

18/ENG 02/074  
ENG 214 A

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MAC - ANTHONY

①  $V_1 = 5 \text{ m/s}, V_2 = 2 \text{ m/s}$   
 $h_c = \frac{0.35(V_1 - V_2)^2}{2g}$

$L = z_1 - z_2 = 2 \text{ m}$

$\frac{P_1}{\rho} + \frac{V_1^2}{2g} + z_1 = \frac{P_2}{\rho} + \frac{V_2^2}{2g} + z_2 + h_c$

$= 2.5 + \frac{(5-2)^2}{2 \times 9.81} + 2 - \frac{(0.35)(5-2)^2}{2 \times 9.81}$

$\therefore P_2 = 540 \text{ bar}$

$k = 0.5 \left[ \frac{13.6}{0.9} - 1 \right] = 7.8 \text{ m}$

$Q = C_d \frac{A_1 A_2 \sqrt{2gh}}{\sqrt{A_1 - A_2^2}}$

$Q = 2.33 \times 10^{-3} \text{ m}^3/\text{s}$

$h = y \left[ \frac{S_1 R - 1}{S_2 R} \right]$

$h = 0.17 \left[ \frac{13.6}{1000} - 1 \right]$

$h = 2.083 \text{ m}$

②  $A_1 = \frac{\pi d^2}{4} = 0.0314 \text{ m}^2$

$V = \sqrt{2gh}$

$V = \sqrt{2 \times 9.81 \times 2.083}$

$V = 6.39 \text{ m/s}$

$A_2 = \frac{\pi d^2}{4} = 0.007853 \text{ m}^2$

$\frac{P_1}{\rho} = \frac{0.658 \times 1}{1000 \times 9.81} = 1.8 \times 10^{-4} \text{ m}$

$\frac{P_2}{\rho} = 0.3 \times 13.6 = 4.08 \text{ m}$

$h = \frac{P_1}{\rho} - \frac{P_2}{\rho} = 4.0802 \text{ m}$

$Q = C_d \frac{A_1 A_2 \sqrt{2gh}}{\sqrt{A_1 - A_2}}$

$Q = 0.0709 \text{ m}^3/\text{s}$

③  $A_1 = \frac{\pi d^2}{4} = 0.0176 \text{ m}^2$

$A_2 = \frac{\pi d^2}{4} = 0.0706 \text{ m}^2$