

$n_f$  = the load factor developed in the drop test (that is, the acceleration ( $dv/dt$ ) in  $gs$  recorded in the drop test) plus 1.0; and  $W_e$ ,  $W$ , and  $L$  are the same as in the drop test computation.

(f) The value of  $n$  determined in accordance with paragraph (e) may not be more than the limit inertia load factor used in the landing conditions in § 23.473.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-7, 34 FR 13091, Aug. 13, 1969; Amdt. 23-48, 61 FR 5148, Feb. 9, 1996]

#### § 23.726 Ground load dynamic tests.

(a) If compliance with the ground load requirements of §§ 23.479 through 23.483 is shown dynamically by drop test, one drop test must be conducted that meets § 23.725 except that the drop height must be—

(1) 2.25 times the drop height prescribed in § 23.725(a); or

(2) Sufficient to develop 1.5 times the limit load factor.

(b) The critical landing condition for each of the design conditions specified in §§ 23.479 through 23.483 must be used for proof of strength.

[Amdt. 23-7, 34 FR 13091, Aug. 13, 1969]

#### § 23.727 Reserve energy absorption drop test.

(a) If compliance with the reserve energy absorption requirement in § 23.723(b) is shown by free drop tests, the drop height may not be less than 1.44 times that specified in § 23.725.

(b) If the effect of wing lift is provided for, the units must be dropped with an effective mass equal to  $W_e = Wh/(h+d)$ , when the symbols and other details are the same as in § 23.725.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-7, 34 FR 13091, Aug. 13, 1969]

#### § 23.729 Landing gear extension and retraction system.

(a) *General.* For airplanes with retractable landing gear, the following apply:

(1) Each landing gear retracting mechanism and its supporting structure must be designed for maximum flight load factors with the gear retracted and must be designed for the combination of friction, inertia, brake

torque, and air loads, occurring during retraction at any airspeed up to  $1.6 V_{S1}$  with flaps retracted, and for any load factor up to those specified in § 23.345 for the flaps-extended condition.

(2) The landing gear and retracting mechanism, including the wheel well doors, must withstand flight loads, including loads resulting from all yawing conditions specified in § 23.351, with the landing gear extended at any speed up to at least  $1.6 V_{S1}$  with the flaps retracted.

(b) *Landing gear lock.* There must be positive means (other than the use of hydraulic pressure) to keep the landing gear extended.

(c) *Emergency operation.* For a landplane having retractable landing gear that cannot be extended manually, there must be means to extend the landing gear in the event of either—

(1) Any reasonably probable failure in the normal landing gear operation system; or

(2) Any reasonably probable failure in a power source that would prevent the operation of the normal landing gear operation system.

(d) *Operation test.* The proper functioning of the retracting mechanism must be shown by operation tests.

(e) *Position indicator.* If a retractable landing gear is used, there must be a landing gear position indicator (as well as necessary switches to actuate the indicator) or other means to inform the pilot that each gear is secured in the extended (or retracted) position. If switches are used, they must be located and coupled to the landing gear mechanical system in a manner that prevents an erroneous indication of either “down and locked” if each gear is not in the fully extended position, or “up and locked” if each landing gear is not in the fully retracted position.

(f) *Landing gear warning.* For landplanes, the following aural or equally effective landing gear warning devices must be provided:

(1) A device that functions continuously when one or more throttles are closed beyond the power settings normally used for landing approach if the landing gear is not fully extended and locked. A throttle stop may not be used in place of an aural device. If