An Internet Book on Fluid Dynamics

Problem 404B

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

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

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 $number/cm^3$?

[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.