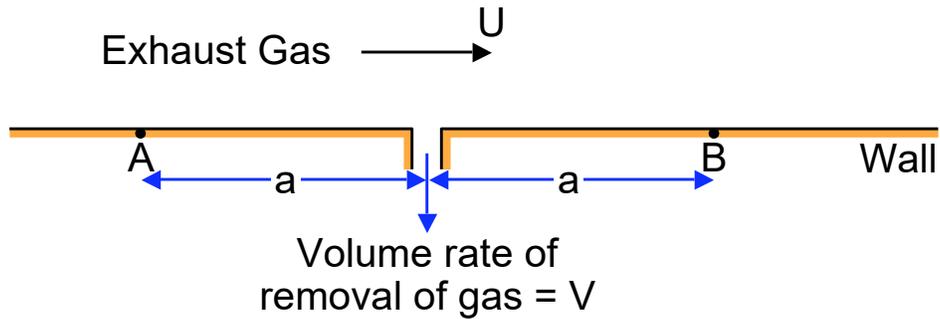## Problem 120M

Exhaust gas quality is to be monitored by continuous removal of gas through a small hole in the flat side of a vent through which the exhaust gas is passing at velocity, U:

This removal of gas (density, ρ) perturbs the flow in the neighborhood of the sampler in such a way that a pressure difference is created between the points A and B which are directly upstream and downstream of the sampler hole by the same distance, a. Assuming that the gas flow is potential, find the expression that relates the volume rate, V, of removal of gas through the hole to the pressure difference, $p_B - p_A$.