

Problem 336A

Compressed air ($\gamma = 1.4$) is supplied from a reservoir to a pipe, 1 cm in diameter and 5 m long. It is estimated that the average friction factor, f , of the flow in the pipe is 0.02 . At the end of this long pipe is a short nozzle whose opening to the atmosphere has one half of the cross-sectional area of the pipe. Assuming that frictional effects in the nozzle can be neglected find the following information pertaining to conditions when the flow through the pipe/nozzle combination is choked:

[A] The Mach number of the flow entering the pipe.

[B] The ratio of the pressure in the reservoir to the pressure in the exit (throat) from the nozzle.