

# **Техникалық термодинамика**

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## Газ және будың араласуы

$$V = V_1 + V_2 + \dots + V_n,$$

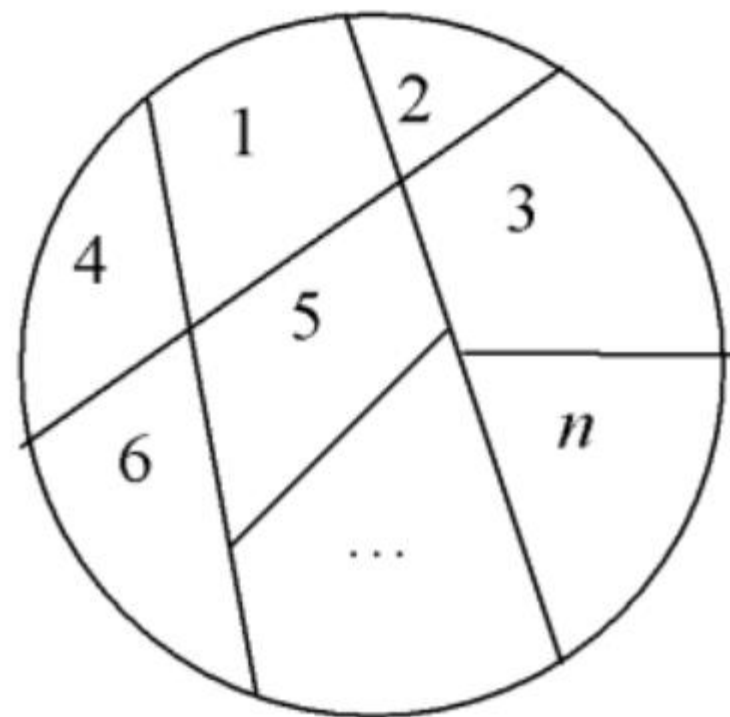
$$G = G_1 + G_2 + \dots + G_n.$$

$$\bar{U} = U_1 + U_2 + \dots + U_n$$

$$G \cdot u = G_1 \cdot u_1 + G_2 \cdot u_2 + \dots + G_n \cdot u_n.$$

$$u = \frac{G_1 u_1 + G_2 u_2 + \dots + G_n u_n}{G_1 + G_2 + \dots + G_n}.$$

$$v = \frac{G_1 v_1 + G_2 v_2 + \dots + G_n v_n}{G_1 + G_2 + \dots + G_n}.$$



$$\boxed{du = c_v dT},$$

$$\begin{aligned} T &= \frac{G_1 c_{v1} T_1 + G_2 c_{v2} T_2 + \dots + G_n c_{vn} T_n}{G c_v} = \frac{G_1 c_{v1} T_1 + G_2 c_{v2} T_2 + \dots + G_n c_{vn} T_n}{G_1 c_{v1} + G_2 c_{v2} + \dots + G_n c_{vn}} = \\ &= \frac{g_1 c_{v1} T_1 + g_2 c_{v2} T_2 + \dots + g_n c_{vn} T_n}{g_1 c_{v1} + g_2 c_{v2} + \dots + g_n c_{vn}}, \end{aligned}$$

$$T = \frac{G_1 T_1 + G_2 T_2 + \dots + G_n T_n}{G}.$$

$$p = \frac{GRT}{V},$$

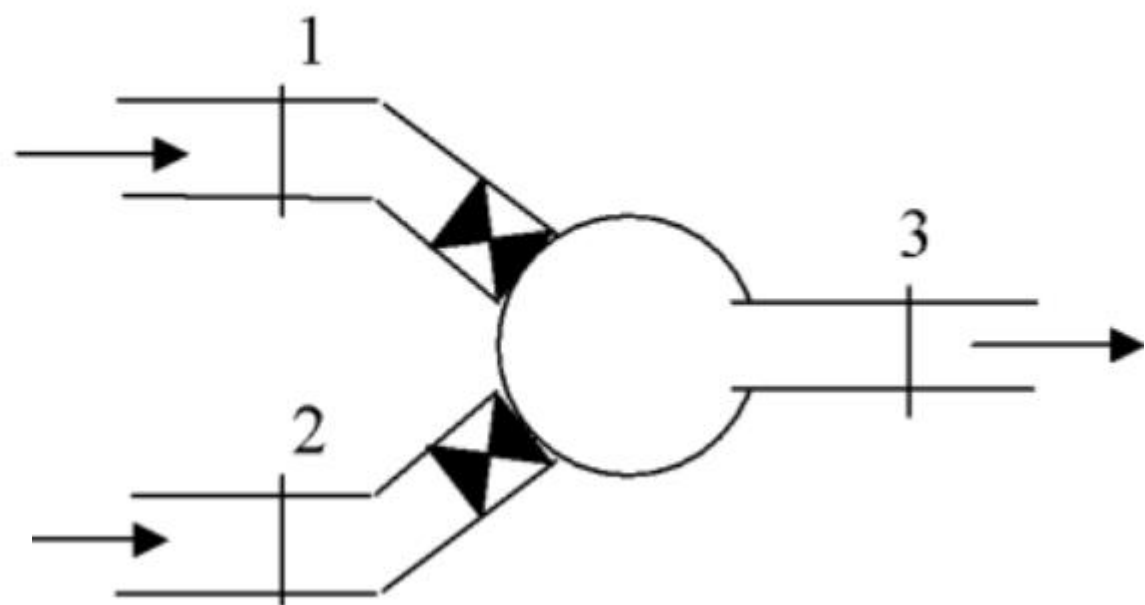
$$G = G_1 + G_2.$$

$$\dot{L} = -p_1 v_1 \dot{G}_1 - p_2 v_2 \dot{G}_2 + p v \dot{G}.$$

$$0 = U - U_1 - U_2 - p_1 v_1 \dot{G}_1 - p_2 v_2 \dot{G}_2 + p v \dot{G}$$

$$H = H_1 + H_2.$$

$$h = \frac{h_1 G_1 + h_2 G_2}{G}.$$



$$T = \frac{c_{p1}T_1G_1 + c_{p2}T_2G_2}{c_{p1}G_1 + c_{p2}G_2} = \frac{c_{p1}T_1g_1 + c_{p2}T_2g_2}{c_{p1}g_1 + c_{p2}g_2} .$$

$$T = \frac{T_1G_1 + T_2G_2}{G_1 + G_2} = T_1g_1 + T_2g_2 .$$

$$v = \frac{RT}{p}$$

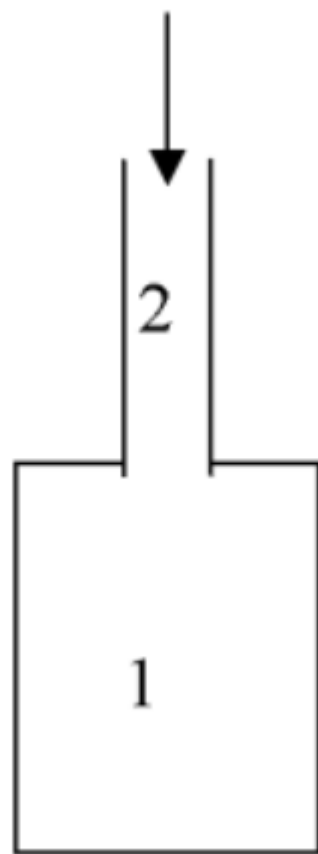
$$G = \bar{G}_1 + \bar{G}_2.$$

$$uG - (u_1G_1 + u_2G_2) = p_2v_2G_2$$

$$u = \frac{u_1G_1 + (u_2 + p_2v_2)G_2}{G} = \frac{u_1G_1 + h_2G_2}{G}.$$

$$T = \frac{T_1G_1 + kT_2G_2}{G_1 + G_2},$$

$$p = \frac{(G_1 + G_2)RT}{V}.$$



$$S = S_1 + S_2 + \dots + S_n$$

$$s = g_1 s_1 + g_2 s_2 + \dots + g_n s_n,$$

$$s - (g_1 s_1 + g_2 s_2 + \dots + g_n s_n) > 0.$$