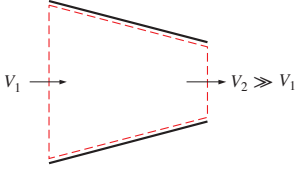
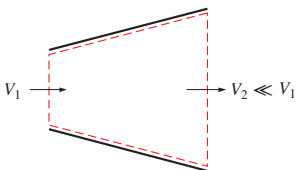
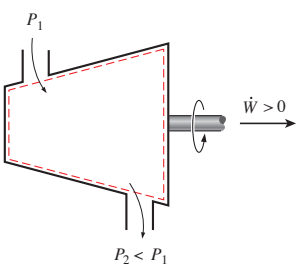
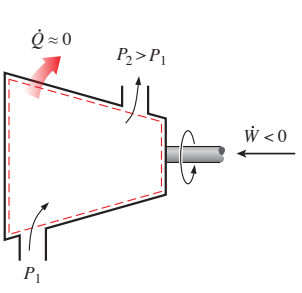
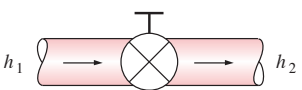
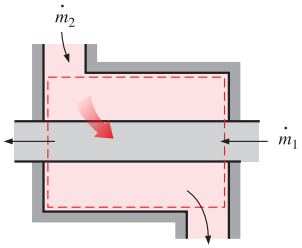
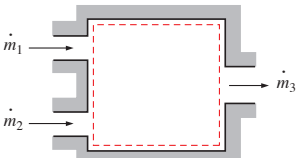


DISPOSITIVO	ESQUEMA	BALANÇO DE ENERGIA E MASSA	TRABALHO E RENDIMENTO ISENTRÓPICO						
BOCAL (CONVERGENTE)		Caso Geral $\dot{W} = 0$ $\Delta e_p \approx 0$ $\dot{Q} = \dot{m} \left(h_2 - h_1 + \frac{V_2^2 - V_1^2}{2} \right)$	Rendimento ISENTRÓPICO de um BOCAL $\eta_N = \frac{V_{2r}^2}{V_{2s}^2} \approx \frac{h_1 - h_{2r}}{h_1 - h_{2s}}$						
DIFUSOR (DIVERGENTE)		Funcionamento ADIABÁTICO $\dot{Q} \approx 0$ $h_2 - h_1 + \frac{V_2^2 - V_1^2}{2} = 0$							
TURBINA		Caso Geral $\Delta e_c \approx 0$ $\Delta e_p \approx 0$ $\dot{Q} - \dot{W} = \dot{m}(h_2 - h_1)$ $q - w = h_2 - h_1$	Trabalho ISENTRÓPICO de compressão de um gás ideal $w_{\text{comp},s} = \frac{kR(T_1 - T_2)}{k - 1}$ $= \frac{kRT_1}{k - 1} \left[\left(\frac{P_2}{P_1} \right)^{\frac{k-1}{k}} - 1 \right]$ Trabalho ISOTÉRMICO de compressão de um gás ideal $w_{\text{comp},T} = RT \ln \left(\frac{P_2}{P_1} \right)$						
COMPRESSOR / VENTILADOR (GASES) BOMBA (LÍQUIDOS)		Funcionamento ADIABÁTICO $\dot{Q} \approx 0$ $\dot{W} = \dot{m}(h_1 - h_2)$ Líquidos (bomba) $\dot{W} \approx \dot{m}v(P_1 - P_2)$		Rendimentos ISENTRÓPICOS <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>$\eta_T = \frac{w_r}{w_s} \approx \frac{h_1 - h_{2r}}{h_1 - h_{2s}}$</td> <td>TURBINA</td> </tr> <tr> <td>$\eta_C = \frac{w_s}{w_r} \approx \frac{h_{2s} - h_1}{h_{2r} - h_1}$</td> <td>COMPRESSOR</td> </tr> <tr> <td>$\eta_B = \frac{w_s}{w_r} \approx \frac{v(P_2 - P_1)}{h_{2r} - h_1}$</td> <td>BOMBA</td> </tr> </table>	$\eta_T = \frac{w_r}{w_s} \approx \frac{h_1 - h_{2r}}{h_1 - h_{2s}}$	TURBINA	$\eta_C = \frac{w_s}{w_r} \approx \frac{h_{2s} - h_1}{h_{2r} - h_1}$	COMPRESSOR	$\eta_B = \frac{w_s}{w_r} \approx \frac{v(P_2 - P_1)}{h_{2r} - h_1}$
$\eta_T = \frac{w_r}{w_s} \approx \frac{h_1 - h_{2r}}{h_1 - h_{2s}}$	TURBINA								
$\eta_C = \frac{w_s}{w_r} \approx \frac{h_{2s} - h_1}{h_{2r} - h_1}$	COMPRESSOR								
$\eta_B = \frac{w_s}{w_r} \approx \frac{v(P_2 - P_1)}{h_{2r} - h_1}$	BOMBA								
VÁLVULA		$h_1 \approx h_2$ $u_1 + P_1 v_1 \approx u_2 + P_2 v_2$							
PERMUTADOR DE CALOR		$\frac{\dot{m}_1(h_{1s} - h_{1e})}{\dot{Q}_1} + \frac{\dot{m}_2(h_{2s} - h_{2e})}{\dot{Q}_2} \approx 0$ $\dot{Q}_1 = -\dot{Q}_2$		Funcionamento aproximadamente ISOBÁRICO					
MISTURADOR		$\dot{m}_1 + \dot{m}_2 = \dot{m}_3$ $\dot{m}_1 h_1 + \dot{m}_2 h_2 \approx \dot{m}_3 h_3$							