

600 ft 1mm

$$\frac{dy}{dt} = Y_{in} - Y_{out}$$

$$Y_{in} = 600$$

$$Y_{out} = \frac{600}{20000} = 0.03y$$

$$\frac{dy}{dt} = 600 - 0.03y$$

$$-20000$$

$$0.1 = e^{-0.163t}$$

$$\ln(0.1) = -0.163t$$

$$t = -2.30$$

$$= 0.03$$

$$t = 96.8 \text{ minutes}$$

Dynamic response for  $t=0$  to  $t=6$  hours with a step input of 5 mm

60 mm  $\rightarrow$  1 bar

d steady state value = 20000

e At the time interval between 180mins to 360min the fresh air steady state was at 20000ft<sup>3</sup>