

§ 25.531

§ 25.531 Hull and main float takeoff condition.

For the wing and its attachment to the hull or main float—

(a) The aerodynamic wing lift is assumed to be zero; and

(b) A downward inertia load, corresponding to a load factor computed from the following formula, must be applied:

$$n = \frac{C_{TO} V_{S1}^2}{\left(\tan^{\frac{2}{3}} \beta\right) W^{\frac{1}{3}}}$$

where—

$n$ =inertia load factor;

$C_{TO}$ =empirical seaplane operations factor equal to 0.004;

$V_{S1}$ =seaplane stalling speed (knots) at the design takeoff weight with the flaps extended in the appropriate takeoff position;

$\beta$ =angle of dead rise at the main step (degrees); and

$W$ =design water takeoff weight in pounds.

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§ 25.533 Hull and main float bottom pressures.

(a) *General.* The hull and main float structure, including frames and bulkheads, stringers, and bottom plating, must be designed under this section.

(b) *Local pressures.* For the design of the bottom plating and stringers and their attachments to the supporting structure, the following pressure distributions must be applied:

(1) For an unflared bottom, the pressure at the chine is 0.75 times the pressure at the keel, and the pressures between the keel and chine vary linearly, in accordance with figure 3 of appendix B. The pressure at the keel (psi) is computed as follows:

$$P_k = C_2 \times \frac{K_2 V_{S1}^2}{\tan \beta_k}$$

where—

$P_k$ =pressure (p.s.i.) at the keel;

$C_2$ =0.00213;

$K_2$ =hull station weighing factor, in accordance with figure 2 of appendix B;

$V_{S1}$ =seaplane stalling speed (Knots) at the design water takeoff weight with flaps extended in the appropriate takeoff position; and

and

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$\beta_k$ =angle of dead rise at keel, in accordance with figure 1 of appendix B.

(2) For a flared bottom, the pressure at the beginning of the flare is the same as that for an unflared bottom, and the pressure between the chine and the beginning of the flare varies linearly, in accordance with figure 3 of appendix B. The pressure distribution is the same as that prescribed in paragraph (b)(1) of this section for an unflared bottom except that the pressure at the chine is computed as follows:

$$P_{ch} = C_3 \times \frac{K_2 V_{S1}^2}{\tan \beta}$$

where—

$P_{ch}$ =pressure (p.s.i.) at the chine;

$C_3$ =0.0016;

$K_2$ =hull station weighing factor, in accordance with figure 2 of appendix B;

$V_{S1}$ =seaplane stalling speed at the design water takeoff weight with flaps extended in the appropriate takeoff position; and

$\beta$ =angle of dead rise at appropriate station.

The area over which these pressures are applied must simulate pressures occurring during high localized impacts on the hull or float, but need not extend over an area that would induce critical stresses in the frames or in the overall structure.

(c) *Distributed pressures.* For the design of the frames, keel, and chine structure, the following pressure distributions apply:

(1) Symmetrical pressures are computed as follows:

$$P = C_4 \times \frac{K_2 V_{S0}^2}{\tan \beta}$$

where—

$P$ =pressure (p.s.i.);

$C_4$ =0.078  $C_1$  (with  $C_1$  computed under § 25.527);

$K_2$ =hull station weighing factor, determined in accordance with figure 2 of appendix B;

$V_{S0}$ =seaplane stalling speed (Knots) with landing flaps extended in the appropriate position and with no slipstream effect; and

$V_{S0}$ =seaplane stalling speed with landing flaps extended in the appropriate position and with no slipstream effect; and  $\beta$ =angle of dead rise at appropriate station.

(2) The unsymmetrical pressure distribution consists of the pressures prescribed in paragraph (c)(1) of this section on one side of the hull or main