factor may not be less than that necessary to obtain the minimum value of step load factor of 2.33).

(3) V_{S0} = seaplane stalling speed in knots with flaps extended in the appropriate landing position and with no slipstream effect.

(4) β = 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.

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

§ 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.

(b) *Unsymmetrical landing for hull and single float seaplanes*. Unsymmetrical step, bow, and stern landing conditions must be investigated. In addition—

(1) The loading for each condition consists of an upward component and a side component equal, respectively, to 0.75 and 0.25 tan β times the resultant load in the corresponding symmetrical landing condition; and

(2) The point of application and direction of the upward component of the load is the same as that in the symmetrical condition, and the point of application of the side component is at the same longitudinal station as the upward component but is directed inward perpendicularly to the plane of symmetry at a point midway between the keel and chine lines.

(c) *Unsymmetrical landing; twin float seaplanes*. The unsymmetrical loading consists of an upward load at the step of each float of 0.75 and a side load of 0.25 tan β at one float times the step landing load reached under § 25.527. The side load is directed inboard, perpendicularly to the plane of symmetry midway between the keel and chine lines of the float, at the same longitudinal station as the upward load.

§ 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;

β = angle of dead rise at the main step (degrees); and

W = design water takeoff weight in pounds.

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

§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
βK = 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
β = 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 β = 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 float centerline and one-half of that pressure on the other side of the hull or main float centerline, in accordance with figure 3 of appendix B.

These pressures are uniform and must be applied simultaneously over the entire hull or main float bottom. The loads obtained must be carried into the sidewall structure of the hull proper, but need not be transmitted in a fore and aft direction as shear and bending loads.

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§25.535 Auxiliary float loads.

(a) *General.* Auxiliary floats and their attachments and supporting structures