuration under consideration.

(c) If deflections under load would significantly change the distribution of external or internal loads, this redistribution must be taken into account.

(d) Simplified structural design criteria may be used if they result in design loads not less than those prescribed in §§ 23.331 through 23.521. For