

SHEET 5

1- (Example 8-1)

A pressure relief valve contains a poppet with a 0.75-in^2 area on which system pressure acts. During assembly, a spring with a spring constant of 2500 lb/in is installed to hold the poppet against its seat. The adjustment mechanism is then set so that the spring is initially compressed 0.20-in from its free length condition. In order to pass full pump flow through the valve at the PRV pressure setting, the poppet must move 0.10-in from its fully closed position. Determine the following

- Cracking pressure
- Full pump flow pressure (PRV pressure setting)

2- (Example 8-4)

The pressure drop across the sharp-edged orifice of (figure 1) is 100 psi . The orifice has a 1-in diameter, and the fluid has a specific gravity of 0.9 . Find the flow rate.

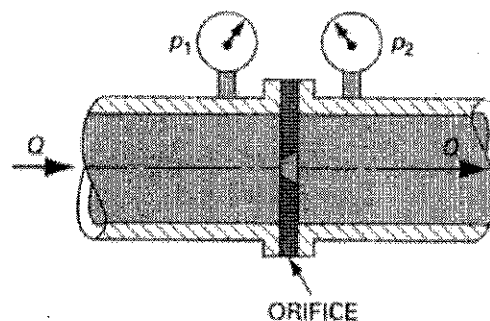


Figure 1

3- (Example 8-5)

A flow control valve experiences a pressure drop of 687-kPa for a flow rate of 98.4-Lpm . The fluid is hydraulic oil with specific gravity of 0.90 . Determine the capacity coefficient.

4- (Example 8-6)

A needle valve is used to control the extending speed of a hydraulic cylinder. The needle valve is placed in the outlet line of the hydraulic cylinder as shown in (figure 2). Determine the required capacity coefficient of the needle valve. The following data are given:

- Desired cylinder speed = 10 in/s
- Cylinder piston diameter = 2 in (area = 3.14 in²)
- Cylinder rod diameter = 1 in (area = 0.79 in²)
- Cylinder load = 1000 lb
- Specific gravity of oil = 0.90
- PRV setting = 500 psi

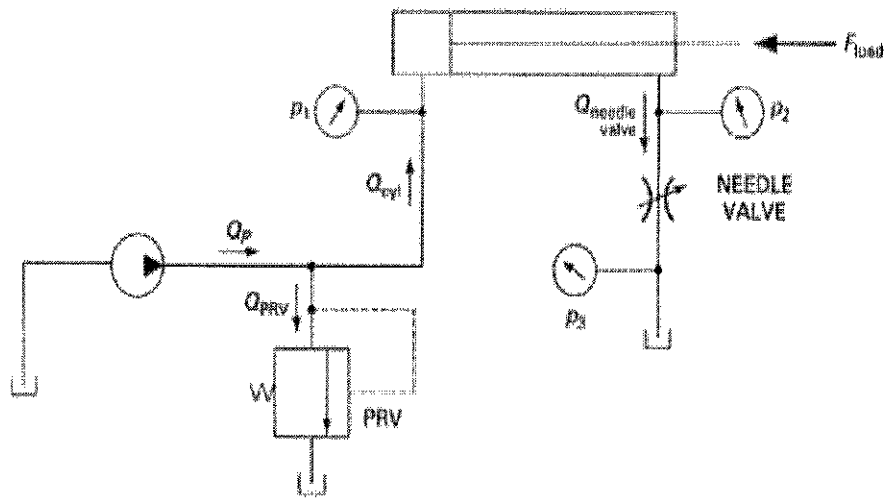


Figure 2