

Problem 404A

The distribution function of nuclei or microbubbles in a water tunnel is given by

$$N_1(R) = N^*/R^{3.5} \quad , \quad R > R_{min} \quad (1)$$

where $N^* = 10^{-5}$ (units $m^{-0.5}$), $R_{min} = 0.00002m$ and R is the microbubble radius in meters. This distribution is evaluated at atmospheric pressure, p_1 , and at a known temperature, T .

- [A] What is the microbubble population density in *number/cm³* ?
- [B] Determine the microbubble distribution function, $N_2(R)$, at a different pressure, p_2 , if the bubbles are assumed to contain only a fixed mass of non-condensable gas, if surface tension effects are neglected and if the temperature remains the same.
- [C] Determine the distribution function, $N_3(R)$, at a different pressure, p_2 , if the bubbles are assumed to contain both water vapor (vapor pressure = p_V) and a fixed mass of non-condensable gas. Again, neglect surface tension and assume the temperature remains the same.