$$F = \frac{2\sigma_o \pi}{3\sqrt{\alpha_c}}(2a_1 - 3a_2)\left\{\frac{2\alpha_c R_c^2 + \beta_c}{4\alpha_c}\left[\mathrm{Ln}\,(2\alpha_c R_c^2 + \beta_c) - 1\right]\right.$$

$$\left. - \frac{\beta_c}{4\alpha_c}\left[\mathrm{Ln}\,(\beta_c) - 1\right] - \frac{1}{2} R_c^2 \ln(2\alpha_c R_c^2 + \beta_c)\right\} - \frac{1}{2}(4a_1 + a_2)\,\pi b R_c^4$$

$$- \frac{4}{3}\pi\sigma_o \left\{7a_1\left[\frac{1}{2\alpha_c}(\alpha_c R_c^4 + \beta_c R_c^2 + \chi_c)^{1/2} - \frac{1}{4}\beta_c \alpha_c^{-3/2} \ln\left\{\frac{\beta_c}{2\sqrt{\alpha_c}}\right.\right.\right.$$

$$\left. + \sqrt{\alpha_c} R_c^2 + (\alpha_c R_c^4 + \beta_c R_c^2 + \chi_c)^{1/2}\right\} - \frac{\sqrt{\gamma_1}}{2\alpha_c} + \frac{1}{4}\beta_c \alpha_c^{-3/2}$$

$$\left. \ln\left(\frac{\beta_c}{2\sqrt{\alpha_c}} + \sqrt{\gamma_c}\right)\right] + 3a_3\left[\frac{1}{2\sqrt{\alpha_c}} \ln\left\{\frac{\beta_c}{2\sqrt{\alpha_c}} + \sqrt{\alpha_c} R_c^2\right.\right. \qquad (43)$$

$$\left.\left. + (\alpha_c R_c^4 + \beta_c R_c^2 + \chi_c)^{1/2}\right\} - \frac{1}{2\sqrt{\alpha_c}} \ln\left(\frac{\beta_c}{2\sqrt{\alpha_c}} + \sqrt{\gamma_c}\right)\right]\right\}$$

$$- \pi\left(\frac{2}{3} a_1 b R_c^2 - a_2 b R_c^2 + 2a_3 b + P_c\right) R_c^2$$