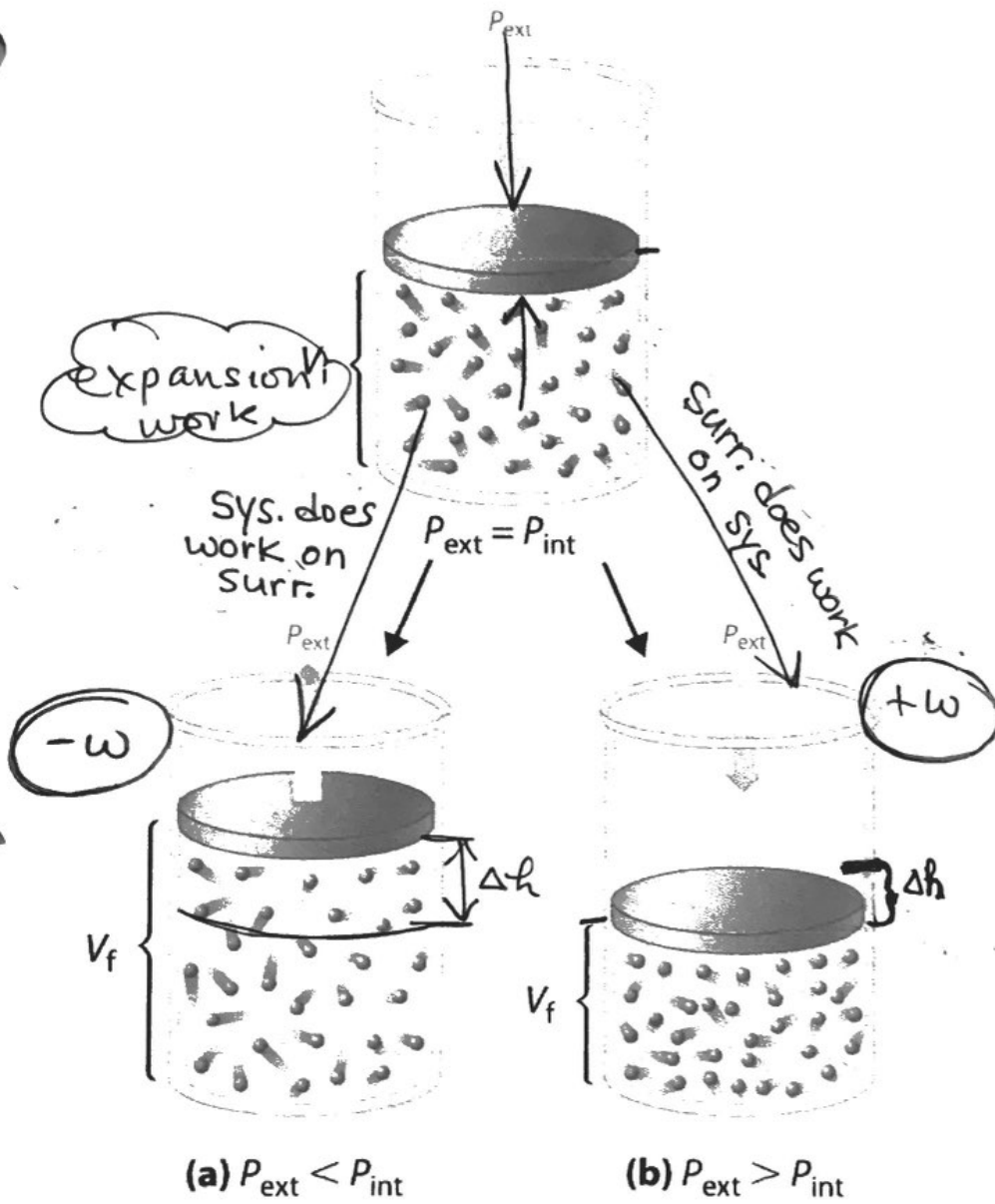


Expansion work



$$P = \frac{\text{Force}}{\text{Area}}$$

$$F = P_{ext} \times A$$

$$W = F \times \text{distance}$$

$$W = P_{ext} \times \text{Area} \times \text{distance}$$

$$= P_{ext} \times \underbrace{\text{Area} \times \Delta \text{height}}_{\Delta \text{Volume}}$$

$$W = P_{ext} \times \Delta V$$

$$W = P \Delta V$$

Expansion of gas
(gas does work on surr.)

Expansion work

$$W = (-)$$

$$-w = P \Delta V$$

$$w = -P \Delta V$$

$$W = -P \Delta V$$