Problem 3B.13

Flow of a fluid through a sudden contraction.

(a) An incompressible liquid flows through a sudden contraction from a pipe of diameter $D_1$ into a pipe of smaller diameter $D_2$. What does the Bernoulli equation predict for $P_1 - P_2$, the difference between the modified pressures upstream and downstream of the contraction? Does this result agree with experimental observations?

(b) Repeat the derivation for the isothermal horizontal flow of an ideal gas through a sudden contraction.