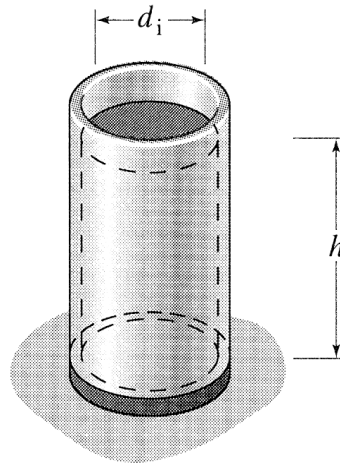


### Example 12.2

A vertical standpipe has an inside diameter of  $d_i = 3\text{m}$  and is filled with water to depth of  $h = 5\text{m}$ . If the allowable hoop stress is  $80\text{MPa}$ , what is the minimum wall thickness of the tank?



$$\sigma_a = 0 ; \text{ open tank}$$

$$\sigma_h = \frac{pr}{t} \Rightarrow t_{\min} = \frac{pr}{\sigma_{\text{allow}}}$$

The pressure in tank is hydrostatic & is maximum at bottom:

$$p_{\max} = \rho gh \quad ; \quad \rho = \text{mass density of water}$$

$$\therefore t_{\min} = \frac{(\rho gh)r}{\sigma_{\text{allow}}}$$