b) after reaching the above temperature, the process is constant volume/density when more heat is added.

\[ d\theta = \frac{dQ}{dV} + P \, dV \]

\[ \text{specific} = \frac{dQ}{m} = C_v \, dT \]

\[ \Rightarrow \quad \frac{Q}{m} = C_v (T - T_i) \]

A initial temp at start of extra heat addition

\[ T_i = \frac{Mg}{mR} (H-d) \]

\[ \Rightarrow \quad T = \frac{Mg}{mR} (H-d) + \frac{Q}{mC_v} \]

and

\[ P = \rho RT \]

\[ \text{Const} \quad \rho = \frac{m}{xA} = \frac{m}{(H-d)A} \]

\[ P = \frac{mR}{(H-d)A} \left[ \frac{Mg}{mR} (H-d) + \frac{Q}{mC_v} \right] \]