Problema di verifica di una valvola

Determinare la portata in unità SI che attraversa la valvola con i seguenti dati:

Notes

The pink painted variables are DATA

The blu painted text is COMMENT

PROBLEM DATA

fluid: WATER

$\rho := 1000 \cdot kg \cdot m^{-3}$ density

$G_f := 1$ specific density

$P_1 := 100 \cdot psi$ upstream absolute pressure

$P_2 := 40 \cdot psi$ downstream pressure

$C_{vn} := 0.395 \cdot \left(gal\, min^{-1} \right) \cdot psi^{-0.5}$ Valve Flow Coefficient

$N_1 := \left[0.0007598 \cdot \left(kg \cdot s^{-1} \right) \cdot \left(gal^{-1} \cdot min \right) \cdot Pa^{-0.5} \cdot psi^{0.5} \right]$ dimensional coefficient

DATA CONVERSION

$P_1 = 6.895 \times 10^5\, Pa$

$P_2 = 2.758 \times 10^5\, Pa$

CHECKOUT CALCULATIONS

$m\_punto := N_1 \cdot C_{vn} \cdot \sqrt{G_f \left(P_1 - P_2 \right)}$

$m\_punto = 11.582\, kg \cdot min^{-1}$ mass flow rate

OTHER CALCULATIONS

$V\_punto := \dfrac{m\_punto}{\rho}$ volume flow rate

volume flow rate conversion:

$V\_punto = 0.193\, L\, s^{-1}$ $V\_punto = 3.06\, gal \cdot min^{-1}$