

Work for Open Systems

Reversible boundary work for *closed systems* $w_B = \int p dv$

Open system reversible work, from 1st Law (single inlet/outlet)

$$\delta q_{rev} - \delta w_{rev} = dh + d(ke) + d(pe)$$

$$\delta q_{rev} = T ds$$

$$T ds = df - v dp$$

$$\rightarrow \delta q_{rev} = dh - v dp$$

$$\cancel{dh} - v dp - \delta w_{rev} = \cancel{dh} + d(ke) + d(pe)$$

neglecting ke & pe, & rearrange;

$$\delta w_{rev} = -v dp$$

$$w_{rev} = - \int_1^2 v dp \quad \text{Reversible work for open system}$$