A high-rise office building located in Albuquerque, New Mexico, at an altitude of 1 mi is exposed to a wind of 40 mi/h. What is the static pressure in the airstream away from the influence of the building? What is the maximum pressure acting on the building? Pressure measurements indicate that a value of $C_p = -5$ occurs near the corner of the wall parallel to the wind direction. If the internal pressure is equal to the free-stream static pressure, what is the total force on a pane of glass 3 ft $\times$ 8 ft located in this region?

\[ V_\infty = 40 \text{ mi/h} = 58.67 \text{ ft/s} \]

_at 5280 ft altitude (by interpolation)_

\[ P = 1742.6 \text{ in Hg}^2 \]

\[ \rho = 0.002031 \text{ slugs/ft}^3 \]

Max pressure @ $C_p = 1$

\[ P_{\text{max}} = P_t = P + \frac{1}{2} \rho V^2 = 1742.6 + \frac{1}{2} (0.002031)(58.67)^2 \]

\[ P_{\text{max}} = 1746.1 \text{ in Hg}^2 \]

**Force on Glass**

\[ C_p = \frac{P - P_\infty}{\rho} \]

\[ P = P_\infty + \frac{1}{2} \rho V^2 C_p = 1742.6 + \frac{1}{2} (0.002031)(58.67)^2(5) \]

\[ = 1742.6 - 17.48 = 1725.1 \text{ in Hg}^2 \]

\[ F = 4PA = (P_{\text{max}} - P_\infty)A \]

\[ = -17.48(3)(8) \]

\[ = 419.5 \text{ lb} \]

\[ F = 419.5 \text{ lb outward} \]