Ch. 1

58) Compute pressure change required to cause a 1% decrease in the volume of mercury. psi and MPa

$$E = \frac{-\Delta p}{\Delta V / V}$$

Mercury

$E = 3{,}590{,}000$ psi

and

$E = 24{,}750$ MPa

$$\Delta p = -E\left(\frac{\Delta V}{V}\right)$$

$$\frac{\Delta V}{V} = -0.01$$

$$\Delta p = -(3{,}590{,}000\ \text{psi})(-0.01)$$

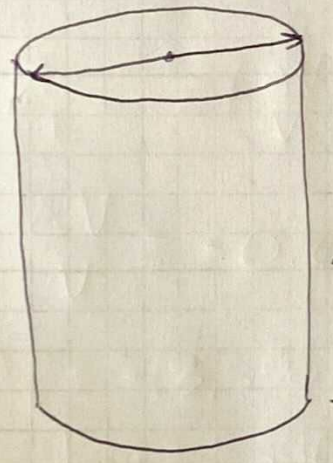
$$\boxed{\Delta p = 35{,}900\ \text{psi}}$$

$$\Delta p = -(24{,}750\ \text{MPa})(-0.01)$$

$$\boxed{\Delta p = 247.5\ \text{MPa}}$$

Ch.1

92) Cylindrical container is 150 mm in diameter and weighs 2.25 N when empty. When filled to a depth of 200 mm with a certain oil it weighs 35.4 N. Calculate specific gravity of the oil.



$W_{container} = 2.25\ N$

$W_{oil} = 35.4 - 2.25 = 33.15\ N$

$m_{oil} = \frac{33.15\ N}{9.81\ m/s^2} = 3.3792\ kg$

$d = 150\ mm \quad r = 75\ mm$
$0.075\ m$

$h = 200\ mm$
$0.2\ m$

$V = \pi r^2 h$

$V = \pi (0.075\ m^2)(0.2\ m)$

$V = 0.003534\ m^3$

$m = 3.3792\ kg$

$\rho_o = \frac{m}{V} = \frac{3.3792\ kg}{0.003534\ m^3}$

$\rho_o = 956.197\ kg/m^3$

$sg = \frac{\rho_o}{\rho_w @ 4°C}$

$sg = \frac{956.197\ kg/m^3}{1000\ kg/m^3}$

$sg = 0.956$

$\boxed{sg = 0.96}$

Ch.2

18) Use appendix give the value of the viscosity for water @ 40°C

from Appendix D

Water @ 40°C

6.5×10^{-4} N·S/m²