

Valve design example No.1

Introduction

The pink painted variables are DATA

The blu painted text is COMMENT

PROBLEM DATA

$\rho := 1000 \cdot \text{kg} \cdot \text{m}^{-3}$ fluid: WATER
density
 $G_f := 1$ specific density
 $P_1 := 100 \cdot \text{psi}$ upstream absolute pressure
 $P_2 := 40 \cdot \text{psi}$ downstream pressure
 $m_{\text{punto}} := 0.193 \cdot \text{kg} \cdot \text{s}^{-1}$ mass flow rate
 $N_1 := [0.0007598 \cdot (\text{kg} \cdot \text{s}^{-1}) \cdot (\text{gal}^{-1} \cdot \text{min}) \cdot \text{Pa}^{-0.5} \cdot \text{psi}^{0.5}]$ dimensional coefficient

DATA CONVERSION

$$P_1 = 6.895 \times 10^5 \text{ Pa}$$

$$P_2 = 2.758 \times 10^5 \text{ Pa}$$

DESIGN CALCULATIONS

$$C_v := \frac{m_{\text{punto}}}{N_1 \cdot \sqrt{(P_1 - P_2)} \cdot G_f}$$

$$C_v = 0.395 \text{ gal min}^{-1} \cdot \text{psi}^{-0.5} \quad \text{Valve Flow Coefficient}$$