

$$\alpha = \frac{G_2}{G_1}, \quad 1 \leq \alpha \leq 3$$

$$D = \sqrt{\frac{4F}{\pi}} = \sqrt{\frac{4G}{\pi V}}$$

$$V = \frac{G}{F} \quad \gamma = \frac{V}{V_1}, \quad 0,2 \leq \gamma \leq 0,8.$$

$$\chi_1 = \sqrt{\frac{\gamma}{1+\alpha}} \quad \chi_2 = \sqrt{1 - \frac{\alpha\gamma}{1+\alpha}} \quad \frac{G_2}{G_1} = \frac{F_2}{F_1}$$

$$D_1 = \chi_1 D = \sqrt{\frac{\gamma}{1+\alpha}} D \quad D_{\text{вix}} = \chi_2 D = \sqrt{1 - \frac{\alpha\gamma}{1+\alpha}} D$$

$$H_{p.3.} = (2,8 - 3,1)D \quad D_{\text{ш}} = (0,9 - 0,95)D$$

$$\frac{F_2}{F_1} = \alpha \quad F_1 = \frac{\pi D_1^2}{4} \quad F_2 = F - F_{\text{вix}} = \frac{\pi}{4} (D^2 - D_{\text{вix}}^2)$$

$$d_{\text{y.m.}} = (0,08 - 0,10)D$$

$$h_{\text{y.m.}} = (0,50 - 0,67)H_{\text{p.3.}}$$

$$r_1 = 0,5D + 3,5a$$

$$r_2 = 0,5D + 2,5a$$

$$r_3 = 0,5D + 1,5a$$

$$r_4 = 0,5D + 0,5a$$

$$a = A/4.$$

$$B = \frac{F_B \cdot 2}{A}$$

$$F_B = F_2$$

$$\Delta P = \xi \frac{\rho V^2}{2} \quad \xi = \xi_1 \left(1 - \frac{G_2}{G}\right)^3 \left(\frac{F}{F_1}\right)^2 + \xi_2 \left(\frac{G_2}{G}\right)^3 \left(\frac{F}{F_2}\right)^2$$

$$\xi_1 = 5,5n + \left[260 + 4,8(n - 3,8)^2\right] \left(\frac{G_2}{G} - 0,3\right)^3$$

$$n = \frac{8D_1}{3\pi} \frac{D_1^3 - d_{i\dot{a}\dot{o}}^3}{(D_1^2 - d_{i\dot{a}\dot{o}}^2)^2} \operatorname{tg}\beta$$

$$\xi_2 = 2,6 + 158 \left(0,6 - \frac{G_2}{G_1}\right)^3 \quad \text{для } \frac{G_2}{G} > 0,6 \quad \xi_2 = 2,6.$$

$$\eta = \frac{G_1 \eta_1 + G_2 \eta_2}{G}$$

$$\eta_1 = \sum_{j=1}^{j=n} (\eta_{\phi 1 j} m_{1 j})$$

$$\eta_2 = \sum_{j=1}^{j=n} (\eta_{\phi 2 j} m_{2 j})$$

$$\eta_{\phi 1 j} = \frac{r_{1(j+1)}^2 - r_{1j}^2}{r_1^2 - r_{обм}^2}$$

$$\eta_{\phi 2 j} = \frac{r_{2(j+1)}^2 - r_{2j}^2}{R^2 - r_2^2}$$

$$R = D/2$$

$$r_2 = D_{внх}/2$$

$G, \text{м}^3/\text{с}$  $\mu, \text{Па}\cdot\text{с}$  $\rho, \text{кг}/\text{м}^3$  $\rho t, \text{кг}/\text{м}^3$  $\eta_{\text{тр}}, \%$  $S_{\text{ПДК}}, \text{м}^2/\text{м}^3$ 

$$a = -\left(5,5 \frac{G_2}{G_1} + 2,8\right) \quad b = \left(5,5 \frac{G_2}{G_1} + 0,4\right) \frac{1}{R}$$

$$R_0 = \left(1 - 0,19 \frac{G_2}{G_1}\right) R$$

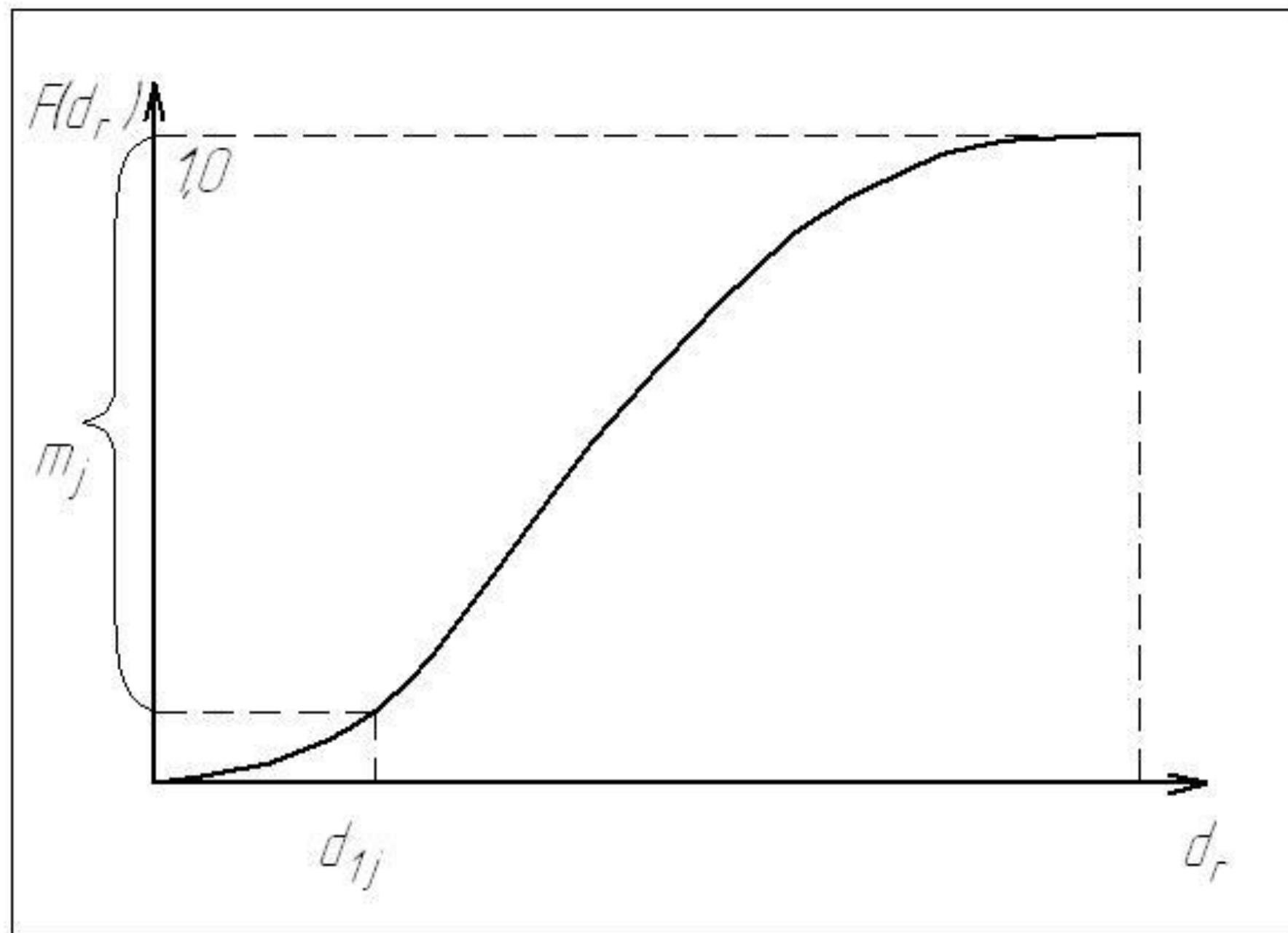
$$K_{1j} = \frac{b(r_{1j} - R_0)}{a(a + bR_0)(a + br_{1j})} + \frac{1}{a^2} \ln \frac{R_0(a + br_{1j})}{r_{1j}(a + bR_0)}$$

$$K_{2j} = \frac{b(r_{2j} - R_{\text{у}})}{a(a + bR_{\text{у}})(a + br_{2j})} + \frac{1}{a^2} \ln \frac{R_{\text{у}}(a + br_{2j})}{r_{2j}(a + bR_{\text{у}})}$$

$$d_{1j} = \frac{7,52R^3}{GR_0} \sqrt{\frac{\mu G_2 \ln \left[ \left( \frac{R_0}{r_{1j}} \right)^2 \left( 1 + \frac{G_2}{G_1} \right) \right] K_{1j}}{\rho_m H_{p.3.} \ln \left( 1 + \frac{G_2}{G_1} \right) \ln \left( \frac{R_0}{r_{1j}} \right)^2}}$$

$$d_{2j} = \frac{4,95R^3}{G} \sqrt{\frac{\mu G_2 \left[ R_0 \ln \frac{R - R_{uu}}{R - r_{2j}} - 1,15(R - R_0) \right] K_{2j}}{\rho_m H_{p.3.} (R^2 - R_0^2) R_0 \ln \frac{R - R_{uu}}{R - r_{2j}}}}$$





$N_{\text{п/п}}$	$r_{1j}$	$\eta_{1j}$	$K_{1j}$	$d_{1j}$	$m_{1j}$
1					
2					
3					

$$c_K = c_H (1 - \eta)$$

$$d_{кр} = \sqrt{\frac{18\mu_z V_z}{H_{p.3.}} \frac{\ln \frac{D_0}{D_{mp}}}{\omega^2 (\rho_m - \rho_z)}}$$

