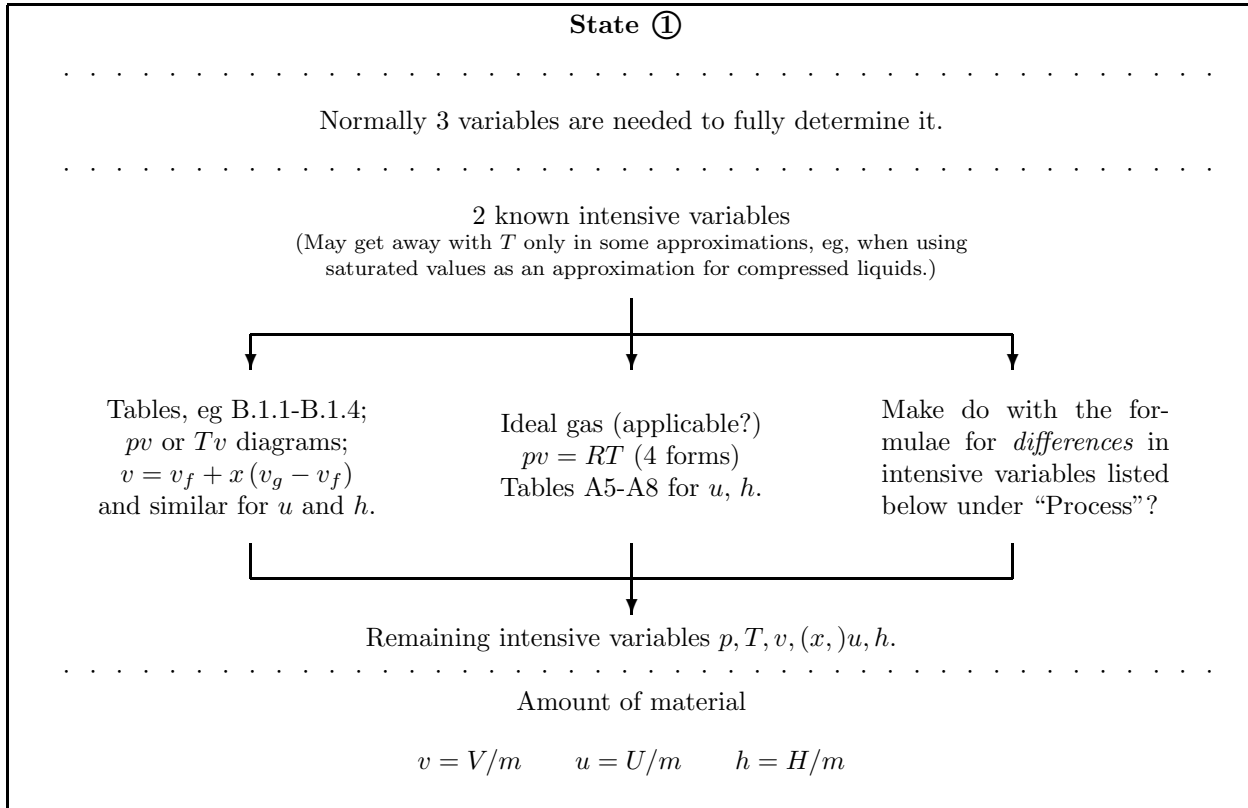


Typical Control Mass Problem Chart

(Not complete material coverage)



Process

C1: Type of process (V constant, p constant, p linear in V , pV^n constant, T constant, ${}_1Q_2 = 0$?)

Adds info about ① or ② ?

C2: Mass: $m_1 (+m_{\text{added}}) = m_2$

Adds info about ① or ② ?

Energy: $E_2 - E_1 = {}_1Q_2 - {}_1W_2 \quad (E = U + KE? + PE?)$

Adds info about ① or ② ?

C3: ${}_1W_2 = 0 \quad \left| \quad p_1(V_2 - V_1) \quad \left| \quad \frac{p_1 + p_2}{2}(V_2 - V_1) \quad \left| \quad \frac{p_2V_2 - p_1V_1}{1-n} \quad \left| \quad p_1V_1 \ln \left(\frac{V_2}{V_1} \right) \quad \left| \quad \text{other?} \right. \right. \right.$

For ideal gases:

$$u_2 - u_1 = \int_1^2 C_v dT \approx C_{v,\text{ave}}(T_2 - T_1) \quad h_2 - h_1 = \int_1^2 C_p dT \approx C_{p,\text{ave}}(T_2 - T_1)$$

For solids and compressed liquids, *by approximation*, best at constant pressure:

$${}_1Q_2 = m \int_1^2 C_{(p)} dT \approx m C_{(p),\text{ave}}(T_2 - T_1)$$

State ②

Same procedures as state ①