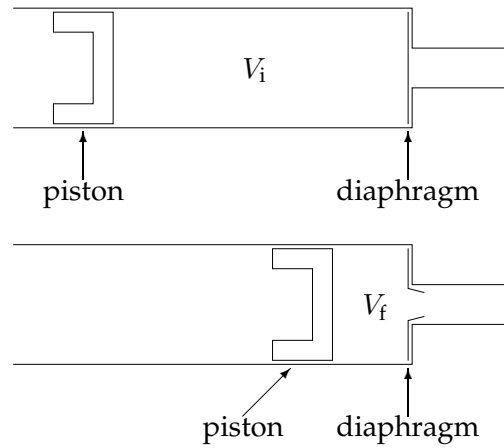


Shock tube considerations

- The resevoir conditions of the shock tube are defined by: the total pressure, P_0 , of the resevoir; the fill pressure, P ; and the shock wave velocity, v .
- The total temperature, T_0 , can be calculated by entering P_0 into the Equilibrium Shock Tube Calculator (ESTC).
- The exit conditions of the tube are then given by entering T_0 and P_0 into STUBE.

The compression ratio, λ , of the compression tube is given by:

$$\lambda = \frac{\text{volume of compression tube before compression}}{\text{volume of compression tube after compression}}$$



ie. $\lambda = \frac{V_i}{V_f} = \frac{\rho_f}{\rho_i} = \left(\frac{P_f}{P_i}\right)^{\frac{1}{\gamma}} = \left(\frac{D}{C}\right)^{\frac{1}{\gamma}}$, where P_f ($= D$) is the diaphragm burst pressure and P_i ($= C$) is the compression tube fill pressure.

The empirical equation for the free piston shock tube (FPST) is

$$\frac{R\lambda}{D} = \text{"constant"},$$

where R is the resevoir fill pressure.