

## § 25.525

maximum design loads for each part of the seaplane structure.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25-23, 35 FR 5673, Apr. 8, 1970]

### § 25.525 Application of loads.

(a) Unless otherwise prescribed, the seaplane as a whole is assumed to be subjected to the loads corresponding to the load factors specified in § 25.527.

(b) In applying the loads resulting from the load factors prescribed in § 25.527, the loads may be distributed over the hull or main float bottom (in order to avoid excessive local shear loads and bending moments at the location of water load application) using pressures not less than those prescribed in § 25.533(b).

(c) For twin float seaplanes, each float must be treated as an equivalent hull on a fictitious seaplane with a weight equal to one-half the weight of the twin float seaplane.

(d) Except in the takeoff condition of § 25.531, the aerodynamic lift on the seaplane during the impact is assumed to be  $\frac{2}{3}$  of the weight of the seaplane.

### § 25.527 Hull and main float load factors.

(a) Water reaction load factors  $n_w$  must be computed in the following manner:

(1) For the step landing case

$$n_w = \frac{C_1 V_{s0}^2}{\left( \tan^{\frac{2}{3}} \beta \right) W^{\frac{1}{3}}}$$

(2) For the bow and stern landing cases

$$n_w = \frac{C_1 V_{s0}^2}{\left( \tan^{\frac{2}{3}} \beta \right) W^{\frac{1}{3}}} \times \frac{K_1}{\left( 1 + r_x^2 \right)^{\frac{2}{3}}}$$

(b) The following values are used:

(1)  $n_w$  = water reaction load factor (that is, the water reaction divided by seaplane weight).

(2)  $C_1$  = empirical seaplane operations factor equal to 0.012 (except that this factor may not be less than that necessary to obtain the minimum value of step load factor of 2.33).

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(3)  $V_{s0}$  = seaplane stalling speed in knots with flaps extended in the appropriate landing position and with no slipstream effect.

(4)  $\beta$  = angle of dead rise at the longitudinal station at which the load factor is being determined in accordance with figure 1 of appendix B.

(5)  $W$  = seaplane design landing weight in pounds.

(6)  $K_1$  = empirical hull station weighing factor, in accordance with figure 2 of appendix B.

(7)  $r_x$  = ratio of distance, measured parallel to hull reference axis, from the center of gravity of the seaplane to the hull longitudinal station at which the load factor is being computed to the radius of gyration in pitch of the seaplane, the hull reference axis being a straight line, in the plane of symmetry, tangential to the keel at the main step.

(c) For a twin float seaplane, because of the effect of flexibility of the attachment of the floats to the seaplane, the factor  $K_1$  may be reduced at the bow and stern to 0.8 of the value shown in figure 2 of appendix B. This reduction applies only to the design of the carry-through and seaplane structure.

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### § 25.529 Hull and main float landing conditions.

(a) *Symmetrical step, bow, and stern landing.* For symmetrical step, bow, and stern landings, the limit water reaction load factors are those computed under § 25.527. In addition—

(1) For symmetrical step landings, the resultant water load must be applied at the keel, through the center of gravity, and must be directed perpendicularly to the keel line;

(2) For symmetrical bow landings, the resultant water load must be applied at the keel, one-fifth of the longitudinal distance from the bow to the step, and must be directed perpendicularly to the keel line; and

(3) For symmetrical stern landings, the resultant water load must be applied at the keel, at a point 85 percent of the longitudinal distance from the step to the stern post, and must be directed perpendicularly to the keel line.