LANDING GEAR

§ 4b.330 *General.* The requirements of §§ 4b.331 through 4b.338 shall apply to the complete landing gear.

§ 4b.331 *Shock absorbers.* (a) The shock absorbing elements for the main, nose, and tail wheel units shall be substantiated by the tests specified in § 4b.332.

(b) The shock absorbing ability of the landing gear in taxying shall be demonstrated by the tests prescribed in § 4b.172.

§ 4b.332 *Landing gear tests.* The landing gear shall withstand the following tests.

(a) *Shock absorption tests.* (1) It shall be demonstrated by energy absorption tests that the limit load factors selected for design in accordance with § 4b.230 (b) for take-off and landing weights, respectively, will not be exceeded.

(2) In addition to the provisions of subparagraph (1) of this paragraph, a reserve of energy absorption shall be demonstrated by a test simulating an airplane descent velocity of 12 f. p. s. at design landing weight, assuming wing lift not greater than the airplane weight acting during the landing impact. In this test the landing gear shall not fail. (See paragraph (c) of this section.)

(b) *Limit drop tests.* (1) If compliance with the limit landing conditions specified in paragraph (a) (1) of this section is demonstrated by free drop tests, these shall be conducted on the complete airplane, or on units consisting of wheel, tire, and shock absorber in their proper relation. The free drop heights shall not be less than the following:

(i) 18.7 inches for the design landing weight conditions.

(ii) 6.7 inches for the design take-off weight conditions.

(2) If wing lift is simulated in free drop tests the landing gear shall be dropped with an effective mass equal to:

$$W_e = W\left(\frac{h+(1-L)d}{h+d}\right),$$

where:

W_e = the effective weight to be used in the drop test (lbs.),

h = specified free drop height (inches),

d = deflection under impact of the tire (at the approved inflation pressure) plus the vertical component of the axle travel relative to the drop mass (inches),

$W = W_g$ for main gear units (lbs.), equal to the static weight on the particular unit with the airplane in the level attitude (with the nose wheel clear in the case of nose wheel type airplanes),

$W = W_t$ for tail gear units (lbs.), equal to the static weight on the tail unit with the airplane in the tail-down attitude,

$W = W_n$ for nose wheel units (lbs.), equal to the vertical component of the static reaction which would exist at the nose wheel, assuming the mass of the airplane acting at the center of gravity and exerting a force of 1.0*g* downward and 0.25*g* forward,

L = the ratio of the assumed wing lift to the airplane weight, not in excess of 0.667.

(3) The attitude in which a landing gear unit is drop tested shall simulate the airplane landing condition critical for the unit.

(4) The value of d used in the computation of W_e in subparagraph (2) of this paragraph shall not exceed the value actually obtained in the drop test.

(c) *Reserve energy absorption drop tests.* (1) If compliance with the reserve energy absorption condition specified in paragraph (a) (2) of this section is demonstrated by free drop tests, the landing gear units shall be dropped from a free drop height of not less than 27 inches.

(2) If wing lift equal to the airplane weight is simulated, the units shall be dropped with an effective mass equal to:

$$W_e = W\left(\frac{h}{h+d}\right);$$

where the symbols and other details are the same as in paragraph (b) of this section.